

NX-3000 series

Function Reference (FUNC)

Version:	4.30
Last Updated:	October 30, 2025
Language:	English
Type:	K, E

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About This Manual

This In-depth manual describes the functions of the transceiver (NX-3200/ NX-3300/ NX-3220/ NX-3320/ NX-3400/ NX-3420/ NX-3720/ NX-3720G/ NX-3720H/ NX-3720HG/ NX-3820/ NX-3820G/ NX-3820H/ NX-3820HG/ NX-3920G/ NX-3921G) used in common in each of an analog, NXDN, or DMR communication system.

This document is created for the product having the following design specifications.

Item	Specifications	How to Verify
Market Code	K, E	Printed or labeled on the packaging and the model name plate on the transceiver.
Firmware Version of the Transceiver	4.30.00	Can be viewed in the Transceiver Information dialog box of KPG-D3/ KPG-D3N. Or, firmware version of the transceiver can be viewed by the following ways: Portable transceiver: Turning the transceiver ON while pressing and holding the Side 1 button causes the firmware version to appear on the display. Mobile transceiver: Turning the transceiver ON while pressing and holding the [+] button causes the firmware version to appear on the display.
Version of KPG-D3/ KPG-D3N	V 4.30	Can be viewed in the About dialog box of KPG-D3/ KPG-D3N.

K: Designed for the North American markets.

E: Designed for the European markets.

Also, the following Radio Feature License is required to use the functions described in this manual:

Function Name	Radio Feature License
1000 CHANNEL	KWD-3000CH
FRONT PANEL PROGRAMMING *2	KWD-3001FP
BLUETOOTH DATA	KWD-3002BT
INDOOR LOCATION LICENSE	KWD-3020-IL
NXDN CONVENTIONAL	KWD-3200CV
NXDN TYPE-C TRUNKING	KWD-3201TR
DMR CONVENTIONAL	KWD-3300CV
DMR CONVENTIONAL *1	KWD-3301CV
DMR TIER III TRUNKING	KWD-3302TR
DIGITAL CONVENTIONAL OPTION	KWD-3500CV
DIGITAL TRUNKING OPTION *1 *3	KWD-3501TR
ENHANCED ENCRYPTION	KWD-3502EE
AES/DES ADVANCED ENCRYPTION	KWD-3503AE
REMOTE CONTROL *2	KWD-3504RC
DES ENCRYPTION	KWD-3505DE

*1 Also includes S-Trunking (The support for S-Trunking ended in March 2022.)

*2 Not available for Portable (Basic Model)

*3 Also includes Trunking 2.5

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About Notations

The following notations are used in this manual.

[]

The characters in [] indicate the name of the operating portion of the transceiver and the key of the PC.

“ ” (Double Quotation Mark)

The characters in “ ” indicate the name of the options, buttons, and menus shown on KPG-D3/ KPG-D3N or the display of the transceiver.

Bold Letters

The characters in bold letters indicate the name of the windows, tabs, checkboxes in KPG-D3/ KPG-D3N and functions assigned to keys on the transceiver.

[] + []

This notation is used for describing functions activated by pressing 2 keys on the PC keyboard at the same time. For example, the notation to enter a capitalized A on the PC is **[Shift] + [a]** for pressing the **[a]** key while pressing the **[Shift]** key.

PF (Programmable Function) button

This function is used for describing the button that is assigned with any function. When the Reset function is assigned to the **[A]** button, the **[A]** button is described as the “**Reset** button”.

Notations for FPU names

KPG-D3 and KPG-D3N are referred to collectively as “KPG-D3/ D3N” in this document.

About the Supported Models and the Notations

This manual describes the supported models according to the following rules:

The following are the supported models of this manual:

Model Name	Frequency	Keypad	LCD	Built-in Device Activation
NX-3200 (K)	136 MHz to 174 MHz	Basic (without a keypad)	Not available	Available
NX-3200 (K2)	136 MHz to 174 MHz	Standard Key	Available	Available
NX-3200 (K3)	136 MHz to 174 MHz	Full Key	Available	Available
NX-3300 (K)	400 MHz to 520 MHz	Basic (without a keypad)	Not available	Available
NX-3300 (K2)	400 MHz to 520 MHz	Standard Key	Available	Available
NX-3300 (K3)	400 MHz to 520 MHz	Full Key	Available	Available
NX-3400 (K3)	RX: 851 MHz to 870 MHz 935 MHz to 941 MHz TX: 806 MHz to 825 MHz 851 MHz to 870 MHz 896 MHz to 902 MHz 935 MHz to 941 MHz	Full Key	Available	Available
NX-3220 (K)	136 MHz to 174 MHz	Basic (without a keypad)	Not available	Available
NX-3220 (K2)	136 MHz to 174 MHz	Standard Key	Available	Available
NX-3220 (K3)	136 MHz to 174 MHz	Full Key	Available	Available
NX-3320 (K)	400 MHz to 520 MHz	Basic (without a keypad)	Not available	Available
NX-3320 (K2)	400 MHz to 520 MHz	Standard Key	Available	Available
NX-3320 (K3)	400 MHz to 520 MHz	Full Key	Available	Available
NX-3420 (K3)	RX: 851 MHz to 870 MHz 935 MHz to 941 MHz TX: 806 MHz to 825 MHz 851 MHz to 870 MHz 896 MHz to 902 MHz 935 MHz to 941 MHz	Full Key	Available	Available
NX-3720H ^{*1} (K)	136 MHz to 174 MHz	-	Available	Not available
NX-3720HG ^{*1} (K)	136 MHz to 174 MHz	-	Available	Available
NX-3820H ^{*1} (K)	450 MHz to 520 MHz	-	Available	Not available
NX-3820H ^{*1} (K2)	400 MHz to 470 MHz	-	Available	Not available
NX-3820HG ^{*1} (K)	450 MHz to 520 MHz	-	Available	Available
NX-3820HG ^{*1} (K2)	400 MHz to 470 MHz	-	Available	Available
NX-3920G (K)	RX: 851 MHz to 870 MHz TX: 806 MHz to 825 MHz 851 MHz to 870 MHz	-	Available	Available
NX-3921G (K)	RX: 935 MHz to 941 MHz TX: 896 MHz to 902 MHz 935 MHz to 941 MHz	-	Available	Available

Model Name	Frequency	Keypad	LCD	Built-in Device Activation
NX-3200 (E)	136 MHz to 174 MHz	Full Key	Available	Available
NX-3200 (E2)	136 MHz to 174 MHz	Standard Key	Available	Available
NX-3200 (E3)	136 MHz to 174 MHz	Basic (without a keypad)	Not available	Available
NX-3300 (E)	400 MHz to 520 MHz	Full Key	Available	Available
NX-3300 (E2)	400 MHz to 520 MHz	Standard Key	Available	Available
NX-3300 (E3)	400 MHz to 520 MHz	Basic (without a keypad)	Not available	Available
NX-3220 (E)	136 MHz to 174 MHz	Full Key	Available	Available
NX-3220 (E2)	136 MHz to 174 MHz	Standard Key	Available	Available
NX-3220 (E3)	136 MHz to 174 MHz	Basic (without a keypad)	Not available	Available
NX-3320 (E)	400 MHz to 520 MHz	Full Key	Available	Available
NX-3320 (E2)	400 MHz to 520 MHz	Standard Key	Available	Available
NX-3320 (E3)	400 MHz to 520 MHz	Basic (without a keypad)	Not available	Available
NX-3720 (E)	136 MHz to 174 MHz	-	Available	Not available
NX-3720G (E)	136 MHz to 174 MHz	-	Available	Available
NX-3820 (E)	400 MHz to 470 MHz	-	Available	Not available
NX-3820G (E)	400 MHz to 470 MHz	-	Available	Available

*1 High Power Model

This manual describes the supported models according to the following rules:

Model Name	Notation			
NX-3200/ NX-3220	VHF	Basic Model	Portable	
		Standard Key Model		
		Full Key Model		
NX-3300/ NX-3320	UHF	Basic Model		
		Standard Key Model		
		Full Key Model		
NX-3400/ NX-3420 *1	800 MHz/ 900 MHz	Full Key Model		
NX-3720	VHF	Mobile		
NX-3720G				
NX-3720H				
NX-3720HG				
NX-3820	UHF			
NX-3820G				
NX-3820H				
NX-3820HG				
NX-3920G *1	800 MHz			
NX-3921G *1	900 MHz			

*1 NX-3400/ NX-3420/ NX-3920/ NX-3921 is not supported in a Trunking 2.5 system.

About Examples of the Transceiver Display

This manual describes mainly by using the display examples of Portable display if the functions are common to the transceivers. The display examples of Mobile display are also described as needed.

Abbreviations Used in This Document

The following abbreviations are used in this in-depth manual. Refer to the abbreviation table below.

Abbreviation	Full Spelling or Meaning
ACK	Acknowledgment
ANR	Active Noise Reduction
AES	Advanced Encryption Standard
AMBE+2	Advanced Multi-Band Excitation
ARC4	Alleged RC4
AUX	Auxiliary
CAI	Common Air Interface
CH	Channel
COM port	Communication port
COR	Carrier-operated Relay
CW	Continuous Wave
DES	Digital Encryption Standard
DFA	Direct Frequency Assignment
DMR	Digital Mobile Radio
DQT	Digital Quiet Talk
DTC	Data Transmission Control
DTMF	Dual Tone Multi-Frequency
ESN	Electronic Serial Number
ETX	The end of Text
FCC	Federal Communications Commission
FPU	Field Programming Unit
GPS	Global Positioning System
HSP	Headset Profile
ID	Identification
LOK	Link OK (connected to the repeater)
MI2	Microphone Input II
Mic	Microphone
OST	Operator Selectable Tone
PA	Public Address
PABX	Private Automatic Branch Exchange
PF	Programmable Function
PSTN	Public Switched Telephone Networks
PTT	Push-to-Talk
QT	Quiet Talk
RAN	Radio Access Number
RSSI	Received Signal Strength Indication
RTC	Real Time Clock
RX	Receive
STX	Start of Text
TOR	Tone Operated Relay
TOT	Time-out Timer
TX	Transmit
Vocoder	Voice Encoder/ Decoder
VOX	Voice-operated Transmit

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About the Programming Software

Various functions and parameters of the transceiver can be configured by using the KPG-D3/ D3N software. Various functions can be enabled by connecting the transceiver to a PC by use of the KPG-36U/ KPG-36X, KPG-22U (Portable) or KPG-46U/ KPG-46X (Mobile) programming cable and writing the data configured using KPG-D3/ D3N to the transceiver. In this manual, a corresponding reference in the help texts of KPG-D3/ D3N is described for each function. Therefore, you can configure the function by referring to the function also appearing in the help texts of KPG-D3/ D3N.

About KPG-D3N

KPG-D3N is the programming software to configure functions for the transceiver to be used in the U.S.A.

KPG-D3N is compliant with the FCC Part 90 standard so that the specification does not allow to configure “25.0 [kHz]” for **Channel Spacing** with a VHF or UHF (except 300 MHz) transceiver in the frequency band regulated by the FCC Part 90. Except for the function above, specifications of KPG-D3 and KPG-D3N are the same.

About the Notation of “Configuration Using KPG-D3/ D3N”

In this manual, for the description of each function written as “Configuration using KPG-D3/ D3N”, a corresponding reference in the help texts of KPG-D3/ D3N is described. Therefore, you can configure the function by referring to the function also appearing in the help texts of KPG-D3/ D3N.

However, for the configuration items related to Analog Voting, configuration is possible only with the KPG-D3 E-license which targets the European markets.

About System/ Personality

For KPG-D3/ D3N, the System/ Personality method is adopted as the configuration method for the zone information.

By using the System/ Personality method, the channels using the different communication systems can exist in one zone because the communication system to be used can be selected for each channel.

In addition, only the configuration item of the Individually format is described in some “Configuration using KPG-D3/ D3N” parts.

If only the configuration item of the Individually format is described, the configuration can also be done by the Table format by replacing the Individually format configuration target (Radio Configuration > System Properties > Systems > (Protocol) > Personalities > Individually ...) with the Table format configuration target (Radio Configuration > System Properties > Systems > (Protocol) > Personalities > Table > Personality Table ...).

Example: Configuring **Alert Tone/ Alert LED Color** (NXDN Function Part)

For the Individually format:

Radio Configuration > System Properties > Systems > NXDN Trunking > Personalities > General

For the Table format:

Radio Configuration > System Properties > Systems > NXDN Trunking > Personalities > Table > Personality Table > General

Configuration items:

- Configuring **Alert Tone/ Alert LED Color** (NXDN Function Part)
- Configuring **Color Code** (DMR Function Part)
- Configuring **Alert LED Color** (DMR Function Part)
- Configuring **Group ID Scan** to be enabled or disabled (DMR Function Part)
- Configuring **Auto Scan** in DMR Conventional to be enabled or disabled (DMR Function Part)
- Configuring **Auto Scan** in DMR-based Trunking to be enabled or disabled (DMR Function Part)
- Configuring **Busy Channel Lockout** (Analog Function Part)
- Configuring **Call Indicator (Group ID)** (Analog Function Part)
- Configuring **PTT ID Mute** to be enabled or disabled (Analog Function Part)
- Configuring **PTT ID Pause** to be enabled or disabled (Analog Function Part)
- Configuring the Scan List Number (Analog Function Part)

Refer to the help texts of KPG-D3/ D3N for the method for configuring the zone information.

About the Configuration of the Communication Protocol

For KPG-D3/ D3N, a **Protocol** (Analog Conventional, LTR Trunking, NXDN Conventional, NXDN Site Roaming/ NXDN Site Roaming with RAN, DMR Conventional, DMR Site Roaming, NXDN Trunking, or DMR-based Trunking) needs to be selected in **System List** of KPG-D3/ D3N in order to configure the system data or Zone-channel data of each communication system.

In this manual, for the description of each function written as “Configuration using KPG-D3/ D3N”, a corresponding reference in the help texts of KPG-D3/ D3N is described as follows:

Configuring **Unit ID** ( See Radio Configuration > System Properties > Systems > NXDN Conventional > General > MDC-1200 > ID (Own) > NXDN)

In this case, if “NXDN Conventional” is selected in **Protocol** of **System List**, **Unit ID** can be configured in an NXDN Conventional system.

Refer to the help texts of KPG-D3/ D3N for the method for configuring **Protocol** using KPG-D3/ D3N.

About Options to Use the Functions Described in This Document

To use the functions described in this document, the following KENWOOD optional accessories need to be prepared on your own as necessary.

Model	Optional Accessories
Portable (NX-3200/ NX-3300/ NX-3400)	• KMC-25 (Speaker Microphone) • KMC-25S (Speaker Microphone) • KMC-41 (Speaker Microphone) • KMC-41D (Speaker Microphone) • KMC-42W (Speaker Microphone) • KMC-42WD (Speaker Microphone) • KMC-46EX (Speaker Microphone) • KMC-51D (Speaker Microphone) • KMC-52 (Speaker Microphone) • KMC-52D (Speaker Microphone) • KMC-54WD (Speaker Microphone) • KMC-70 (Speaker Microphone) • KMC-72 (Speaker Microphone) • KPG-36U/ KPG-36X (USB Programming Cable/ True USB Programming Cable) • KHS-11BE (2-wire Palm Microphone with Earphone (Beige)) • KHS-11BL (2-wire Palm Microphone with Earphone (Black)) • KHS-12BE (3-wire Palm Microphone with Earphone (Beige)) • KHS-12BL (3-wire Palm Microphone with Earphone (Black)) • KHS-14 (Lightweight Single Muff Headset) • KHS-15-BH (Heavy Duty Behind-the-Head Headset with Noise Canceling Boom Mic) • KHS-15-OH (Heavy Duty Over-the-Head Headset with Noise Canceling Boom Mic)
Portable (NX-3220/ NX-3320/ NX-3420)	• EMC-11 (Clip Microphone with Earphone) • EMC-12 (Clip Microphone with Earphone) • KHS-1 (Headset with PTT/VOX) • KHS-21 (Headset) • KHS-29F (Headset) • KHS-35F (Headset) • KMC-21 (Compact Speaker Microphone) • KMC-21S (Compact Speaker Microphone) • KMC-45 (Speaker Microphone) • KMC-48GPS (GPS Speaker Microphone) • KMC-45D (Speaker Microphone) • KPG-22U (USB Programming Interface Cable)

Model	Optional Accessories
Mobile	• KCT-73MIC (Hands-free Microphone Kit) • KCT-74PTT (Hands-free PTT Kit) • KCT-72 (Connection Cable) • KCT-71 (Remote Control Cable) • KMC-27A (Noise Canceling Microphone) • KMC-27B (Standard Microphone) • KMC-28A (Noise Canceling Microphone with DTMF) • KMC-30 (Standard Microphone) • KMC-32 (Microphone with 16-Keypad) • KMC-35 (Microphone) • KMC-36 (Microphone with DTMF) • KMC-9C (Desktop Microphone) • KMC-53 (Desktop Microphone) • KMC-60 (Microphone) • KMC-62 (Microphone with 16-Keypad) • KMC-65 (Microphone) • KMC-66 (Microphone with 12-Keypad) • KES-3 (External Speaker) • KES-5 (External Speaker) • KES-5A (External Speaker) • KCT-18 (Ignition Sense Cable) • KCT-23 (DC Cable) • KCT-60 (Connection Cable) • KRA-40G (GPS Antenna) • KPG-46U/ KPG-46X (USB Programming Cable/ True USB Programming Cable)

About the Built-in GPS Receiver Unit

The GPS receiver unit is built-in for Portable and NX-3720G/ NX-3720HG/ NX-3820G/ NX-3820HG/ NX-3920G/ NX-3921G. Read the following warnings before using the built-in GPS receiver unit of Portable and NX-3720G/ NX-3720HG/ NX-3820G/ NX-3820HG/ NX-3920G/ NX-3921G.

● On the use of the GPS

- With frequency interference in the GPS receive frequency range to the transceiver or another transceiver, the GPS receiver may not position normally.
1. If the GPS receiver positions during transmission:
 - The GPS receiver may be unable to position if the transmit spurious emission of the transceiver interferes within the GPS receive frequency range.
 - The interference to the GPS receiver changes depending on the transmission power of the transceiver. Greater transmission power results in the higher possibility of being unable to position.
 2. If the GPS receiver positions during reception:
 - The GPS receiver may be unable to position if the harmonics of the oscillator equipped in the transceiver interfere within the GPS receive frequency range.
 3. Effects of other interfering frequencies (such as if other transceivers transmit):
 - Even with transmit and receive frequencies other than the above, the GPS receiver may be unable to position if frequencies emitted from other transceivers and electronic equipment interfere within the GPS receive frequency range.
- As the built-in GPS receiver unit consumes more power when powered on compared to when powered off, the battery life of the transceiver becomes shorter compared to when the built-in GPS receiver unit is powered off.
 - If the clock in the transceiver is not configured, a cold start always occurs. Therefore, the time until the start of positioning is longer. (Refer to [Adjusting the Time.](#))

How to Search for Information

For your convenience of reading through this document using Adobe Acrobat or Adobe Reader, a link to a corresponding item is pasted in the Contents page, Index page, the lower part of each page and in the context. Clicking the portion where a link is pasted enables a jump to the corresponding page.

Placing a pointer over the portion where a link is pasted changes the shape of the pointer to a hand (☞).

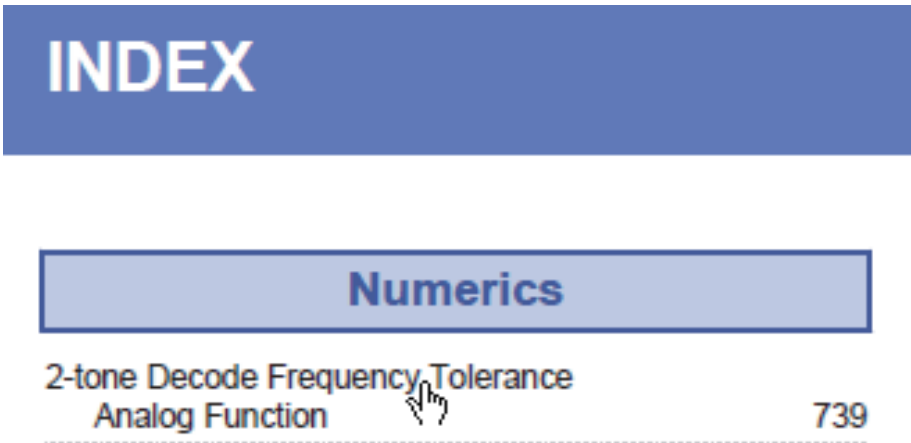
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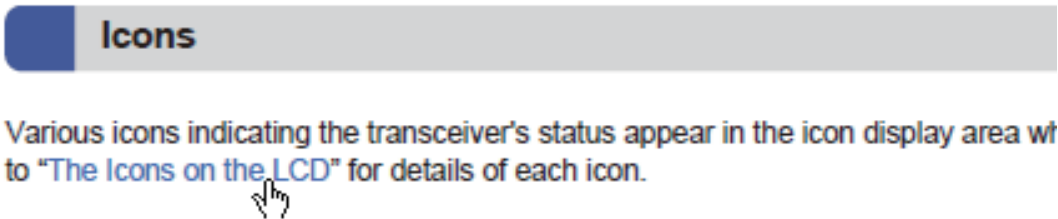
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Clicking a function name, a title or a page number in the Index pages allows a jump to the corresponding page.



Blue Characters in the Main Text

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Open the Reference

In this manual, a reference is written as "NXDN Function Part SCAN". Clicking the link opens the corresponding page.

Outline of This Transceiver

NX-3200/ NX-3300/ NX-3220/ NX-3320/ NX-3400/ NX-3420/ NX-3720/ NX-3720G/ NX-3720H/ NX-3720HG/ NX-3820/ NX-3820G/ NX-3820H/ NX-3820HG/ NX-3920G/ NX-3921G is the VHF/ UHF transceiver or 800 MHz/ 900 MHz transceiver for the use of professionals. The transceiver is equipped with the digital communications system (conventional and trunking) which complies with the NXDN and DMR common air interface specifications, as well as the existing analog FM mode.

GENERAL FEATURES

Portable

- 128 Zones, 250 Channels per zone *¹
- 4 Zones, 16 Channels per zone (Basic Model) *¹

Models

- VHF Models
Low: 1 W, High: 5 W
- UHF Models
Low: 1 W, High: 5 W
- 800 MHz/ 900 MHz Models
Low: 1 W, High: 3 W

Display Functions

- 7 Color LED/ Light Bar
- Function/ Status LCD Icons
- Transmit/ Busy/ Call Alert/ Warn LED

Specifications

- Emergency/ AUX Button
- On/ Off Volume Knob
- 16-Position Mechanical Selector
- 4 Front PF Buttons & Cross Button (Full/ Standard key model)
- 12-Key Keypad (Full key model)
- 2 Side PF Buttons
- Audio Power more than 1 W@8 Ω
- PC Serial Interface
- Built-in GPS Receiver
- Built-in Bluetooth
- Motion Sensor

Others

- Date & 12/ 24 Hour Time Clock

Mobile

- 128 Zones, 250 Channels per zone *¹

Models

- VHF Models
Low: 5 W, High: 50 W (K type), 25 W (E type)
- UHF Models
Low: 5 W, High: 45 W (K type), 25 W (E type)
- 800 MHz/ 900 MHz Models
Low: 5 W, High: 15 W

Display Functions

- 7 Color LED
- Function/ Status LCD Icons
- Transmit/ Busy/ Call Alert/ Warn LED

Specifications

- Emergency/ AUX Button
- 4 Up/ Down Selectors & 6 Front PF Buttons
- Front Panel Speaker, 4 W Speaker Audio
- PC Serial Interface
- DB 15 Accessory Interface
- 9 Programmable AUX I/Os
- 2 Programmable AUX Outputs
- Microphone
- Built-in GPS Receiver (NX-3720G/ NX-3720HG/ NX-3820G/ NX-3820HG/ NX-3920G/ NX-3921G)
- Built-in Bluetooth (NX-3720G/ NX-3720HG/ NX-3820G/ NX-3820HG/ NX-3920G/ NX-3921G)

Others

- Date & 12/ 24 Hour Time Clock
- Timed Power-off
- Ignition Sense
- Public Address/ Horn Alert Output

NXDN DIGITAL MODES

GENERAL

- NXDN Digital Air Interface
- AMBE+2 VOCODER
- 6.25 kHz (Very Narrow)/ 12.5 kHz (Narrow) Channel Spacing
- Over-the-Air Alias
- Paging Call
- Emergency Call
- All Group Call
- Status Message ^{*3}
- Remote Stun/ Kill ^{*2}
- Remote Monitor ^{*2}
- Short & Long Messages ^{*3}
- AUX Input Status Message (Mobile Only) ^{*4}
- AUX Output Status Message (Mobile Only) ^{*5}
- Ignition On/ Off GPS Reporting (Mobile Only)
- Data with Voice
- Single Scan, List Scan
- NXDN Scrambler Included
- AES & DES Encryption Option
- AES/ DES Key Loader Option

CONVENTIONAL MODE

- 63 Radio Access Numbers (RAN)
- Individual Call & Group Call
- Mixed FM/ Digital Operation
- Site Roaming
- 2-tone
- Multi-Zone Scan

TRUNKING MODE

- Individual Call
- Group Call & Broadcast Call
- Telephone Call
- Transmission Trunked Mode ^{*6}
- Message Trunked Mode ^{*6}
- 4 Priority Monitor IDs ^{*6}
- Remote Group Add ^{*2}
- Failsoft Mode
- 2-tone

DMR MODES

GENERAL

- DMR Digital Air Interface
- AMBE+2 VOCODER
- 12.5 kHz Channel Spacing
- Over-the-Air Alias
- Color Code
- Individual Call
- Group Call & Broadcast Call
- Emergency Call
- All Group Call
- Status Message ^{*3}
- Remote Stun/ Kill ^{*2}
- Remote Monitor ^{*2}
- Short Messages ^{*3}
- AUX Input Status Message (Mobile Only) ^{*4}
- AUX Output Status Message (Mobile Only) ^{*5}
- Call Interruption
- Remote Control
- Ignition On/ Off GPS Reporting (Mobile Only)
- Single Scan
- Bit Scramble Encryption
- AES & DES Encryption Option
- ARC4 Encryption Option (not available for Trunking 2.5, S-Trunking)

CONVENTIONAL MODE

- Paging Call
- Site Roaming
- Unaddressed Call
- Open Voice Channel Mode (OVCM)
- Multi-Zone Scan
- List Scan

TRUNKING MODE

- Telephone Call
- Dialing Mode
- Alternate Zone-Channel (not available for Trunking 2.5, S-Trunking)
- Vote Now ^{*8} (not available for S-Trunking)
- 4 Priority Monitor IDs (not available for S-Trunking)
- Network Failure Indicator

ANALOG MODES

GENERAL

- 12.5 kHz (Narrow)/ 20.0 kHz (Wide 4k)/ 25.0 kHz (Wide) Channel Spacing ^{*7}
- Conventional & LTR Systems
- FleetSync/ FleetSync II, MDC-1200, DTMF
- QT/ DQT/ 2-tone
- Single Scan, List Scan
- Priority Scan
- Multi-Zone Scan
- Voice Inversion Scrambler (16 Codes)

FleetSync

- PTT ID/ Caller ID
- Selective/ Group Call
- Status Message ^{*3}
- Emergency, Short & Long Messages ^{*3}
- AUX Input Status Message (Mobile Only) ^{*4}
- AUX Output Status Message (Mobile Only) ^{*5}
- Ignition On/ Off GPS Reporting (Mobile Only)

MDC-1200

- PTT ID/ Caller ID
- Selective/ Group Call
- Radio Check, Radio Inhibit/ Uninhibit
- AUX Output ID (Mobile Only) ^{*5}

5-tone

- Selective/ Group Call
- Status Message
- Emergency Call

^{*1} The maximum number of channels that can be configured for a transceiver in total is 260 for NX-3220/ NX-3320/ NX-3420 (Full Key Model/ Standard Key Model), 64 for Portable (Basic Model), and 512 for NX-3200/ NX-3300/ NX-3400 (Full Key Model/ Standard Key Model)/ Mobile. With the Radio Feature License (KWD-3000CH) enabled, the maximum number of configurable channels can be extended to 1,000. The number of channels that can be configured for 1 zone is also extended from 250 to 512.

^{*2} The supported PC software and external devices need to be separately prepared for the transmitting transceiver.

^{*3} To send messages or data with serial communications, the supported PC software and external devices need to be separately prepared for the transmitting transceiver. In addition, to send the received messages or data to external devices, the supported PC software and external devices need to be separately prepared for the receiving transceiver.

^{*4} A sensor to detect the change of port status needs to be attached to the AUX Input port for the transmitting transceiver.

^{*5} To remotely control external devices according to the change of port status, the external devices need to be connected to the AUX Output port for the receiving transceiver.

^{*6} These trunking functions rely on the programming and operation of the system. Priority Monitor also requires NX subscriber settings.

^{*7} For KPG-D3N, "25.0" cannot be configured for Channel Spacing [kHz] if a receive frequency or a transmit frequency is configured in the following ranges:

VHF: above 149.98750 MHz and less than 174.01250 MHz

UHF: above 420.98750 MHz and less than 470.01250 MHz

^{*8} These trunking functions rely on the programming and operation of the system.

Revision History

Date	Description
2017.9.29	1) Changed the version information in "About This Manual". 2) Added NX-3200/ NX-3300 as a supported model. Common Function Part 3) Added the "14-pin universal connector (NX-3200/ NX-3300)" and "External Microphone (NX-3200/ NX-3300) (KMC-41)" in "2.1 NX-3200/ NX-3300/ NX-3220/ NX-3320". 4) Added the description on Display Type in "Portable" of "2.3 About LCD" > "LCD". Added the display example of "Simple Type" configured in Display Type. 5) Added "Portable (NX-3200/ NX-3300)" to "3.1 Connecting the Transceiver to a PC". 6) Added "Vibrator Mode" to Table 4-3. 7) Added the Vibrator icon to Table 6-3. 8) Added "Display Type" in "6.9 Display Functions of the Display". 9) Added the following tones to Table 7-1 and Table 7-3: In-service Tone Playback End Tone 10) Revised the description on "Out of Range Tone" in Table 7-3. 11) Added the supported microphone and speaker to Table 7-13 and Table 7-14. 12) Added "●Playing back the latest audio data" to "10.2 Playing Back the Recorded Audio (Playback)". 13) Added "12.1 Universal Connector". 14) Revised the notes in "14.2 Password When Reading Configuration Data in a PC (Password (Read))". 15) Revised the notes in "14.3 Password for Writing Configuration Data (Password (Write))". 16) Added the information of NX-3200/ NX-3300 to "17 USING VOX". 17) Added "18 READING THE LOG INFORMATION OF THE TRANSCEIVER (FIELD SUPPORT)". 18) Added the following functions to Table 19-1: AUX (NX-3200/ NX-3300 only) Playback (Last Recording) Save Log Data Vibrator (NX-3200/ NX-3300 only) 19) Added "Playback (Last Recording)" to Table 19-2. 20) Added the following functions to Table 19-3: AUX (NX-3200/ NX-3300 only) Display Type (Portable (Full Key Model/ Standard Key Model) only) Save Log Data Vibrator 21) Added the information of NX-3200/ NX-3300 to "19.4 Available Functions for COM Port". 22) Added "Playback End Tone" to "●Control Tone" of "21 LIST OF BEEPS IN EACH MODE". NXDN Function Part 23) Changed "Out of Range Indicator/ Out of Range Tone" to "Out of Range Indicator". Added "Out of Range Tone" and "In-service Tone". 24) Added "In-service Tone" to "●Control Tone" of "9 LIST OF BEEPS IN EACH MODE". DMR Function Part 25) Added the description on Emergency Status (DMR) in "Status ID" of "3.6 ID Sent When Emergency Mode is Activated". 26) Added "3.7 About the Display for Receiving an Emergency Call". 27) Changed the version number from 1.00 to 1.10.

Date	Description
2018.4.16	1) Changed the version information in “About This Manual”. Common Function Part 2) Changed “Function Mode Frame” to “Function Frame” in “2.3 About LCD”. 3) Added the note to “Home Channel”. 4) Added the note to “Direct Channel”. 5) Revised “The maximum number of data that can be stored” in Table 4-6. 6) Added the note related to Over-the-Air Alias to “Caller ID Stack”. 7) Added the note to “4.10 Switching the Display Language”. 8) Added the description on the use of KRK-19B and KRK-18H in “12.2 D-sub 15-pin Connector”. 9) Added the description in “External Hook”. 10) Added the description of the behavior for the DMR Conventional Channel to “For a Conventional Channel (Analog/ NXDN/ DMR) or an LTR Trunking system:” for “COR” in Table 12-8. 11) Added the information of KCT-72 to “Modulation Line” in Table 12-9. 12) Added “Control Head Mic Input” and “Auto Microphone 7 Select” to Table 12-9. 13) Added “12.3 Separating the Control Head and RF Deck” to “12 USING EXTERNAL PORTS”. NXDN Function Part 14) Revised “The maximum number of data that can be stored” in Table 2-15. 15) “Sending and Receiving a Short Message (Short Data Call (Extended))” to “2.10 Sending and Receiving a Short Message (Short Data Call)”. 16) Added the conditions of when the code is not reset to “Hook (Mobile only)” in Table 2-22 and Table 2-29. 17) Added the behavior description to “Quick Site Roaming”. 18) Added the behavior description to “Disabled” in Table 2-37. 19) Added the information on the DES dedicated encryption type (DES Encryption) in Table 5-1. 20) Added “5.3 DES Dedicated Encryption Type (DES Encryption)”. 21) Added the information on the DES dedicated encryption type (DES Encryption) in “5.6 Multi-key List”. 22) Added the behavior description to “Disabled” in Table 6-6. 23) Added “8 USING DIGITAL ENCODE/ DECODE FORMAT”. 24) Added “9 USING TASK REQUEST”. DMR Function Part 25) Added the following items to “2.1 Initiating Voice Communications (Basic Transmission and Reception)”: - Over-the-Air Alias - Auto Slot Select 26) Added the note related to Over-the-Air Alias to the following items: - Receiving an Individual Call - Individual ID List - Receiving an Individual Call (Individual Call Acknowledge Request) - Display When the Transceiver Receives a Group Call (Group Call Display Type) - Displaying the ID of the Communicating Caller on the LCD (Caller ID Display) 27) Added the note related to the GPS Combination function to the following items: - Power-on Status - Selecting the Transmission Method of GPS Data (GPS Report Channel) 28) Added the following items to “2.15 Sending GPS Data”: - Sending GPS Data Together With Status Call (GPS Combination) - Sending GPS Data Together With Emergency Call (GPS Combination) - Sending GPS Data during Voice Communications (GPS Report with Voice)

Date	Description
2018.4.16	29) Added the note to “GPS Report Interval Time”. 30) Added the behavior description to “Quick Site Roaming”. 31) Added the behavior description to “Disabled” in Table 2-31. 32) Added the information on the DES dedicated encryption type (DES Encryption), GPS Combination, and GPS Report with Voice in Table 4-1. 33) Added “4.3 DES Dedicated Encryption Type (DES Encryption)”. 34) Added the information on the DES dedicated encryption type (DES Encryption) in “4.7 Multi-key List”. 35) Added the behavior description to “Disabled” in Table 5-5. 36) Added “7 USING DIGITAL ENCODE/ DECODE FORMAT”. 37) Added “8 USING TASK REQUEST”. Analog Function Part 38) Added the conditions of when the code is not reset to “Hook (Mobile only)” in Table 2-12 and Table 5-8. 39) Added the note to “Registering a Channel in the Tactical Zone”. 40) Deleted the note related to the scan in “Migrating to the Tactical Zone”. 41) Added the behavior description to “Quick Vote”. 42) Added the behavior description to “Disabled” in Table 2-14. 43) Revised “The maximum number of data that can be stored” in Table 4-18. 44) Added the description of Tactical Zone Scan in “11.5 Scanning the Specific Channel Preferentially (Priority Scan)”. 45) Added “11.6 Scanning the Tactical Zone (Tactical Zone Scan)”. 46) Added the behavior description to “Disabled” in Table 11-5. 47) Changed the version number from 1.10 to 1.30.
2018.8.31	1) Changed the version information in “About This Manual”. Common Function Part 2) Added the description of “Bluetooth standard Version 4.0” to “11 BLUETOOTH COMMUNICATION”. 3) Added “11.9 About Bluetooth Low Energy (Heart Rate Service/ Automatic Injury Detection Service/ Battery Service/ Device Information Service)”. 4) Added “11.10 Notifying the Heart Rate from a Bluetooth-compatible Device to the Transceiver (Heart Rate Service)”. 5) Added “11.11 Notifying of Damage on a Bluetooth-compatible Device to the Transceiver (Automatic Injury Detection Service)”. 6) Added “11.12 Confirming the Remaining Battery Power of a Bluetooth-compatible Device (Battery Service)”. 7) Added “11.13 Confirming the Manufacturer Name, Model Number, Etc. of a Bluetooth-compatible Device (Device Information Service)”. 8) Revised “Transparent 2 (NXDN)” in Table 19-6 to “Transparent (Digital)”. NXDN Function Part 9) Added “Initiating Another Call While Receiving a Group Call” to “3.8 Making a Group Call (Transmission Trunked)”. 10) Added “Late Entry Cancel Time” to “3.8 Making a Group Call (Transmission Trunked)”. 11) Added “Auto Reset Timer” to “8 USING DIGITAL ENCODE/ DECODE FORMAT”. 12) Added “AUTR” to “8.1 Encode Format”. 13) Added “AUTR” to “8.2 Decode Format”. DMR Function Part 14) Added the description to the note of “Auto Slot Select” in “2.1 Initiating Voice Communications (Basic Transmission and Reception)”. 15) Added “2.12 Sending and Receiving a Long Message (Long Data Call)”. 16) Added the information on Heart Rate Service/ Automatic Injury Detection Service to “3.1 Placing the Transceiver in Emergency Mode”. 17) Added “6.3 Transparent”. 18) Added “Auto Reset Timer” to “7 USING DIGITAL ENCODE/ DECODE FORMAT”. 19) Added “AUTR” to “7.1 Encode Format”. 20) Added “AUTR” to “7.2 Decode Format”. Analog Function Part 21) Revised “Transparent 2 (NXDN)” of “Transparent” to “Transparent (Digital)”. 22) Changed the version number from 1.30 to 1.40.

Date	Description
2019.7.5	1) Changed the version information in “About This Manual”, and added “DMR TIER III TRUNKING”. 2) Added “NX-3400/ NX-3420” and “NX-3920G/ NX-3921G” to “About the Notation of the Supported Models”. 3) Added “PABX” and “PSTN” to “Abbreviations Used in This Document”. 4) Added “DMR-based Trunking” to the description in “About the Configuration of the Communication Protocol”. 5) Added the following to “About Options to Use the Functions Described in this Document”. Portable: KMC-70 (Speaker Microphone) KMC-72 (Speaker Microphone) Mobile: KMC-65 (Microphone) KMC-66 (Microphone with 12-Keypad) KES-5A (External Speaker) 6) Added “NX-3400/ NX-3420” and “NX-3920G/ NX-3921G” to the description in “About the Built-in GPS Receiver Unit”. 7) Added “NX-3400/ NX-3420” and “NX-3920G/ NX-3921G” to the description in “Outline of This Transceiver”. 8) Added “800 MHz/ 900 MHz Models” to “GENERAL FEATURES”. 9) Added “TRUNKING MODE” to “DMR MODES”. Common Function Part 10) Added the following to “2 PANEL LAYOUT”: NX-3400/ NX-3420 NX-3920G/ NX-3921G KMC-70/ KMC-72 11) Added “Previous” to Table 2-1. 12) Added “DMR Tier III Trunking system” to the supported system of “3.6 Writing Configuration Data Using Wireless Communication (OTAP)”. 13) Added “Dialing Mode” and “Redial Mode” to Table 4-3. 14) Added “Dialing (DMR)” to Table 4-4. 15) Added the description of a DMR-based Trunking system to “Group + Short Message” and “Group + Status” in Table 4-4. 16) Corrected the description in “4.7 Viewing the Receive History (Stack)”. 17) Added or corrected the note in “Caller ID Stack”. 18) Added or corrected the note in “Clear Caller ID Stack on Reply”. 19) Added “PF 3” to “Mic Keypad/Buttons” in Table 4-12. 20) Added the description of a DMR-based Trunking system to “5.1 Transmit/ Receive Frequencies”. 21) Added “NX-3400/ NX-3420” and “NX-3920G/ NX-3921G” to Table 5-1. 22) Added “NX-3400/ NX-3420” and “NX-3920G/ NX-3921G” to Table 5-2. 23) Added the description and the note of a DMR-based Trunking system to “5.2 Transmit Power”. 24) Added or corrected the note in Table 5-3. 25) Added the items of “DMR-based Trunking system” to “5.3 Channel Spacing”. 26) Added the items of “DMR-based Trunking system” to “5.4 Displaying the Signal Strength Level (RSSI Level, BER) (Maintenance Display)”. 27) Added or corrected the note in “5.4 Displaying the Signal Strength Level (RSSI Level, BER) (Maintenance Display)”. 28) Added the description of a DMR-based Trunking system to “6.1 Busy LED”. 29) Added “DMR-based Trunking” to Table 6-2. 30) Added the example and note of “Unit ID (Own) (NP-FIN-IN)/ DMR = 328-20-200” to “Power-on Text”. 31) Added or corrected the note in “Sub-LCD Display”. 32) Added “System Code” to Table 6-5. Also, added the description of DMR-based Trunking to “Site Number”.

Date	Description
2019.7.5	33) Added the following tones to “Warning Tone” in Table 7-1: Group Subscription Invalid Indicator Tone Trunking Tone Invalid Dialing Entry Tone 34) Added the description of a DMR-based Trunking system to the following tones in Table 7-3: Out of Range Tone In-service Tone Call Request Tone 35) Added the description of a DMR-based Trunking system to the following tones in Table 7-4: Call Invalid Tone No Reply Tone Call Fail Tone Call Deny Tone 36) Added the following tones to Table 7-4: Group Subscription Invalid Indicator Tone Trunking Tone Invalid Dialing Entry Tone 37) Added “DMR-based Trunking” to Table 7-10. 38) Added the description of a DMR-based Trunking system to “Using Sound to Notify the Timing to Start Communications (PTT Proceed Tone)”. Out of Range Tone 39) Added or corrected the note in “7.5 Using the Transceiver as a Megaphone (Public Address)”. 40) Added the following to Table 7-13: Speaker 1: KMC-70 Speaker 2: KMC-72, KES-5A 41) Added the following to Table 7-14: Microphone 1: KMC-65, KMC-66 Microphone 5: KMC-70, KMC-72 42) Added the items of a “DMR-based Trunking system” to “Reducing Battery Consumption (Battery Saver)”. 43) Added the description of a DMR-based Trunking system to Table 10-1. 44) Added the note to “Sending the GPS data using wireless communication” in “10.3 Storing the GPS Data (GPS Data Storage)”. 45) Added the description of a DMR-based Trunking system to Table 11-3. 46) Added or corrected the note in “Connecting by Headset Profile”. 47) Added or corrected the note in “Configuring the FPU”. 48) Added “Reconnecting by Bluetooth Low Energy” to “11.9 About Bluetooth Low Energy (Heart Rate Service/ Automatic Injury Detection Service/ Battery Service/ Device Information Service)”. 49) Added the description of a DMR-based Trunking system to “Automatic Status Transmission” and “Status Request Message Response”. 50) Added “DMR-based Trunking” to Table 12-2. 51) Added “External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice)” to Table 12-3. 52) Corrected the note in “External PTT (Voice)” in “Available Functions for AUX Input Ports”. 53) Corrected the description of “Data PTT” in “Available Functions for AUX Input Ports”. 54) Added “External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice)” to “Available Functions for AUX Input Ports”. 55) Added “DMR-based Trunking Zone-Channel” to Table 12-6.

Date	Description
2019.7.5	56) Added the description of a DMR-based Trunking system to the following in Table 12-8: LOK COR TOR 57) Added or corrected the description in “Dwell Time”. 58) Added or corrected the description in “Functions When Sending by Using the External PTT and Data PTT”. 59) Added or corrected the description of each item in Table 12-9. 60) Added the items of “DMR-based Trunking” to “Conditions to Activate the Horn Alert”. 61) Added “NX-3400” and “NX-3420” to “17 USING VOX”. 62) Added “Dialing” and “Redial” to Table 19-1. 63) Added “DMR-based Trunking” to the following in Table 19-1: Broadcast Call 1 to Call 6 Call Response Clear Group + Short Message Group + Status Individual Individual + Short Message Individual + Status 64) Added “Dialing” and “Redial” to Table 19-3. 65) Added “DMR-based Trunking” to “If 16 Zone/Channel Selector is disabled”. 66) Added the following tones to “Warning Tone” in “21 LIST OF BEEPS IN EACH MODE”: Group Subscription Invalid Indicator Tone Trunking Tone Invalid Dialing Entry Tone NXDN Function Part 67) Added the description of the behavior during receipt of a status in “Checking Whether Another Transceiver Is in Operation (Radio Check)”. 68) Added the description of the RSSI level to “E” in “Site Roaming Behaviors”. 69) Added “Transmission Operation during Receipt of a Group Call” to “3.8 Making a Group Call (Transmission Trunked)”. 70) Added the description of the behavior to “Late Entry Cancel Time”. DMR Function Part 71) Added the description of a DMR-based Trunking system to the note in “2.10 Sending and Receiving a Status Message (Status Call)”. 72) Added the description of a DMR-based Trunking system to “Sending a Status Message”. 73) Added or corrected the description in “About the Behavior When a Message Requesting the Status Transmission Is Received”. 74) Added the description of a DMR-based Trunking system to “Status” in Table 2-16. 75) Added the description of a DMR-based Trunking system to “Sending the Received Status Message from the Communication Port (Status Message (Serial Output))”. 76) Added the description and the note of the status to “Power-off Status”. 77) Added the description of a DMR-based Trunking system to Table 2-18. 78) Added the description of the status to “AUX Input Status Message”. 79) Added or corrected the description in “Storing the Selected or Sent Status (Status Hold)”. 80) Added the description of a DMR-based Trunking system to “2.11 Sending and Receiving a Short Message (Short Data Call)”.

Date	Description
2019.7.5	81) Added the description of a DMR-based Trunking system to “Sending a Short Message”. 82) Corrected the description in “Short Message Stack”. 83) Added the description of a DMR-based Trunking system to “Sending the Received Short Message from the Communication Port (Short Message (Serial Output))”. 84) Added the note to “2.12 Sending and Receiving a Long Message (Long Data Call)”. 85) Added or corrected the note in “2.14 Calling All Transceivers Having the Same Color Code (Unaddressed Call)”. 86) Added “Out of Range” for the conditions which cancel automatic transmission of GPS data in “Sending GPS Data Automatically at Certain Intervals (GPS Report Mode)”. 87) Added the note to “Sending GPS Data Based On Travel Distance (GPS Distance Change)”. 88) Added the description of each item in Table 2-31. 89) Added or corrected the description in “Checking Whether Another Transceiver Is in Operation (Radio Check)”. 90) Added “3 DMR-BASED TRUNKING SYSTEM”. 91) Added the description of a DMR-based Trunking system to “Emergency Alarm”. 92) Added the description of a DMR-based Trunking system to “4.2 Configuration Related to Transmission and Reception in Emergency Mode”. 93) Added the description of a DMR-based Trunking system to “Emergency Channel Type”. 94) Added the note to “Transmit Duration”. 95) Added the note to “Emergency ID Type”. 96) Added the description of a DMR-based Trunking system to “Emergency DMR ID”. 97) Added or corrected the description in “Status IDs”. 98) Added the note related to a DMR-based Trunking system to “5 USING COMMUNICATION SECURITY”. 99) Added the note related to an S-Trunking system to “5.4 Enhanced Encryption”. 100) Added the description of a DMR-based Trunking system to the note in “6.2 Scanning in One Zone (Single Scan)”. 101) Added the note to “6.3 Scan by Registering Multiple Target Channels for Scan in the List (List Scan)”. 102) Added the note to “6.4 Scanning All Target Zones for Scanning (Multi-Zone Scan)”. 103) Added or corrected the note in “Priority Channel Type (Type)” in “6.5 Scanning the Specific Channel Preferentially (Priority Scan)”. 104) Added “Reception Behavior during the Scan in a DMR-based Trunking System” to “6.6 Transceiver Behavior during the Scan”. 105) Added “Example in a DMR-based Trunking system” to “Timing for Sending and Receiving Data”. 106) Added the note to “Transparent on Data System-Personality” in “7.3 Transparent”. 107) Added the following to “10 LIST OF BUTTON OPERATIONS IN EACH MODE”: - Autodial Mode - Dialing Mode - Redial Mode 108) Added the following in “11 LIST OF BEEPS IN EACH MODE”: - Group Subscription Invalid Indicator Tone - Invalid Dialing Entry Tone Analog Function Part 109) Added the description of the RSSI level to “E” in “Voting Behavior”. 110) Changed the version number from 1.40 to 3.00.
2019.12.13	1) Changed each version information in “About This Manual”. 2) Added the description of specification changes to “10 LIST OF BUTTON OPERATIONS IN EACH MODE”. 3) Added the description of Emergency Mode, etc. to “2.15 Terminating Voice Communications by a Transceiver Other Than the Transmitting Transceiver (Call Interruption)”. 4) Added the description of the supported models to “3.14 Executing Various Communications by Using the Dialing Function”. 5) Changed the version number from 3.00 to 3.20.

Date	Description
2020.7.20	1) Changed the version information in “About This Manual”. 2) Added the following to “Mobile” in “About Options to Use the Functions Described in This Document”. KMC-60 (Microphone) KMC-62 (Microphone with 16-Keypad) NXDN Function Part 3) Corrected the description related to GPS Report Channel in “Selecting the Transmission Method of GPS Data (GPS Report Channel)”. DMR Function Part 4) Corrected the description related to GPS Report Channel in “Selecting the Transmission Method of GPS Data (GPS Report Channel)”. 5) Added “2.13 Communicating with a Telephone (Telephone Call)”. Analog Function Part 6) Corrected the description related to GPS Report Channel in “Selecting the Transmission Method of GPS Data (GPS Report Channel)”. 7) Changed the version number from 3.20 to 3.30.
2020.10.5	NXDN Function Part 1) Corrected the Sample Scripts for the following items in “8.1 Encode Format/ 8.2 Decode Format”: ENC enc STOPS DECAT time dec 2) Corrected the Transceiver behavior for the following item in “8.2 Decode Format”: DECA dec DMR Function Part 3) Corrected the Sample Scripts for the following items in “8.1 Encode Format/ 8.2 Decode Format”: ENC enc STOPS DECAT time dec 4) Corrected the Transceiver behavior for the following item in “8.2 Decode Format”: DECA dec Analog Function Part 5) Added the note in “SEND #0 to SEND #F” of “8.1 Encode Format”. 6) Corrected the Sample Scripts for the following items in “8.1 Encode Format/ 8.2 Decode Format”: SCHK SDIAL SELD SLEN ofs TPD TPE DECF dec

Date	Description
2020.10.5	7) Corrected the Transceiver behaviors for the following items in “8.1 Encode Format/ 8.2 Decode Format”: - IDLOF - SCHK - SELD - DECF dec - DISPM - DSPMT - GRP0 - GRP0A - GRPP - QUEUE - SSTO 1 to SSTO 8 - STO 1 to STO 8 8) Corrected the Descriptions for the following items in “8.2 Decode Format”: - DISPM - DSPMT - GRPP 9) Changed the version number from 3.30 to 3.31.
2021.6.30	DMR Function Part 1) Added the note to “2.6 Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Individual Call Acknowledge Request)”. 2) Added the conditions for Background Hunt to function to “Background Hunt”. 3) Changed the version number from 3.31 to 3.32.
2022.5.26	1) Changed the version information in “About This Manual”. Common Function Part 2) Added “IP Based Packet Data Format” to “3.6 Writing Configuration Data Using Wireless Communication (OTAP)”. DMR Function Part 3) Added the following items to “Table 3-2 Functions for S-Trunking and DMR Tier III Trunking”. - DMR IP Addressing - ICMP Echo - IP Packet Data Services 4) Added the transceiver behavior to “Transceiver’s behavior for Registration”. 5) Added “3.5 Using IP Bearer Service”. 6) Changed the version number from 3.32 to 3.60.

Date	Description
2022.9.26	1) Changed the version information in “About This Manual”. Common Function Part 2) Added the description of when the OTAP function is used in a Trunking 2.5 system in “3.6 Writing Configuration Data Using Wireless Communication (OTAP)”. 3) Added the note in “5.4 Displaying the Signal Strength Level (RSSI Level, BER) (Maintenance Display)”. DMR Function Part 4) Common Function Part 5) Added the note to “Receiving a Short Message”. 6) Added the following items: 2.14 Sending a DTMF Code 2.23 Out of Range Indicator 7) Changed the configuration condition of Fleet Dialing Plan from a DMR-based Trunking system to a DMR Tier III Trunking system and S-Trunking system in this manual. 8) Added the information related to a Trunking 2.5 system to “3 DMR-BASED TRUNKING SYSTEM”. 9) Added the information about end of support for the S-Trunking system to “3 DMR-BASED TRUNKING SYSTEM”. 10) Changed the version number from 3.60 to 4.00.
2022.12.22	1) Changed the version information in “About This Manual”. Common Function Part 2) Added “14.4 Restricting the Functions of KPG-D3/ D3N (Read FPU Data Inhibition)”. 3) Changed the version number from 4.00 to 4.01.
2023.6.16	1) Changed the version information in “About This Manual”. Common Function Part 2) Added an NXDN Conventional system and an NXDN Site Roaming system for the supported systems in “Out of Range Tone”. 3) Added the note in “10.2 Playing Back the Recorded Audio (Playback)”. NXDN Function Part 4) Added the following items: 2.14 Communicating with a Telephone (Telephone Call) 2.21 Out of Range Indicator Group-registration Timer 5.7 Radio Access Control 5) Corrected the description and the note description related to Priority Monitor ID in “Receiving a High-priority Call (Priority Monitor ID)”. 6) Added the conditions of when the transceiver begins Registration in “Conditions for the transceiver to begin Registration”. DMR Function Part 7) Added the description of when a Telephone Call is made in Autodial Mode to “2.13 Communicating with a Telephone (Telephone Call)”. 8) Corrected the description in “Checking Whether Another Transceiver Is in Operation (Radio Check)”. 9) Added the note in “About the Slot Numbers (Slot Selection)”. 10) Changed the version number from 4.01 to 4.10.

Date	Description
2025.10.30	1) Changed the version information in “About This Manual”. 2) Added the following to Radio Feature License: INDOOR LOCATION LICENSE (KWD-3020-IL) Common Function Part 3) Added “11 INDOOR LOCATION”. 4) Added the description of Data + Location Data Output to “19.4 Available Functions for COM Port”. NXDN Function Part 5) Added the following items: 2.22 Indoor Location (NXDN) 3.28 Indoor Location (NXDN Trunking) 6) Added “Data + Location Data Output” to the description of COM port. DMR Function Part 7) Added “2.24 Indoor Location (DMR)”. 8) Added “Data + Location Data Output” to the description of COM port. 9) Added description related to the support for All Call to the following items: Receiving a High-priority Call (Priority Monitor ID) 3.20 Prioritizing Own Voice Communications by Terminating Other Voice Communications (Call Interruption) Analog Function Part 10) Added “Data + Location Data Output” to the following of FleetSync: Status Message (Serial Output) Short Message Short Message (Serial Output) Long Message Unit ID (Serial Output) 11) Changed the version number from 4.10 to 4.30.

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Basic Configurations for Using the Transceiver	Configuring Various Functions for the Transceiver Frequencies and signaling for transmission and reception, channel data, including the transmit power, and other functions required for various communications, such as an Individual Call or a Group Call, can be configured by using KPG-D3/ D3N. HOW TO CONNECT TO DEVICES Page 20	Assigning Functions to the Buttons on the Transceiver Various functions can be assigned to the PF buttons on the transceiver. Available Functions for the PF Buttons Page 275
	Writing the Configuration Data to the Transceiver The data configured by using KPG-D3/ D3N can be written to the transceiver. Writing the data configured by using KPG-D3/ D3N to the transceiver allows the transceiver to work according to the configuration data. Writing the Configuration Data to the Transceiver Page 23	Reading the Configuration Data from the Transceiver The configuration data in the transceiver can be read into KPG-D3/ D3N. By reading the configuration data written in the transceiver into KPG-D3/ D3N, the configuration data can be changed or written to another transceiver. Reading the Configuration Data from the Transceiver Page 24
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	Using Function Buttons Pressing a button to which a function is assigned can activate the assigned function or place the transceiver in various Function Modes. Using Function Buttons Page 30	Viewing the Receive History Various received messages and callers who made calls can be viewed. Viewing the Receive History (Stack) Page 48
	Executing a Function by Selecting the Function from the Menu Selecting functions in Menu Mode activates various functions or places the transceiver in various Function Modes. Using Menu Mode Page 37	Transmitting Just by Audio Input to a Microphone By using the VOX function, audio can be transmitted just by audio input into a microphone without pressing the PTT switch. USING VOX Page 268

Indication and Display	Lighting the LED While Transmitting and Receiving The transceiver can light or flash the LED while the transceiver is transmitting or receiving. Busy LED Page 80 Transmit LED Page 80 Selective Call Alert LED Page 82 Optional Signaling LED Page 83	Displaying a Bitmap Image When the Transceiver is Turned ON A desired bitmap image can be displayed on the transceiver display when the transceiver is turned ON. Displaying a Bitmap Image When the Transceiver is Turned ON (Custom Start-up Screen) Page 95
	Displaying the Remaining Battery Power Level (Portable Only) A user can be notified on the level of the remaining battery power on the LCD and by LED. Displaying the Remaining Battery Power Level (Battery Warning) Page 137	
Sound	Tones Used for the Transceiver Various tones sound from the transceiver according to the operation of the transceiver. Tones that Sound When a User Operates the Transceiver or When the Transceiver Status Is Changed Page 96	Changing the Calling Alert Tone Tones that sound from the transceiver when the transceiver receives a call using optional signaling or a status message can be changed to the desired tone. Tones that Sound When the Transceiver Receives a Call Page 105
Indoor Location	Using the Indoor Location Function Indoor Location is the function to manage the position of the transceiver by using Bluetooth. INDOOR LOCATION Page 155	

Security	Using a Password to Protect the Transceiver A user can set a password to the transceiver so that the transceiver cannot be used by others without the user's permission. Password for Transceiver Operation (Transceiver Password) Page 254	Using a Password to Protect the Configuration Data of the Transceiver To prevent the configuration data of the transceiver from being altered without the user's permission, or to prevent the configuration data written in the transceiver from being diverted, a password can be set for the configuration data. Password When Reading Configuration Data in a PC (Password (Read)) Page 255 Password for Writing Configuration Data (Password (Write)) Page 256
Functions of Transceivers for Vehicles	Turning the Transceiver ON or OFF by Linking with a Vehicle Ignition For Mobile, the transceiver can automatically be turned ON or OFF by linking with the status of the port linked with the vehicle ignition by using the ignition-linked function. Turning the Transceiver ON or OFF According to the State of the Ignition Sense Port (Ignition Sense) Page 247	Turning the Headlights On of the Vehicle or Making the Horn Sound When the Transceiver Receives a Call For Mobile, by using the horn alert function, the transceiver can turn the headlights On of a vehicle to which the transceiver is connected or make the horn sound when the transceiver receives a call. Controlling Vehicle Operation According to the State of the Horn Alert Port (Horn Alert) Page 249
Other Convenient Functions	Locking the Transceiver Buttons By locking the transceiver buttons, a user can avoid erroneous operation of the transceiver caused by physically contacting the transceiver while carrying it around the waist, etc. Locking the Transceiver Buttons (Button Lock) Page 67	Reducing Battery Consumption (Portable Only) The power consumption of the transceiver can be reduced by setting the transceiver receiving intermittently. Reducing Battery Consumption (Battery Saver) Page 140
	Recording the Received or Transmitted Audio (Optional) The transmitted or received audio can be recorded in the internal memory of the transceiver. The recorded audio can be played back on the transceiver. Recording Transmitted and Received Audio Automatically (Auto Recording) Page 146	Displaying the Location Information of the Transceiver By using an internal or optional GPS receiver unit, the transceiver can display the own location information on the display. USING THE GPS POSITION DISPLAY FUNCTION Page 143

2.1

NX-3200/ NX-3300/ NX-3220/ NX-3320/ NX-3400/ NX-3420

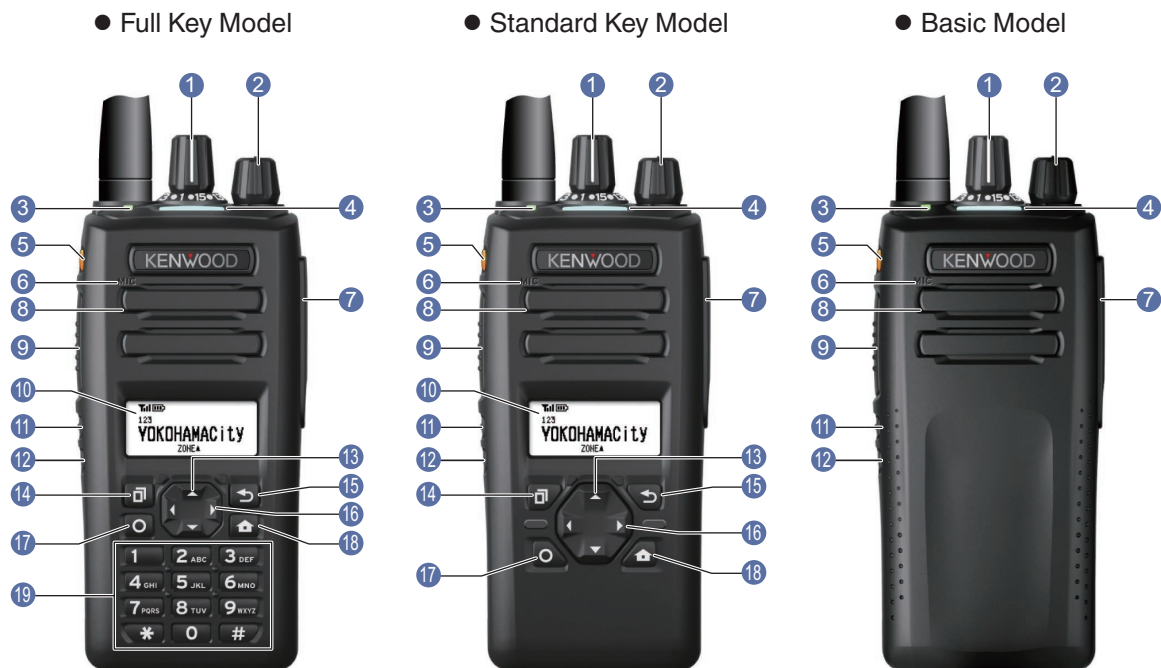


Figure 2-1 NX-3200/ NX-3300/ NX-3220/ NX-3320/ NX-3400/ NX-3420 Front View

1 Selector

The preassigned function will be activated or will be changed to the active state. It is normally used to change the zone or channel.

2 Power Switch/ Volume Control

The transceiver can be turned ON by rotating the Power switch. The volume level of the speaker sound can be adjusted.

3 Transmit LED/ Busy LED

These LEDs light when the transceiver transmits or receives a signal.

4 Light Bar

This Light Bar lights when selecting a channel or upon reception.

5 AUX Button

The preassigned function will be activated or will be changed to the active state.

6 Built-in Microphone**7 14-pin Universal Connector (NX-3200/ NX-3300/ NX-3400)
2-pin Connector (NX-3220/ NX-3320/ NX-3420)**

The transceiver and a PC are connected by using a programming cable.
An external device such as an optional device is connected.

8 Speaker

The received audio and the Alert Tone sound from the speaker.

9 PTT Switch

Pressing the PTT switch allows transmitting.

10 LCD

The channel number and the transceiver's status appear on this display.

11 Side 1 Button

The preassigned function will be activated or will be changed to the active state.

12 Side 2 Button

The preassigned function will be activated or will be changed to the active state.

13 [▲]/ [▼] Button

The preassigned function will be activated or will be changed to the active state. It is normally used to change the zone or channel.

14 [□] (Menu) Button

The preassigned function will be activated or will be changed to the active state. In this manual, the [□] (Menu) button is described as the **Menu** ([□]) button.

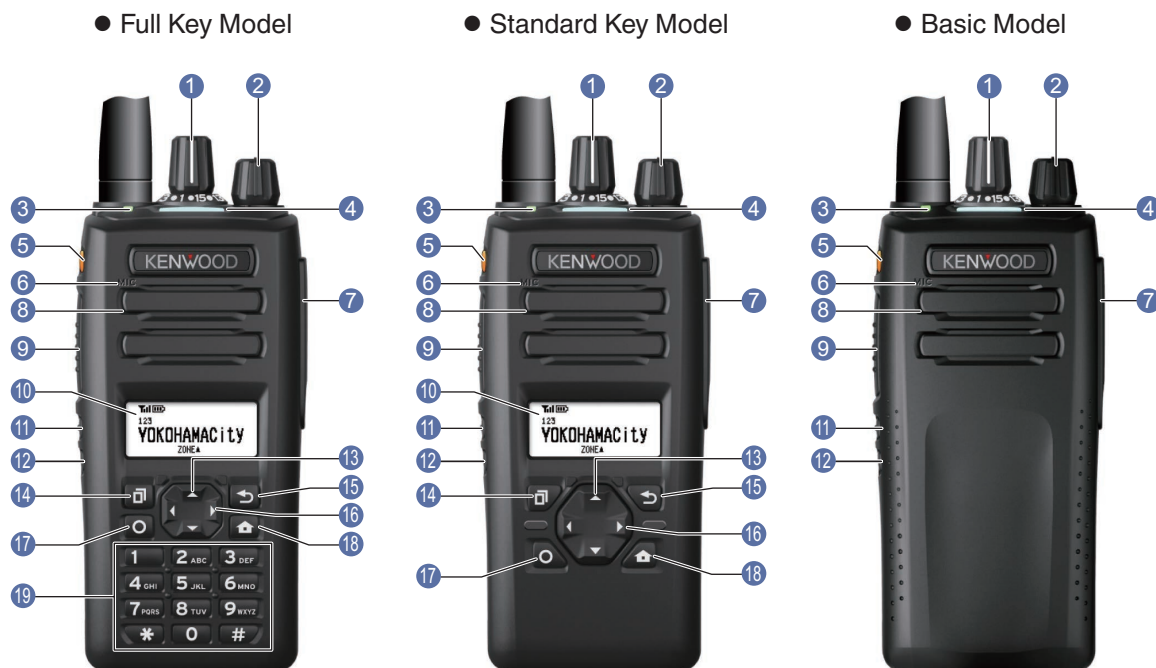


Figure 2-2 NX-3200/ NX-3300/ NX-3220/ NX-3320/ NX-3400/ NX-3420 Front View

15 [↵] (Back) Button

The preassigned function will be activated or will be changed to the active state. In this manual, the [↵] (Back) button is described as the **Back** ([↵]) button.

16 [◀/▶] Button

The preassigned function will be activated or will be changed to the active state. It is normally used to change the zone or channel.

17 [○] (Function) Button

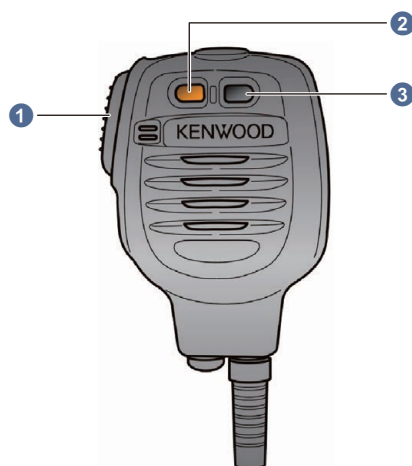
The preassigned function will be activated or will be changed to the active state. In this manual, the [○] (Function) button is described as the **Function** ([○]) button.

18 [🏠] (Home) Button

The preassigned function will be activated or will be changed to the active state. In this manual, the [🏠] (Home) button is described as the **Home** ([🏠]) button.

19 Keypad

The transceiver can be operated by pressing a button.

External Microphone (KMC-41) (dedicated for NX-3200/ NX-3300/ NX-3400)**Figure 2-3 KMC-41****1 PTT Switch**

Pressing the **PTT** switch allows transmitting.

2 PF 1 Button

The preassigned function will be activated or will be changed to the active state.

3 PF 2 Button

The preassigned function will be activated or will be changed to the active state.

External Microphone (KMC-70/ KMC-72) (dedicated for NX-3200/ NX-3300/ NX-3400)**Figure 2-4 KMC-70/ KMC-72****1 PTT Switch**

Pressing the **PTT** switch allows transmitting.

2 PF 1 Button

The preassigned function will be activated or will be changed to the active state.

3 PF 3 Button (KMC-70 only)

The preassigned function will be activated or will be changed to the active state.

4 PF 2 Button

The preassigned function will be activated or will be changed to the active state.

External Microphone (KMC-45D) (dedicated for NX-3220/ NX-3320/ NX-3420)

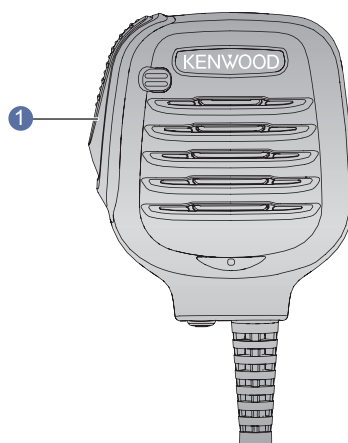


Figure 2-5 KMC-45D

① PTT Switch

Pressing the **PTT** switch allows transmitting.

2.2

NX-3720/ NX-3720G/ NX-3720H/ NX-3720HG/ NX-3820/
NX-3820G/ NX-3820H/ NX-3820HG/ NX-3920G/ NX-3921G

Figure 2-6 NX-3720/ NX-3720G/ NX-3720H/ NX-3720HG/ NX-3820/ NX-3820G/ NX-3820H/ NX-3820HG/ NX-3920G/ NX-3921G Front View

1 [⏻] (Power) Switch

The transceiver is turned ON when this switch is pressed and the transceiver is turned OFF when this switch is pressed again. In this manual, the [⏻] (Power) switch is described as the **Power** switch.

2 [+]/ [-] Button

The preassigned function will be activated or will be changed to the active state. It is normally used for the volume adjustment of the speaker.

3 LCD

The channel number and the transceiver's status appear on this display.

4 [▲]/ [▼] Button

The preassigned function will be activated or will be changed to the active state. It is normally used to change the zone or channel.

5 Speaker

The received audio and the Alert Tone sound from the speaker.

6 Transmit LED/ Busy LED

These LEDs light when the transceiver transmits or receives a signal.

7 8-pin Modular Jack

The transceiver and a PC are connected by using a programming cable.

8 [🏠] (Home) Button

The preassigned function will be activated or will be changed to the active state. In this manual, the [🏠] (Home) button is described as the **Home** ([🏠]) button.

9 [☐] (Menu) Button

The preassigned function will be activated or will be changed to the active state. In this manual, the [☐] (Menu) button is described as the **Menu** ([☐]) button.

The default of the [☐] (Menu) button is the Menu function. If the configuration is changed using KPG-D3/ D3N, a newly configured function will be activated. Unless the Menu function is reassigned to the [☐] (Menu) button, Menu Mode cannot be activated even if the [☐] (Menu) button is pressed.

10 [↩] (Back) Button

The preassigned function will be activated or will be changed to the active state. In this manual, the [↩] (Back) button is described as the **Back** ([↩]) button.

11 [◀]/ [▶] Button

The preassigned function will be activated or will be changed to the active state. It is normally used to change the zone or channel.

12 [Δ] (AUX) Button

The preassigned function will be activated or will be changed to the active state.

External Microphone (KMC-36)

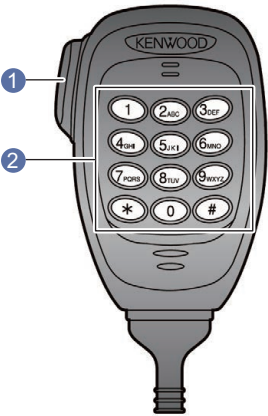


Figure 2-7 KMC-36

1 PTT Switch

Pressing the **PTT** switch allows transmitting.

2 Keypad

The transceiver can be operated by pressing a button.

2.3 About LCD

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

LCD

The LCD of the transceiver is as follows. The contents that appear on the LCD varies depending on the transceiver's status.

Portable

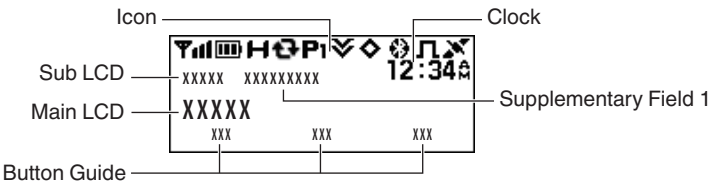
For Portable, the contents that appear on the LCD vary depending on the configuration in **Display Type** (Normal Type or Simple Type).

If Simple Type is configured in **Display Type**, the Button Guide does not appear.

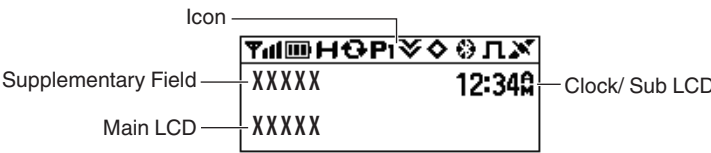
● Basic Frame

This frame is used to display the name, such as the channel name. Various icons indicating the transceiver's status appear in the icon display area.

Normal Type:



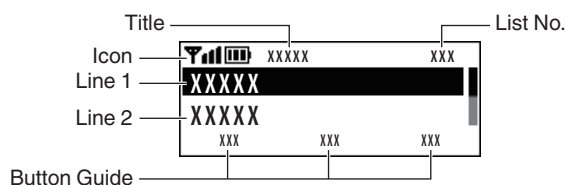
Simple Type:



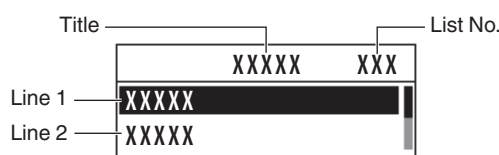
● Function Frame 1

This frame is used to display the Function Mode, such as Individual Call Mode and Status Mode. The number, such as the list number or channel number, appears at the right end of the title line.

Normal Type:



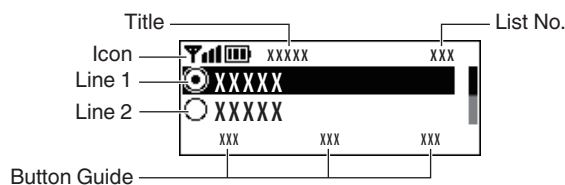
Simple Type:



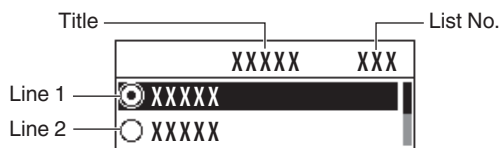
● Function Frame 2

This frame is used to display the Function Mode, such as Status Mode. The number, such as the list number or channel number, appears at the right end of the title line. The icon can be displayed at the right side of each line.

Normal Type:



Simple Type:



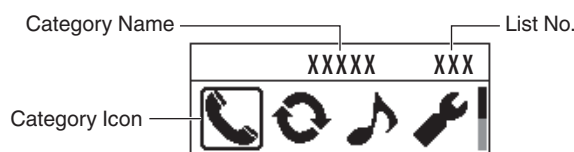
● Category Icon Frame

This frame is used to display the Menu Category in Icon Mode. (Refer to [Using Menu Mode.](#))

Normal Type:



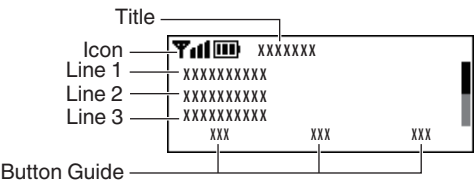
Simple Type:



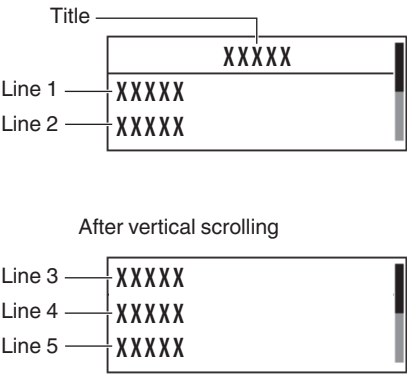
● Message Frame

This frame is used to display the message, such as the Short Message.

Normal Type:



Simple Type:



● Popup Display

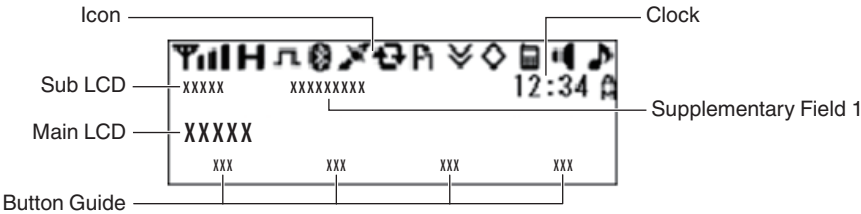
The popup appears when the adjustment of the volume level or the operation of Button Lock occurs.



Mobile

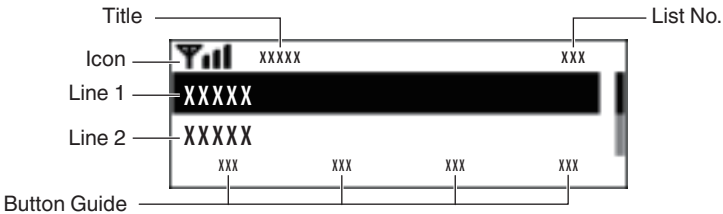
● Basic Frame

This frame is used to display the name, such as the channel name. Various icons indicating the transceiver’s status appear in the icon display area.



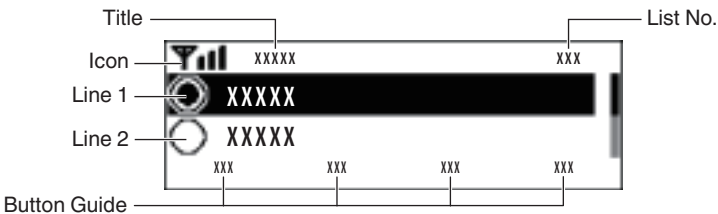
● Function Mode Frame 1

This frame is used to display the Function Mode, such as Individual Call Mode and Status Mode. The number, such as the list number or channel number, appears at the right end of the title line.



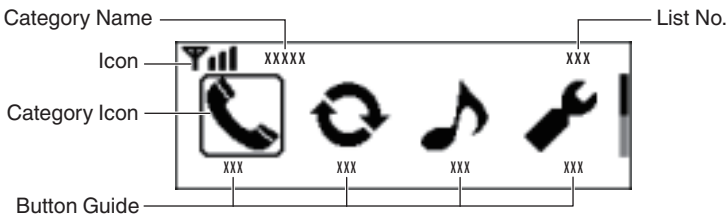
● Function Mode Frame 2

This frame is used to display the Function Mode, such as Status Mode. The number, such as the list number or channel number, appears at the right end of the title line. The icon can be displayed at the right side of each line.



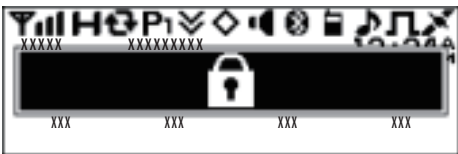
● Category Icon Frame

This frame is used to display the Menu Category in Icon Mode.



● Popup Display

The popup appears when the adjustment of the volume level or the operation of Button Lock occurs.



Icons

Various icons indicating the transceiver’s status appear in the icon display area when a channel name is displayed. Refer to “The Icons on the LCD” for details of each icon.

● Portable



● Mobile



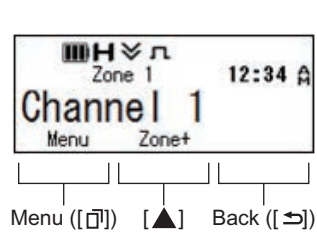
Button Guide

The button guide is displayed at the bottom of the LCD. (Portable: Only if Normal Type is configured in **Display Type**)
For Portable, the button guide displays the functions that function when the **Menu** ([F]), [▲], or **Back** ([F]) button is pressed.
For Mobile, the button guide displays the functions that function when the **Menu** ([F]), **Back** ([F]), [◀], or [▶] button is pressed.
The text that appears on the display varies depending on the transceiver’s status.

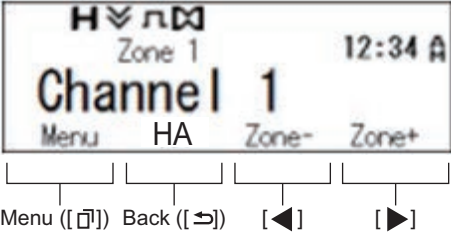
● PF Button

Functions assigned to each button will appear while the channel name appears. (Refer to [Available Functions for the PF Buttons.](#))

Portable:



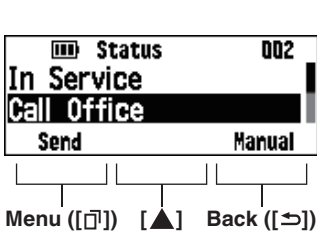
Mobile:



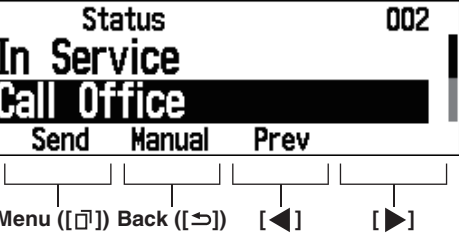
● Function Mode

Functions that can be used in each mode appear while the transceiver is in Function Mode, such as Selcall Mode, Status Mode and Stack Mode. However, the button guide for the [▲] button does not appear if the function which is used to select the list or code is assigned to the [▲] or [▼] button.

Portable:



Mobile:



The following are button guides that appear while the transceiver is in Function Mode. (Refer to [Available Functions for the PF Buttons](#).)

Table 2-1 Button Guide (Function Mode)

Button Guide	Operation
OK	Determines the data of the entered characters, code, or list.
Select	Determines the data of the selected characters, code, or list.
Delete	Deletes the data of the selected characters, code, or list.
Confrm	Authenticates the entered password.
Exit	Aborts the Function Mode.
Next	Proceeds to the next step.
Back	Goes back to the previous step.
Prev	Goes back to the previous display.
Play	Starts the playback of audio data. Starts automatic switching of the display for latitude, longitude, and altitude in GPS Position Display Mode. Starts automatic switching of the display for RSSI, etc. in BLE Beacon Display Mode.
Pause	Stops recording. Pauses automatic switching of the display for latitude, longitude, and altitude in GPS Position Display Mode. Pauses automatic switching of the display for RSSI, etc. in BLE Beacon Display Mode.
Conn	Enters the state to confirm connection with the device.
Discon	Enters the state to confirm disconnection with the device.
Call	Initiates the call.
Send	Sends the data.
Page	Initiates the Paging Call.
◀ Disp (Mobile only)	Switches the display.
Disp ▶ (Mobile only)	Switches the display.
◀ (Mobile only)	Selects a category.
▶ (Mobile only)	Selects a category.
Reset	Resets the entered 5-tone code and restores the initial state.
List	Goes back to list selection.
Manual	Goes back to manual entry.
View	Switches to the Short Message View display.

 Note

- The button guide which appears while the transceiver is in Function Mode is only for the functions that can be activated.
- Button Guide for a function assigned to and activated by pressing and holding a **PF** button appears only if no function is assigned to the same button.

Example 1) "BtnLck" appears as Button Guide in the following case: Function = None, Hold = Button Lock

Example 2) "Light" appears as Button Guide in the following case: Function = Backlight, Hold = Button Lock

When the transceiver is turned ON after the power source is attached to the transceiver, the transceiver starts up. To make the transceiver ready for use, the configuration data needs to be created using KPG-D3/ D3N and written to the transceiver.

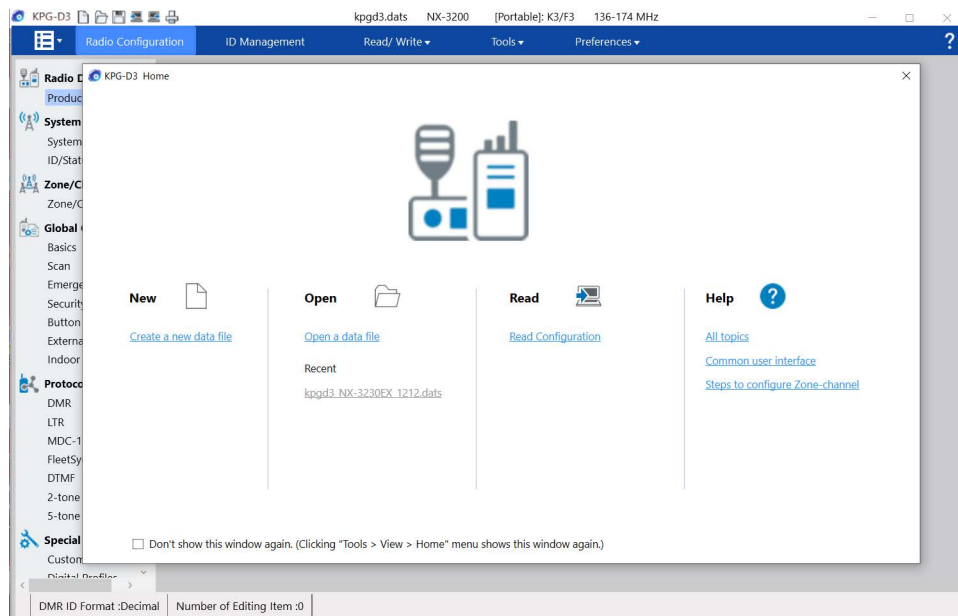


Figure 3-1 KPG-D3/ D3N Main Window

By using KPG-D3/ D3N, the zone and channel data needs to be configured and then the parameters for various functions can be configured. Refer to the help texts for configuration methods.

3.1 Connecting the Transceiver to a PC

To write the configuration data to or read the configuration data from the transceiver via serial communications by using a programming cable, “Wired” needs to be selected from **Communication Method Preset** of **COM port**. Also, the transceiver and a PC with KPG-D3/ D3N installed need to be connected by using the programming cable.

Portable (NX-3200/ NX-3300/ NX-3400)

The transceiver and a PC need to be connected by using the KPG-36U/ KPG-36X programming cable. Refer to the figure below.

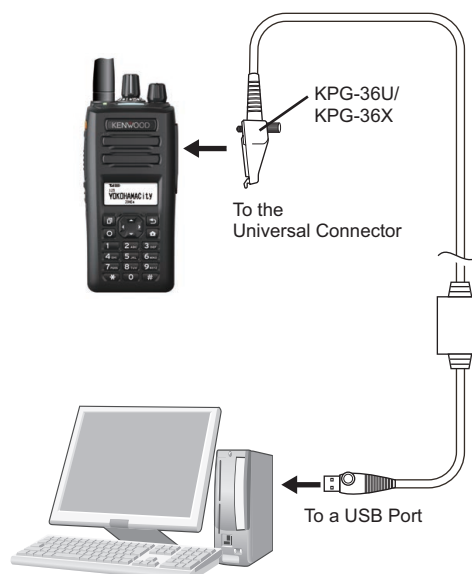


Figure 3-2 Connection of the Transceiver (Portable) and a PC 1

Portable (NX-3220/ NX-3320/ NX-3420)

The transceiver and a PC need to be connected by using the KPG-22U programming cable.
Refer to the figure below.

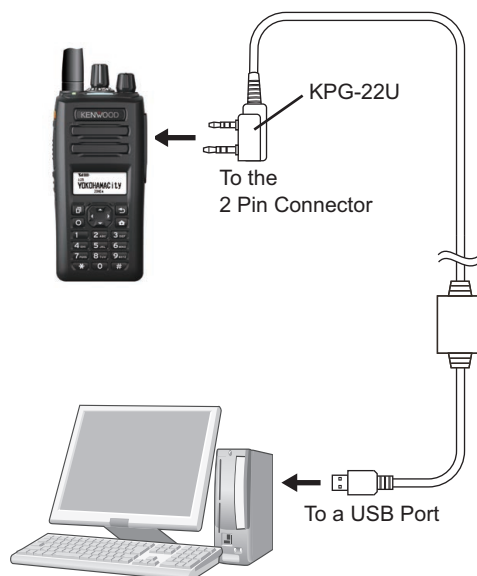


Figure 3-3 Connection of the Transceiver (Portable) and a PC 2

Mobile

The transceiver and a PC need to be connected by using the KPG-46U/ KPG-46X programming cable.
Refer to the figure below.

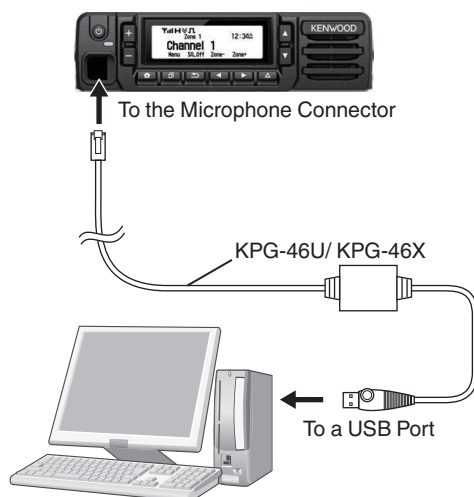


Figure 3-4 Connection of the Transceiver (Mobile) and a PC

Configuration using KPG-D3/ D3N

Configuring **Communication Method Preset** ( See Preferences > COM port)

3.2 Connecting the Transceiver to a PC by Bluetooth

To write the configuration data to the transceiver or to read the configuration data from the transceiver by using Bluetooth communication, “Bluetooth SPP” needs to be selected from **Communication Method Preset** of **COM port** and a Bluetooth-compatible device (the transceiver) to be written with the configuration data needs to be selected in **Device List**.

Note

- To connect the transceiver to a PC by Bluetooth, a connection by Serial Port Profile of Bluetooth is required. Refer to “[About Serial Port Profile \(SPP Connection/ SPP Disconnection\)](#)” for the connection by Serial Port Profile.

Configuration using KPG-D3/ D3N

- Configuring **Communication Method Preset** ( **See** Preferences > COM port)
- Selecting a Bluetooth-compatible device (the transceiver) in **Device List** ( **See** Preference > COM port > Bluetooth SPP)

3.3 Writing the Configuration Data to the Transceiver

Selecting “Write Configuration” from **Read/Write** of KPG-D3/ D3N displays **Write Configuration**. Clicking the “Write” button of **Write Configuration** enters FPU Programming Mode and starts writing the configuration data to the transceiver.

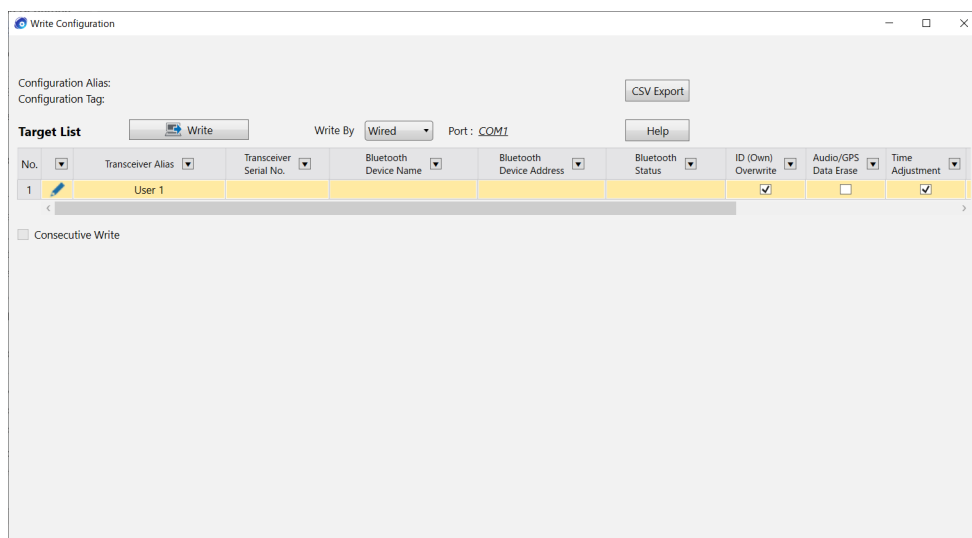


Figure 3-5 Write Configuration

Note

- To write the configuration data by connecting the transceiver to a PC by the use of a programming cable, “Wired” needs to be selected in **Write By** of **Write Configuration**. To write the configuration data to the transceiver by using Bluetooth communication, “Bluetooth” needs to be selected in **Write By** of **Write Configuration**.

The transceiver behaves as follows according to the configuration in **Write Configuration**:

- Clicking on **Time Adjustment** and writing automatically configures the transceiver to the time configured in a PC. Refer to “[ADJUSTING THE TIME ON THE TRANSCEIVER](#)” for the operations to manually adjust the time of the transceiver after writing the configuration data.
- Clicking on **Audio/GPS Data Erase** and writing deletes the audio data and GPS data stored on the transceiver.
- Clicking on **DFA Data Erase** and writing deletes the Direct Frequency Assignment information stored on the transceiver. If **NXDN Type-C Trunking** is disabled, **DFA Data Erase** does not appear.
- Clicking on **Consecutive Write** and writing keeps **Write Configuration** open even when writing completes, and writing can be continued in another transceiver by changing various IDs.
- Clicking on **ID (Own) Overwrite** and writing overwrites various ID data on the transceiver by the ID data configured by KPG-D3/ D3N. Clicking off **ID (Own) Overwrite** and writing can write configuration data on the transceiver without overwriting various IDs configured in the transceiver.

3.4 Reading the Configuration Data from the Transceiver

To change the data configured in the transceiver, read the configuration data from the transceiver to KPG-D3/ D3N, and then write the configuration data to the transceiver after the configuration data has been changed.

Selecting “Read Configuration” from **Read/Write** of KPG-D3/ D3N displays **Read Configuration**. Clicking the “Read” button of **Read Configuration** enters FPU Programming Mode and starts reading the configuration data from the transceiver.

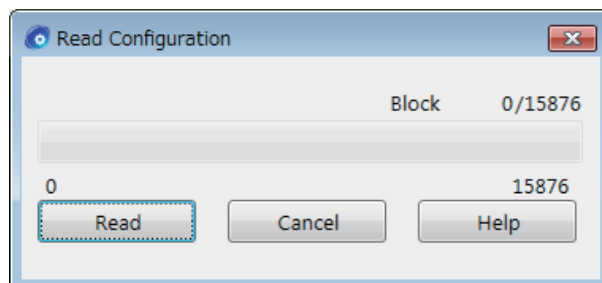


Figure 3-6 Read Configuration

3.5 Embedding a Message in the Transceiver (Embedded Message)

The message can be written to the transceiver as part of the configuration data by using KPG-D3/ D3N.

Data Embedded Message

Data Embedded Message is the function to store a maximum of 64 alphanumeric characters in the transceiver. The transceiver profile information, such as the control number and the file name of the configuration data written in the transceiver, can be embedded.

The message can be written to the transceiver by using KPG-D3/ D3N. The message written in the transceiver is stored as a part of the configuration data.

The embedded messages can be read from the transceiver by using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

Configuring **Data Embedded Message** ( See Radio Configuration > Special Settings > Maintenance > Data Embedded Message)

Transceiver Embedded Message

Transceiver Embedded Message is the function to store a maximum of 32 alphanumeric characters in the transceiver. The transceiver profile information, such as the control number and the file name of the configuration data written in the transceiver, can be embedded.

The message can be written to the transceiver by using KPG-D3/ D3N. The **Transceiver Embedded Message** is stored in the transceiver as independent data from the configuration data.

The embedded messages can be read from the transceiver by using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

Configuring **Transceiver Embedded Message** ( See Tools > Transceiver Embedded Message)

3.6 Writing Configuration Data Using Wireless Communication (OTAP)

OTAP (Over-The-Air Programming) is the function to write configuration data to the transceiver using wireless communications. This function enables configuration data for the transceiver to be updated by remotely controlling from the base station.

OTAP can be used in a communication system which supports NEXEDGE or DMR digital communication (an NXDN Conventional system, an NXDN Trunking system, a DMR Conventional system, or a DMR-Based Trunking system).

To use this function, the PC application software, OTAP Manager (KPG-180AP) is required to manage configuration data of KPG-D3/ D3N and transmit the configuration data to each subscriber unit via the base station transceiver.

Also, to use the OTAP function in a Trunking 2.5 system, the firmware of the transceiver, FPU (KPG-D3/ D3N), and OTAP MANAGER (KPG-180AP) need to be updated to the following versions:

Firmware of the transceiver: 4.00.00 or later

FPU (KPG-D3/ D3N): V 4.00 or later

OTAP MANAGER (KPG-180AP): V 5.00 or later

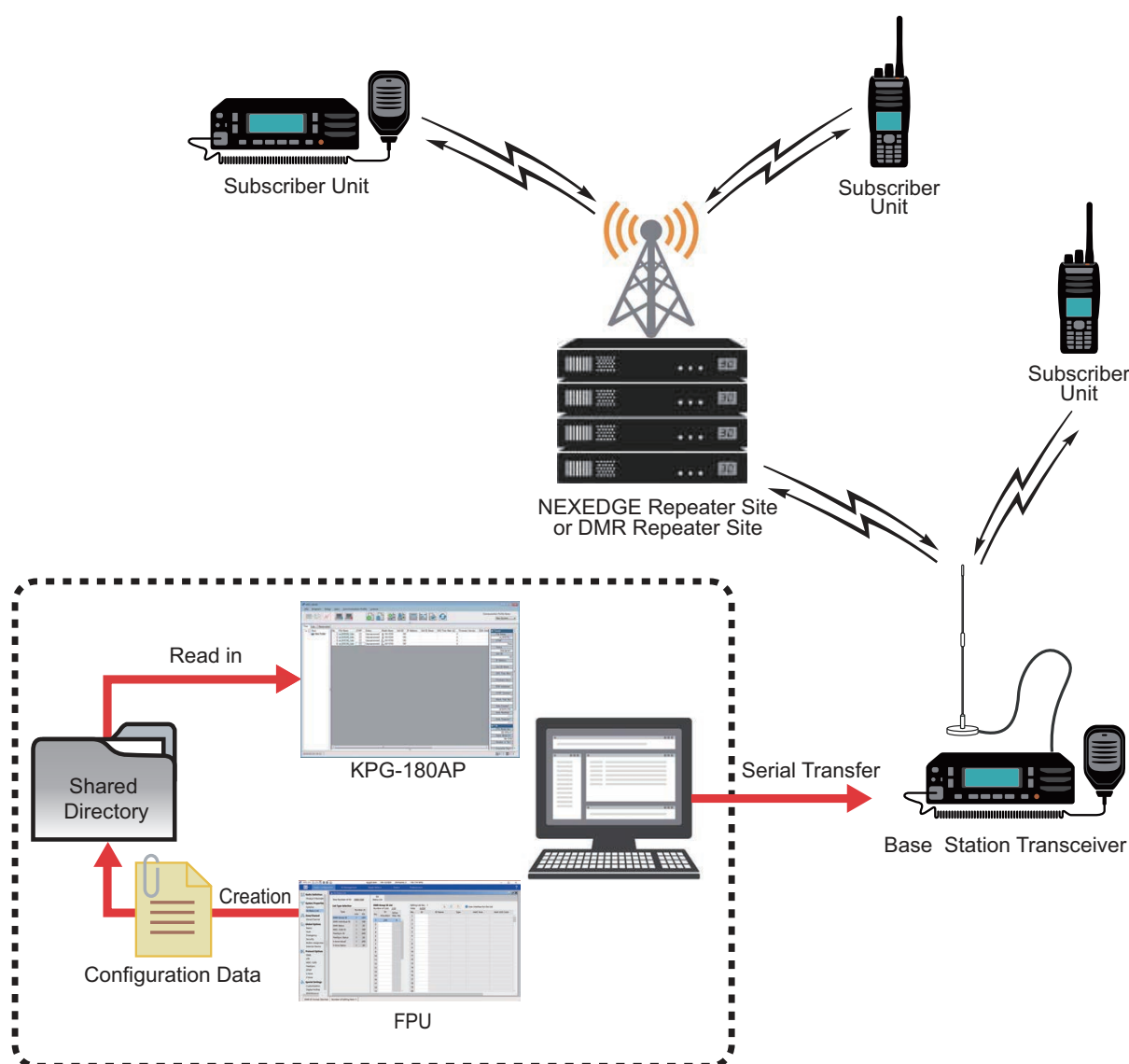


Figure 3-7 Example of the System Structure

The transceiver for which OTAP is enabled can be used in a system where OTAP is incorporated. The subscriber unit can write the received configuration data into the unit and enable the configuration data. The base station transceiver can send the configuration data to the subscriber unit according to the request from OTAP MANAGER.

Refer to OTAP MANAGER (KPG-180AP) Basic Operations supplied with KPG-180AP (Ver 5.00 or later) for the details of this function.

Configuration using KPG-D3/ D3N

Configuring **OTAP** to be enabled or disabled ( See Radio Configuration > Radio Definition > Product Information > Product Information > Features)

IP Connection by the IP Based Packet Data Format

OTAP communication by the IP Based Packet Data format only supports an IP connection in a Trunking 2.5 system and DMR Tier III Trunking system and does not support a serial connection. Therefore, the structure where the transceiver behaves as the base is not supported.

To perform the OTAP communication by the IP Based Packet Data format, etc., the PC application software, OTAP MANAGER (KPG-180AP) is required.



Figure 3-8 IP Connection by the IP Based Packet Data Format

In addition, to perform the OTAP communication by the IP Based Packet Data format, etc., the following items need to be configured in KPG-D3/ D3N:

- IP Packet Data Services
- DMR Air Interface IP Address
- OTAP Port

Note

- To use communication by the IP Based Packet Data format, use a third-party repeater which supports communication by the IP Based Packet Data format.
- OTAP Port is the reception port configuration for OTAP data from KPG-180AP. Configure the same value as the port configuration in KPG-180AP. If a value which is different from the port configuration in KPG-180AP is configured, the transceiver cannot receive OTAP data from KPG-180AP.
- Refer to OTAP MANAGER (KPG-180AP) Basic Operations supplied with KPG-180AP (Ver 5.00 or later) for the details of the IP connection structure of OTAP.

Configuration using KPG-D3/ D3N

- Configuring **OTAP** to be enabled or disabled ( See Radio Configuration > Radio Definition > Product Information > Product Information > Features)
- Configuring **IP Packet Data Services** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Packet Data)
- Configuring **DMR Air Interface IP Address** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Packet Data)
- Configuring **OTAP Port** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Packet Data > OTAP)

4.1 Turning the Transceiver ON/ OFF

Turning the Transceiver ON

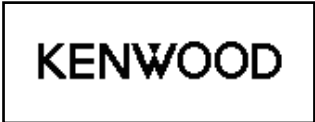
For Portable, rotating the **Power** switch clockwise causes the transceiver to be turned ON.

For Mobile, pressing the **Power** switch causes the transceiver to be turned ON. Also, the transceiver can be turned ON by linking to the status of the Ignition Sense port of a vehicle. (Refer to [Turning the Transceiver ON or OFF According to the State of the Ignition Sense Port \(Ignition Sense\)](#).)

- **If the data is written to the transceiver and the password is not configured**

Turn the transceiver ON.

A Power-on Tone A (1 beep) sounds from the transceiver, and then an animated logo appears for 500 ms.



If **Custom Start-up Screen** is configured, a Power-on Tone A (1 beep) sounds from the transceiver when the transceiver is turned ON and the bitmapped image configured for the transceiver appears. (Refer to [Displaying a Bitmap Image When the Transceiver is Turned ON \(Custom Start-up Screen\)](#).)



The transceiver enters User Mode, and then the channel name appears.



Note

- The animated logo appears only if **Custom-Start-up Screen** is not configured.
- If **Power-on Text** is configured, the Power-on Text appears for 2 sec after the animated logo or **Custom-Start-up Screen** appears. (Refer to [Power-on Text](#).)
- For Portable (Full Key Model/ Standard Key Model), if **Battery Voltage** is enabled, the voltage value of a battery appears for approximately 5 sec after the animated logo or **Custom-Start-up Screen** appears. (Refer to [Displaying the Voltage Value of a Battery When the Transceiver Is Turned ON \(Battery Voltage\)](#).)
- For Portable, the Light Bar lights according to the configuration in **Light Bar Color**. (Refer to [Configuration for the Light Bar](#).)

● If the data is written to the transceiver and the transceiver's password is configured

1 Turn the Transceiver ON.

A Power-on Tone A (1 beep) sounds from the transceiver, and then an animated logo appears for 500 ms.

If **Custom Start-up Screen** is configured, a Power-on Tone A (1 beep) sounds from the transceiver when the transceiver is turned ON and the bitmapped image configured for the transceiver appears for 2 sec. (Refer to [Displaying a Bitmap Image When the Transceiver is Turned ON \(Custom Start-up Screen\)](#).)

"Password" appears after the animated logo or **Custom-Start-up Screen** appears. (Refer to [Password for Transceiver Operation \(Transceiver Password\)](#).)




Note

- The animated logo appears only if **Custom Start-up Screen** is not configured.
- In the following cases, if the transceiver is turned ON, the transceiver enters Transceiver Password Mode:
 - If **Transceiver Password** is configured, "Transceiver Password" is not assigned to any of the **PF** buttons, and "Transceiver Password" is not configured in Menu Mode
 - When "Transceiver Password" is assigned to one of the **PF** buttons, or when "Transceiver Password" is configured for Menu Mode, if the transceiver is turned OFF while the transceiver is in Transceiver Password Mode

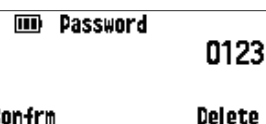
2 Enter a password.

Refer to "[Entering or Deleting a Code](#)" for entry methods.

When the correct password is entered, a Password Authorization Tone (2 beeps) sounds from the transceiver, and then the password protection of the transceiver is disabled.

If **Power-on Text** is configured, the Power-on Text appears for 2 sec. (Refer to [Power-on Text](#).)

The transceiver enters User Mode, and then the channel name appears.




Note

- If the firmware is not written to the transceiver correctly, the transceiver will enter Firmware Programming Mode. In this case, write the firmware to the transceiver again.
- "UNPROGRAM" appears on the main display if no data is written to the transceiver. In this case, data needs to be written to the transceiver by using KPG-D3/ D3N.
- A tone for Power-on Tone A that sounds when the transceiver is turned ON can be arbitrarily created using KPG-D3/ D3N.

Turning the Transceiver OFF

For Portable, rotate the **Power** switch counterclockwise until it clicks to turn the transceiver OFF.

For Mobile, pressing the **Power** switch while the transceiver is turned ON causes the transceiver to be turned OFF. Also, the transceiver can be turned OFF according to the status of the vehicle engine, either switched On or Off. (Refer to [Turning the Transceiver ON or OFF According to the State of the Ignition Sense Port \(Ignition Sense\)](#).)

Note

- If the transceiver is turned OFF without operating the **Power** switch by the following operations, the audio data recorded with the Auto Recording function is not retained:
 - Removing the battery pack (Portable only)
 - No remaining battery power (Portable only)
 - Removing the power cable (Mobile only)

Retain Power Switch Status

Supported Models: Mobile

Retain Power Switch Status is the function to configure whether to store the **Power** switch status (ON or OFF) when the power source is disconnected from the transceiver.

Whether to turn the transceiver ON when the power source is connected to the transceiver depends as below on the configuration in **Retain Power Switch Status**:

Table 4-1 Retain Power Switch Status

Configuration	Description
Enabled	Enables the capability to retain the ON- or OFF-state of the Power switch. By disconnecting the power source while the transceiver Power switch is in the ON state and then by reconnecting the power source, the transceiver is turned ON and starts up. Even if the power source is reconnected after the power source is disconnected while the transceiver Power switch is in the OFF state, the transceiver remains turned OFF. In this case, the transceiver does not start up unless the Power switch is pressed.
Disabled	Disables the capability to retain the ON- or OFF-state of the Power switch. Regardless of the previous ON- or OFF-state of the Power switch, the transceiver power is turned ON by connecting the power source to the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Retain Power Switch Status** ( See [Radio Configuration > Global Options > Basics > General > Power-on/off > Mobile](#))

4.2 Adjusting the Volume Level

Portable

Rotating the **Volume** control clockwise increases the volume level from the speaker, and rotating the **Volume** control counterclockwise decreases the volume level from the speaker.

Mobile

Pressing the **Volume Up** button increases the volume level in steps of 1. Pressing the **Volume Down** button increases the volume level in steps of 1.

If “**Volume Up** (Continuous)” or “**Volume Down** (Continuous)” is assigned to the **Volume Up** or **Volume Down** button, the volume level is increased or decreased continuously every 100 ms by pressing and holding the **Volume Up** or **Volume Down** button.

4.3 Using Function Buttons

The following functions can be assigned to each button of the transceiver using KPG-D3/ D3N. Pressing a button to which a function is assigned can activate the assigned function or place the transceiver in various Function Modes. (Refer to [Available Functions for the PF Buttons](#).)

The following are the configuration examples for each button of the transceiver:

Table 4-2 Examples of Button Configurations

Button	Function	2nd Function	Hold Function	Hold Delay
Home ([)	Home Channel	None	Home Channel Select	3.0
Back ([)	Button Lock	Autodial	None	1.0
AUX	Function	None	None	1.0

A function can be assigned to Function, 2nd Function and Hold of each button on the transceiver.

● Function

The function is activated by pressing a button.

In the configuration example above, pressing the **Home** ([)], **Back** ([)], or **AUX** button activates the function assigned to each button.

If a button to which Function is assigned is pressed, the transceiver waits for a function assigned to 2nd Function to be activated.

● 2nd Function

The function is activated by pressing a button to which the function is assigned to 2nd Function after the **Function** button is pressed.

In the configuration example above, pressing the **Back** ([) button after the **AUX** button is pressed activates the Autodial function.

● Hold

The function is activated by pressing and holding a button for the length of time configured for Hold Delay.

In the configuration example above, pressing and holding the **Home** ([) button for 3 sec activates the Home Channel Select function.

Note

- The two functions, Primary and Secondary, can be assigned to each button on the transceiver. Which function is used can be configured for each zone or channel.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Mode Reset Timer

Mode Reset Timer is the timer for canceling the standby status of further key entry in Function Mode, and for canceling the function activation status of 2nd Function. By using this function, Function Mode does not need to be disabled manually. The function also helps by canceling the Function Mode automatically so as not to remain in Function Mode for too long a time.

The transceiver has some special Function Modes. When the transceiver enters one of these modes, a preprogrammed display appears on the main display and sub-display and the **Mode Reset Timer** starts counting down the time. If no button is pressed before the amount of time configured in **Mode Reset Timer** expires, the transceiver returns to the previous mode.

If a **Function** button is pressed, the transceiver waits for a function configured for 2nd Function to be activated, and then **Mode Reset Timer** starts counting down. If no button is pressed before the amount of time configured in **Mode Reset Timer** expires, the transceiver cancels waiting for the function to be activated. **Mode Reset Timer** can be extended by button operation.

Mode Reset Timer is used for the following Function Modes:

Table 4-3 Objective Function Modes for Mode Reset Timer

2-tone Mode
Activity Detection Mode* ¹
ANR Preset Mode* ¹
Audio Profile Mode* ¹
Autodial Mode
Autodial Programming Mode
AUX A/B/C Mode* ¹
BLE Beacon Display Mode
Bluetooth Mode* ¹
Bluetooth Device Mode* ¹
Bluetooth Find Device Mode* ¹
Bluetooth Headset Connection Type Mode
Bluetooth Information Mode* ¹
Bluetooth My Devices Mode* ¹
Bluetooth Speaker Mode* ¹
Broadcast Mode* ¹
Channel Entry Mode
Clock Mode* ¹
Clock Adjustment Mode
Dialing Mode
Direct Channel & OST Mode
Display Format Mode* ¹
Display Type Mode* ¹
External Mic Sense Mode* ¹
External Speaker Mode
Fixed Volume Mode* ¹
Free-dial Entry Mode
GPS Mode* ¹
GPS/Bluetooth Reset Mode* ¹
GPS Position Display Mode
Group Call Mode
Group ID Entry Mode

High Transmit Power Mode ^{*1}
Horn Alert Mode ^{*1}
Individual Call Mode
IP Address Mode
Key Delete Mode
Language Mode ^{*1}
LCD Brightness Mode ^{*1}
Lone Worker On/Off Mode
Low Transmit Power Mode
Maintenance Display Mode
Medium Transmit Power Mode ^{*1}
Menu Mode
Mic Sense Mode ^{*1}
Microphone Type Mode ^{*1}
Monitor Mode ^{*1}
My ID Mode
OST Mode ^{*1}
OST List Mode
OVCM Mode
Playback Mode
Priority-channel Select Mode
Public Address Mode ^{*1}
Radio Check Mode ^{*1}
Radio Inhibit Mode ^{*1}
Radio Uninhibit Mode ^{*1}
Receive Entry Mode
Redial Mode
Remote Control Mode
RX Audio Equalizer (High) Mode ^{*1}
RX Audio Equalizer (High Midrange) Mode ^{*1}
RX Audio Equalizer (Middle) Mode ^{*1}
RX Audio Equalizer (Low Midrange) Mode ^{*1}
RX Audio Equalizer (Low) Mode ^{*1}
RX Audio Gain Control Mode ^{*1}
Scan Mode ^{*1}
Scan Delete/Add Mode ^{*1}
Scan Normal Mode ^{*1}
Scan Program Mode
Scrambler/Encryption Mode ^{*1}
Scrambler/Encryption Code Mode
Selcall Mode
Short Message Mode
Site Lock Mode ^{*1}

Site Select Mode
Speaker Type Mode ^{*1}
Squelch Level Mode
Squelch Off Mode ^{*1}
Stack Mode
Status Mode
Surveillance Mode ^{*1}
System Select Mode
Talk Around Mode ^{*1}
Task Request Confirmation Mode
Transceiver Password Mode ^{*2}
TX Audio Equalizer (High) Mode ^{*1}
TX Audio Equalizer (High Midrange) Mode ^{*1}
TX Audio Equalizer (Middle) Mode ^{*1}
TX Audio Equalizer (Low Midrange) Mode ^{*1}
TX Audio Equalizer (Low) Mode ^{*1}
TX Audio Gain Control Mode ^{*1}
Vibrator Mode ^{*1}
VOX Mode ^{*1}
VOX Gain Level Mode ^{*1}
Zone Delete/Add Mode ^{*1}

^{*1} Modes entered only from Menu Mode.

^{*2} "Input Password" reappears on the display when the duration configured in **Mode Reset Timer** elapses.

Configuration using KPG-D3/ D3N

Configuring **Mode Reset Timer** ( See Radio Configuration > Global Options > Basics > General > Control)

Keypad Operation

Supported Models: Portable (Full Key Model)/ Mobile

The keypad operating method can be selected according to the user's purpose.

Functions can be assigned to the keypad by using KPG-D3/ D3N. The following is the list of the functions that can be assigned to the transceiver for Keypad Operation:

Table 4-4 Keypad Operation

Configuration	Description
None	Pressing a button on the keypad of the transceiver causes a Button-entry Error Tone (1 beep) to sound, but it has no effect on the transceiver.
Channel Entry	Pressing a key on the keypad can directly specify a channel. (Refer to Changing the Channel by Specifying the Number (Channel Entry) .)
Group ID/Channel Entry	In an NXDN Trunking system, pressing the [0] to [9] buttons on the transceiver's keypad can directly specify the Group ID in the NXDN Trunking system. (Refer to Changing the Group ID by Specifying the ID (Group ID Entry) (NXDN Trunking System Only) .) In a system other than an NXDN Trunking system, pressing the [0] to [9] buttons on the transceiver's keypad can directly specify the channel number. (Refer to Changing the Channel by Specifying the Number (Channel Entry) .)
OST	Pressing a key on the keypad can directly select the OST from the OST List 1 to OST List 40. (Refer to Analog Function Part Changing the Decode/ Encode Combination of the QT/ DQT (OST))
Autodial	Pressing the [0] to [9] buttons on the keypad enters Autodial Mode. In Autodial Mode, the transceiver can transmit by selecting a DTMF code from Autodial List or directly entering a DTMF code.
Keypad Auto PTT	Every time a key on the keypad is pressed, the DTMF code is instantly sent.
Short Message	Pressing the [0] to [9] buttons on the keypad enters Short Message Mode. In Short Message Mode, a Short Message can be sent by directly entering a Short Message.
Status	Pressing the [0] to [9] buttons on the keypad enters Status Mode. In Status Mode, a status configured in the Status List in an NXDN system or a DMR system can be selected. Also, in an NXDN system or a DMR system, a status can be sent by directly entering a status.
Individual	Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Individual Call Mode in an NXDN system or a DMR system. In Individual Call Mode, a call can be initiated by selecting an Individual ID configured in the Individual ID List or directly entering an Individual ID.
Individual + Short Message	NXDN system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Individual Call Mode in an NXDN system. In Individual Call Mode, a call can be initiated by selecting an Individual ID configured in the Individual ID List or directly entering an Individual ID. Then, pressing the [M] button while the transceiver is in Individual Call Mode allows the transceiver to enter Short Message Mode. In Short Message Mode, a Short Message can be sent by directly entering a Short Message. DMR system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Individual Call Mode in a DMR system. In Individual Call Mode, a call can be initiated by selecting an Individual ID configured in the Individual ID List or directly entering an Individual ID. Then, pressing the [M] button while the transceiver is in Individual Call Mode allows the transceiver to enter Short Message Mode. In Short Message Mode, a Short Message can be sent by directly entering a Short Message.
Individual + Status	NXDN system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Individual Call Mode in an NXDN system. In Individual Call Mode, a call can be initiated by selecting an Individual ID configured in the Individual ID List or directly entering an Individual ID. Then, pressing the [M] button while the transceiver is in Individual Call Mode allows the transceiver to enter Status Mode. In Status Mode, a Status Message can be sent by selecting a status configured in NXDN Status List or by directly entering a status number. DMR system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Individual Call Mode in a DMR system. In Individual Call Mode, a call can be initiated by selecting an Individual ID configured in the Individual ID List or directly entering an Individual ID. Then, pressing the [M] button while the transceiver is in Individual Call Mode allows the transceiver to enter Status Mode. In Status Mode, a status can be sent by selecting a status configured in the DMR Status List or directly entering a status.

Configuration	Description
Group	NXDN Conventional system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Group Call Mode in an NXDN Conventional system. In Group Call Mode, a Group Call can be initiated by selecting a Group ID registered in the Group ID List. DMR system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Group Call Mode in a DMR Conventional system. In Group Call Mode, a Group Call can be initiated by selecting a Group ID registered in the Group ID List.
Group + Short Message	NXDN Conventional system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Group Call Mode in an NXDN Conventional system. In Group Call Mode, a call can be initiated by selecting a Group ID registered in the Group ID List. Then, pressing the [M] button while the transceiver is in Group Call Mode allows the transceiver to enter Short Message Mode. In Short Message Mode, a Short Message can be sent by directly entering a Short Message. NXDN Trunking system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Short Message Mode in an NXDN Trunking system. In Short Message Mode, a Short Message can be sent by directly entering a Short Message. DMR Conventional system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Group Call Mode in a DMR Conventional system. In Group Call Mode, a Group Call can be initiated by selecting a Group ID registered in the Group ID List. Then, pressing the [M] button while the transceiver is in Group Call Mode allows the transceiver to enter Short Message Mode. In Short Message Mode, a Short Message can be sent by directly entering a Short Message. DMR-based Trunking system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Short Message Mode in a DMR-based Trunking system. In Short Message Mode, a Short Message can be sent by directly entering a Short Message.
Group + Status	NXDN Conventional system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Group Call Mode in an NXDN Conventional system. In Group Call Mode, a call can be initiated by selecting a Group ID registered in the Group ID List. Then, pressing the [M] button while the transceiver is in Group Call Mode allows the transceiver to enter Status Mode. In Status Mode, a Status Message can be sent by selecting a status configured in NXDN Status List or by directly entering a status number. NXDN Trunking system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Status Mode in an NXDN Trunking system. In Status Mode, a Status Message can be sent by selecting a status configured in NXDN Status List or by directly entering a status number. DMR Conventional system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Group Call Mode in a DMR Conventional system. In Group Call Mode, a Group Call can be initiated by selecting a Group ID registered in the Group ID List. Then, pressing the [M] button while the transceiver is in Group Call Mode allows the transceiver to enter Status Mode. In Status Mode, a status can be sent by selecting a status configured in the DMR Status List or directly entering a status. DMR-based Trunking system: Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Status Mode in a DMR-based Trunking system. In Status Mode, a status can be sent by selecting a status configured in the DMR Status List or directly entering a status.

Configuration	Description
Direct Channel & OST	Pressing the [0] to [9] buttons on the keypad allows the transceiver to enter Direct Channel & OST Mode. If the Menu () or the [*] button is pressed in Direct Channel & OST Mode, the transceiver migrates to the channel of the entered number. Or, if the Back () or [#] button is pressed in Direct Channel & OST Mode, the transceiver migrates to the OST list of the entered number, and this OST list number is configured after the OST list number is displayed for 2 sec.
Dialing (DMR)	Pressing the [0] button to [9] button, [*] button, or [#] button on the keypad allows the transceiver to enter Dialing Mode in a DMR-based Trunking system. In Dialing Mode, a Dialing code can be sent by entering a Dialing code.
Free-dial Entry	Pressing the [0] to [9] buttons on the keypad enters Free-dial Entry Mode. In Free-dial Entry Mode, a 5-tone code can be sent by directly entering a 5-tone code.

Note

- Refer to each Function Reference for details about various calls.
- To directly enter an Individual ID or status in an NXDN system or DMR system, Manual Dialing needs to be enabled using KPG-D3/ D3N. (Refer to [Manual Dialing](#).)
- Refer to “[Available Functions for the PF Buttons](#)” for the description on FleetSync or MDC-1200.

Configuration using KPG-D3/ D3N

Configuring **Keypad Operation** ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

Manual Dialing

Manual Dialing is the function to directly enter an Individual ID or status number in an NXDN system or DMR system. In an analog system, this function can directly enter a Fleet/ ID or an MDC-1200 ID.

If **Manual Dialing** is enabled, a call can be made by directly entering an Individual ID, Fleet/ ID, or status number by using a keypad or the [] or [] button.

Configuration using KPG-D3/ D3N

- Configuring **Manual Dialing** (NXDN Conventional) to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > TX Options)
- Configuring **Manual Dialing** (NXDN Trunking) to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)
- Configuring **Manual Dialing** (DMR Conventional) to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > TX Options)
- Configuring **Manual Dialing** (DMR-based Trunking) to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > TX Options)
- Configuring **Manual Dialing** (FleetSync) to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > FleetSync)
- Configuring **Manual Dialing** (MDC-1200) to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > TX Options > MDC-1200)

4.4

Using Menu Mode

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Menu Mode allows a selecting a function in the menu format and activating the function.

Since a maximum of 64 functions can be configured for a maximum of 12 categories, many functions can be used in Menu Mode.

Operating the transceiver

The following procedure is an example of the user operation in Menu Mode.

1

Press the **Menu** button.

The transceiver enters Menu Mode and then category icons appear.



2

Select a category by pressing the **[▲]**, **[▼]**, **[◀]**, or **[▶]** button.

Note

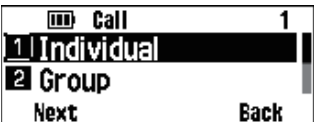
- If other function icons are in the rows below and the **[▶]** button is pressed while the focus is at the right end of the current row, the function icons in the row directly below appear and the focus moves to the left end of this row directly below. If other function icons are not in the rows below and the **[▶]** button is pressed while the focus is at the right end of the current row, a Rollover Tone (1 beep) sounds from the transceiver, and then the focus moves to the left end of the current row.
- If other function icons are in the rows above and the **[◀]** button is pressed while the focus is at the left end of the current row, the function icons in the row directly above appear and the focus moves to the right end of this row directly above. If other function icons are not in the rows above and the **[◀]** button is pressed while the focus is at the left end of the current row, a Rollover Tone (1 beep) sounds from the transceiver, and then the focus moves to the right end of the current row.



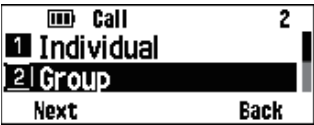
3

Press the **Menu** (**[□]**) or **[*]** button.

The Function List for the selected category appears.

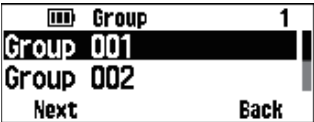


4 Select the function to be started from the Function List by pressing the [▲] or [▼] button.

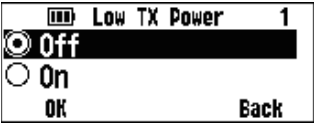


5 Press the Menu ([□]) or [*] button.

The selected function functions.



Options for a function such as “On” and “Off” can be selected by pressing the [▲] or [▼] button, and then can be confirmed by pressing the Menu ([□]) or [*] button.



Note

- The category does not appear in Menu Mode when only one category is configured. When the transceiver enters Menu Mode, the functions registered in Menu Mode appear.
- Refer to “LIST OF BUTTON OPERATIONS IN EACH MODE” for the operation of each button in Menu Mode.

Configuration using KPG-D3/ D3N

Configuring Menu Mode ( See Radio Configuration > Global Options > Button Assignment > Menu)

4.5 Changing the Zone-channel

The Zone-channel can be changed using the **Selector** (Portable only) or **PF** buttons.

Changing the Zone

The zone can be changed by operating the **Selector** (Portable only) or **PF** buttons.

Portable

● Changing the zone according to the number indicated by the pointer of the Selector

Rotating the **Selector** causes the transceiver to migrate to the zone having the same number specified by the **Selector**. Zones that can be selected are limited to zone 1 to zone 16.

If an unprogrammed zone is selected, "*****" appears on the display.

This behavior can be realized by installing a stopper on the **Selector**, enabling **16 Zone/Channel Selector**, and assigning the Zone Select function to the **Selector**. (Refer to [Available Functions for the Selector](#).)

● Changing the zone regardless of the number indicated by the pointer of the Selector

Rotating the **Selector** clockwise increases the zone number in steps of 1. Rotating the **Selector** counterclockwise decreases the zone number in steps of 1.

If an unprogrammed zone is selected, the zone will be skipped.

This behavior can be realized by disabling **16 Zone/Channel Selector** and assigning the Zone Up/ Down function to the **Selector**. (Refer to [Available Functions for the Selector](#).)

● Changing the zone by using the PF button

Pressing the **Zone Up** button increases the zone number in steps of 1. Pressing the **Zone Down** button decreases the zone number in steps of 1.

If "Zone Up (Continuous)" or "Zone Down (Continuous)" is assigned to the **Zone Up** or **Zone Down** button, the zone number is increased or decreased continuously every 200 ms by pressing and holding the **Zone Up** or **Zone Down** button.

If an unprogrammed zone is selected, the zone will be skipped.



Note

- The operation for changing the zone changes depending on the configuration in **Rollover/End Stop**. (Refer to [Rollover/End Stop](#).)
- For Basic Model, zones that can be selected are from Zone 1 to Zone 4. When a zone is selected, the following tones sound from the transceiver depending on the zone selected:

Zone 1: Zone 1 Select Tone (1 beep)

Zone 2: Zone 2 Select Tone (2 beeps)

Zone 3: Zone 3 Select Tone (3 beeps)

Zone 4: Zone 4 Select Tone (4 beeps)

In this case, Rollover Tone (1 beep) does not sound from the transceiver even if "Rollover" is configured in **Rollover/End Stop**. However, if the **Zone-Channel Guide** is used, Rollover Tone (1 beep) sounds from the transceiver, although the above tones do not sound. (Refer to [Zone-Channel Guide](#).)

- For Basic Model, up to 128 zones can be selected if **1000 Channel** is enabled.

Mobile

Pressing the **Zone Up** button increases the zone number in steps of 1. Pressing the **Zone Down** button decreases the zone number in steps of 1.

If “Zone Up (Continuous)” or “Zone Down (Continuous)” is assigned to the **Zone Up** or **Zone Down** button, the zone number is increased or decreased continuously every 200 ms by pressing and holding the **Zone Up** or **Zone Down** button.

If an unprogrammed zone is selected, the zone will be skipped.

Note

- The operation for changing the zone changes depending on the configuration in **Rollover/End Stop**. (Refer to [Rollover/End Stop](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **16 Zone/Channel Selector** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Selector)

Changing the Channel

The channel can be changed using the **Selector** (Portable only) or **PF** buttons.

Portable

● Changing the channel according to the number indicated by the pointer of the Selector

Rotating the **Selector** causes the transceiver to migrate to the channel having the same number specified by the **Selector**. Channels that can be selected are limited to channel 1 to channel 16.

If an unprogrammed channel is selected, “*****” appears on the display. While an unprogrammed channel is selected, the LED lights switching between yellow and red, and a Warning Tone A (continuous beep) sounds from the transceiver.

This behavior can be realized by installing a stopper on the **Selector**, enabling **16 Zone/Channel Selector**, and assigning the Channel Select function to the **Selector**. (Refer to [Available Functions for the Selector](#).)

● Changing the channel regardless of the number indicated by the pointer of the Selector

Rotating the **Selector** clockwise increases the channel number in steps of 1. Rotating the **Selector** counterclockwise decreases the channel number in steps of 1.

If an unprogrammed channel is selected, the channel will be skipped.

This behavior can be realized by disabling **16 Zone/Channel Selector** and assigning the Channel Up/ Down function to the **Selector**. (Refer to [Available Functions for the Selector](#).)

● If using the PF buttons:

Pressing the **Channel Up** button increases the channel number in steps of 1. Pressing the **Channel Down** button decreases the channel number in steps of 1.

If “Channel Up (Continuous)” or “Channel Down (Continuous)” is assigned to the **Channel Up** or **Channel Down** button, the channel number increases or decreases continuously at 200 ms intervals by pressing and holding the **Channel Up** or **Channel Down** button.

If an unprogrammed channel is selected, the channel will be skipped.

Note

- The operation for changing the channel changes depending on the configuration in **Rollover/End Stop**. (Refer to [Rollover/End Stop](#).)
- For Full Key Model/ Standard Key Model and Mobile, the channels from 1 to 250 can be selected. However, up to 512 channels can be selected if **1000 Channel** is enabled.
- For Basic Model, only channels from 1 to 16 can be selected. However, up to 512 channels can be selected if **1000 Channel** is enabled.

Mobile

Pressing the **Channel Up** button increases the channel number in steps of 1. Pressing the **Channel Down** button decreases the channel number in steps of 1.

If “Channel Up (Continuous)” or “Channel Down (Continuous)” is assigned to the **Channel Up** or **Channel Down** button, the channel number increases or decreases continuously at 200 ms intervals by pressing and holding the **Channel Up** or **Channel Down** button.

If an unprogrammed channel is selected, the channel will be skipped.

Note

- The operation for changing the channel changes depending on the configuration in **Rollover/End Stop**. (Refer to [Rollover/End Stop](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **16 Zone/Channel Selector** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Selector)

Rollover/End Stop

Rollover/End Stop is the method to configure how a zone or channel migrates when changing the zone or channel using the **PF** buttons or **Selector** on the transceiver.

The zone or channel migrates as below depending on the configuration using KPG-D3/ D3N when changing the zone or channel using the **PF** buttons or **Selector** on the transceiver.

Table 4-5 Rollover/End Stop

Configuration	Description
Rollover	A Rollover Tone (1 beep) sounds from the transceiver and the transceiver migrates to the zone or channel having the lowest number when attempting to increase the zone or channel number while the zone or channel having the largest number is selected. The transceiver migrates to the zone or channel having the largest number when attempting to decrease the zone or channel number while the zone or channel having the lowest number is selected.
End Stop	The zone or channel in the range between the highest and lowest numbers can be selected. The zone or channel number is not looped. A Stop Tone (1 beep) sounds from the transceiver and the transceiver does not migrate to a different zone or channel when attempting to increase the zone or channel number while the zone or channel having the largest number is selected. Also, a Stop Tone (1 beep) sounds from the transceiver and the transceiver does not migrate to a different zone or channel when attempting to decrease the zone or channel number while the zone or channel having the lowest number is selected.

Configuration using KPG-D3/ D3N

Configuring **Rollover/End Stop** ( [See](#) Radio Configuration > Global Options > Basics > General > Control)

Changing the Channel by Specifying the Number (Channel Entry)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Channel Entry can be used to directly migrate to the channel to be used.

For use of this function, pressing the **Channel Entry** or **Group ID/Channel Entry** button causes the transceiver to enter Channel Entry Mode.

● Using the Channel Entry button

The channel number in the current zone can be specified by directly entering numbers after pressing the **Channel Entry** button.

Also, if “Channel Entry” is configured in **Keypad Operation**, the channel number can be specified by pressing the **[0]** to **[9]** buttons on the keypad even if the **Channel Entry** button is not pressed.

● Using the Group ID/Channel Entry button

While a zone other than an NXDN Trunking system zone is selected, the channel in the current zone can be specified by directly entering numbers after pressing the **Group ID/Channel Entry** button.

Also, if “Group ID/Channel Entry” is configured in **Keypad Operation**, the channel can be specified by pressing the **[0]** to **[9]** buttons on the keypad while a zone other than an NXDN Trunking system zone is selected.

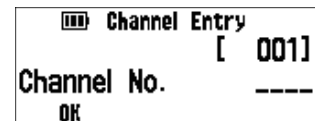
The transceiver automatically recognizes the digits of the highest channel number configured for the transceiver. The channel number can be entered within this range of digits.

Operating the transceiver

1 Press the **Channel Entry** button, or press the **Group ID/Channel Entry** button after selecting a zone other than an NXDN Trunking system zone.

The transceiver enters Channel Entry Mode.

The following operations are identical even if the transceiver enters Channel Entry Mode by using the keypad.



2 Enter the channel number.

The following are examples for entering a channel number by using the keypad.

- If the maximum channel number has 3 digits:
 - To make a call on channel 250, press the **[2]**, **[5]** and **[0]** buttons in this order.
 - To make a call on channel 90, press the **[0]**, **[9]** and **[0]** buttons in this order.
 - To make a call on channel 7, press the **[0]**, **[0]** and **[7]** buttons in this order.
 - If the maximum channel number has 2 digits:
 - To make a call on channel 90, press the **[9]** and **[0]** buttons in this order.
 - To make a call on channel 7, press the **[0]** and **[7]** buttons in this order.
 - If the maximum channel number has 1 digit:
 - To make a call on channel 7, press the **[7]** button.
- If the maximum number of digits is entered, the transceiver exits Channel Entry Mode and then migrates to the channel of the entered channel number.

3 Press the **Menu** ([) button.

The transceiver exits Channel Entry Mode and then migrates to the channel of the entered number.

If there is no channel of the entered channel number, a Button-entry Error Tone (1 beep) sounds from the transceiver, and then the transceiver exits Channel Entry Mode.

Note

- Refer to “[LIST OF BUTTON OPERATIONS IN EACH MODE](#)” for button operations for entering the channel number in Channel Entry Mode.
- The channel number selected before the transceiver enters Channel Entry Mode appears on the display, such as “[001]”. Pressing the **Menu** ([) or [*****] button while no channel number is entered causes the transceiver to exit Channel Entry Mode and then to return to this channel number.
- If the transceiver exits Channel Entry Mode by pressing the **Home** ([) button, the transceiver returns to the channel selected before the transceiver entered Channel Entry Mode.
- Pressing the **PTT** switch while in Channel Entry Mode causes the transceiver to transmit on the channel selected before the transceiver entered Channel Entry Mode.
- If the channel is changed while in Channel Entry Mode, pressing the **PTT** switch initiates transmission on the channel to which the transceiver has changed.
- If no button is pressed before the amount of time configured in **Mode Reset Timer** elapses, the transceiver exits Channel Entry Mode and then returns to the channel selected before the transceiver entered Channel Entry Mode.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Changing the Group ID by Specifying the ID (Group ID Entry) (NXDN Trunking System Only)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Group ID Entry is the function to migrate the transceiver to the channel with the Group ID which is directly selected and to be used in an NXDN Trunking system.

The Group ID to be used can be specified by directly entering a Group ID after pressing the **Group ID/Channel Entry** button when a zone in an NXDN Trunking system is selected.

Also, if “Group ID/Channel Entry” is configured in **Keypad Operation**, the Group ID can be specified by pressing the [**0**] to [**9**] buttons on the keypad while a zone in an NXDN Trunking system is selected.

By specifying a Group ID configured for a zone in an NXDN Trunking system, the transceiver can migrate to a channel with the Group ID.

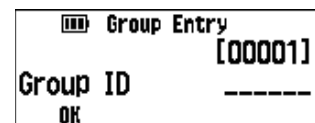
The transceiver automatically recognizes the digits of the highest Group ID in all the zones in an NXDN Trunking system configured for the transceiver.

Operating the transceiver

1 Press the **Group ID/Channel Entry** button after an NXDN Trunking system zone is selected.

The transceiver enters Group ID Entry Mode.

The following operations are identical even if the transceiver enters Group ID Entry Mode by using the keypad.



2 Enter a Group ID.

The following are examples for entering a Group ID by using the keypad.

- If the maximum Group ID has 5 digits:
 To enter Group ID 21250, press the **[2]**, **[1]**, **[2]**, **[5]** and **[0]** buttons in this order.
 To enter Group ID 1250, press the **[0]**, **[1]**, **[2]**, **[5]** and **[0]** buttons in this order.
 To enter Group ID 250, press the **[0]**, **[0]**, **[2]**, **[5]** and **[0]** buttons in this order.
 To enter Group ID 90, press the **[0]**, **[0]**, **[9]** and **[0]** buttons in this order.
 To enter Group ID 7, press the **[0]**, **[0]**, **[0]**, **[0]** and **[7]** buttons in this order.
- If the maximum Group ID has 4 digits:
 To enter Group ID 1250, press the **[1]**, **[2]**, **[5]**, and **[0]** buttons in this order.
 To enter Group ID 250, press the **[0]**, **[2]**, **[5]**, and **[0]** buttons in this order.
 To enter Group ID 90, press the **[0]**, **[0]**, **[9]** and **[0]** buttons in this order.
 To enter Group ID 7, press the **[0]**, **[0]**, **[0]**, and **[7]** buttons in this order.
- If the maximum Group ID has 3 digits:
 To enter Group ID 250, press the **[2]**, **[5]** and **[0]** buttons in this order.
 To enter Group ID 90, press the **[0]**, **[9]** and **[0]** buttons in this order.
 To enter Group ID 7, press the **[0]**, **[0]** and **[7]** buttons in this order.
- If the maximum Group ID has 2 digits:
 To enter Group ID 90, press the **[9]** and **[0]** buttons in this order.
 To enter Group ID 7, press the **[0]** and **[7]** buttons in this order.
- If the maximum Group ID has 1 digit:
 To enter Group ID 7, press the **[7]** button.

If the maximum number of digits is entered, the transceiver exits Group ID Entry Mode and then migrates to the channel of the entered Group ID.

3 Press the **Menu** (**[F4]**) button.

The transceiver exits Group ID Entry Mode and then migrates to the channel of the entered Group ID.

If there is no channel with the entered Group ID, a Button-entry Error Tone (1 beep) sounds from the transceiver, and then the transceiver exits Group ID Entry Mode.

Note

- Refer to “**LIST OF BUTTON OPERATIONS IN EACH MODE**” for button operations for entering the Group ID in Group ID Entry Mode.
- Pressing the **PTT** switch while in Group ID Entry Mode causes the transceiver to transmit on the channel selected before the transceiver entered Group ID Entry Mode. If the channel is changed while in Group ID Entry Mode, pressing the **PTT** switch initiates transmission on the channel to which the transceiver has changed.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver (See Radio Configuration > Global Options > Button Assignment)

Changing the Channel with a Single Touch

The channel can be changed with a single touch by using the Home Channel or Direct Channel function.

Home Channel

Home Channel is the function to migrate the transceiver to a preconfigured channel by pressing the **Home Channel** button. The transceiver can move to and from channels in the same zone.

Also, pressing the **Home Channel Select** button can change the Home Channel.

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the Home Channel can be changed by selecting "Home Channel Select". (Refer to [Using Menu Mode.](#))

Note

- If the **Home Channel** button is pressed during the scan, the transceiver pauses scanning while the transceiver is migrating to the Home Channel, and then a Scan Stop Tone (2 beeps) continuously sounds from the transceiver at 30-sec intervals.
- **Priority Monitor ID** of NXDN Trunking functions according to the configuration for the Home Channel to which the transceiver migrates.

Operating the transceiver

● Migrating to the Home Channel

1 Press the **Home Channel** button.

A Button Beep A (1 beep) sounds from the transceiver, and then the transceiver migrates to the Home Channel configured for the selected zone. "Home" appears on the display.



2 Press the **Home Channel** button again.

A Button Beep B (2 beeps) sounds from the transceiver, and then the transceiver returns to the previous channel.



● Changing the Home Channel

1 Select the channel to be configured as the Home Channel.



2 Press the **Home Channel Select** button.

A Button Beep C (3 beeps) sounds from the transceiver, and then the Home Channel is changed. "Home" appears on the display at the same time.



Configuration using KPG-D3/ D3N

- Configuring **Home Channel** ( See Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > General > Home Channel)
- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Direct Channel

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Direct Channel is the function to migrate the transceiver to a preconfigured channel by pressing one of the **Direct Channel 1** to **Direct Channel 5** buttons. The transceiver can move to and from channels in each zone.

Also, pressing one of the **Direct Channel 1 Select** to **Direct Channel 5 Select** buttons can change the Direct Channel.

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the Direct Channel can be changed by selecting one of "Direct Channel 1 Select" to "Direct Channel 5 Select". (Refer to [Using Menu Mode.](#))

Note

- If the Return function is enabled, pressing one of the **Direct Channel 1** to **Direct Channel 5** buttons during the scan pauses scanning while the transceiver is migrating to the Direct Channel, and then a Scan Stop Tone (2 beeps) continuously sounds from the transceiver at 30-sec intervals.
- **Priority Monitor ID** of NXDN Trunking, Trunking 2.5, and DMR Tier III Trunking functions according to the configuration for the channel to which the transceiver migrates.

Operating the transceiver

● Migrating to the Direct Channel

Press one of the **Direct Channel 1** to **Direct Channel 5** buttons.

A Button Beep A (1 beep) sounds from the transceiver, and then the transceiver migrates to the Direct Channel regardless of the selected zone. "DRn" appears on the display. The selected Direct Channel number is entered in "n".



If the same Direct Channel button is pressed again while the **Return** function is enabled, a Button Beep B (2 beeps) sounds from the transceiver, and then the transceiver returns to the previous channel.



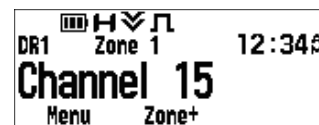
● Changing the Direct Channel

- 1 Select the channel to be configured as the Direct Channel.



2 Press one of the **Direct Channel 1 Select** to **Direct Channel 5 Select** buttons.

A Button Beep C (3 beeps) sounds from the transceiver, and then the Direct Channel is changed. “DRn” appears on the display at the same time.



Configuration using KPG-D3/ D3N

- Configuring **Direct Channel** (**See** Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Direct Channel)
- Configuring **Return** to be enabled or disabled (**See** Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Direct Channel)
- Assigning functions to the **PF** buttons on the transceiver (**See** Radio Configuration > Global Options > Button Assignment)

4.6 Transmitting/ Receiving

The **PTT** switch can be used to transmit and receive.

Receiving

Received audio sounds from the speaker when the transceiver receives a signal and conditions to unmute the speaker are satisfied. To respond, speak into the microphone while pressing the **PTT** switch.

Transmitting

Transmitting can be initiated by selecting the desired Zone-channel and then pressing the **PTT** switch. Audio is transmitted by speaking into the microphone while pressing the **PTT** switch. Releasing the **PTT** switch terminates transmitting.

Conditions to unmute the speaker while receiving, the transceiver behavior while transmitting, or communication methods, such as an individual call or group call, vary according to the system in use. Refer to each Function Reference for communication methods in each system.

In addition, for Mobile, various communications can be done using the external ports of the transceiver. Refer to “[D-sub 15-pin Connector](#)” for the function of the external ports of Mobile.

Note

- Audio characteristics of the microphone and speaker for transmitting and receiving can be configured in **Audio Profile**. (Refer to [Configuring Audio Profile \(Audio Profile\)](#).)

4.7 Viewing the Receive History (Stack)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

In Stack Mode, the incoming call history (Caller ID) can be viewed. In an analog system (FleetSync/ MDC-1200/ 5-tone), an NXDN system, or a DMR system, in addition to the incoming call history, received Status Messages and Short Messages can be viewed in Stack Mode. Received IDs and messages are stored in the stack memory of the transceiver.

In order to store the received IDs and various messages in the stack memory of the transceiver, Caller ID Stack, Status Message Stack, or Short Message Stack needs to be individually enabled by using KPG-D3/ D3N.

The “✉” icon appears if messages are stored in the transceiver. If there is an unread message, the “✉” icon blinks.

Pressing the **Stack** button places the transceiver in Stack Mode. Or, the transceiver can also be placed in Stack Mode by selecting “Stack” after placing the transceiver in Menu Mode by pressing the **Menu** button. (Refer to [Using Menu Mode](#).)

The maximum number of stack data that can be stored

● Caller ID/ Status

A maximum of 250 Caller IDs and Statuses can be stored in the transceiver stack memory.

Note

- Stack data will be deleted or stored as the examples below depending on the configuration in **Old Message Overwrite**. (Refer to [Storage Procedure of the Receive History \(Old Message Overwrite\)](#).)

When a configuration to automatically delete old data:

It is assumed that a voice call and 249 Status Messages are stored, and the voice call is oldest data. In this case, if a new received Status Message is stored, the data of the voice call is deleted and 250 Status Messages are stored.

When a configuration to not automatically delete old data:

It is assumed that 250 Status Messages are stored. In this case, even if a voice call is newly received, the voice call is not stored because 250 Status Messages are stored.

● Short Message

The maximum number of Short Message data that can be stored in the transceiver stack memory varies as follows depending on the configuration of **Short Message Stack** in each communication protocol.

Table 4-6 The Maximum Number of Short Messages That Can Be Stored (NXDN/ FleetSync)

Configuration of Short Message Stack		The maximum number of data that can be stored
NXDN	FleetSync	
Disabled	Disabled	0
Disabled	Enabled	128
Enabled	Disabled	128/ 48 ^{*1}
Enabled	Enabled	128/ 48 ^{*1}

^{*1} Up to 128 if **Extended Short Message** is disabled.

Up to 48 if **Extended Short Message** is enabled.

Table 4-7 The Maximum Number of Short Messages That Can Be Stored (DMR/ FleetSync)

Configuration of Short Message Stack		The maximum number of data that can be stored
DMR	FleetSync	
Disabled	Disabled	0
Disabled	Enabled	128
Enabled	Disabled	32
Enabled	Enabled	32

Operating the transceiver

● Confirming the message

1 Press the **Stack** button.

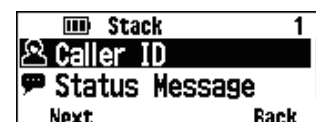
A Button Beep A (1 beep) sounds from the transceiver and the transceiver enters Stack Mode.

The following operations are the same even if the transceiver enters Stack Mode by pressing the **Menu** button.

The display when entering Stack Mode varies depending on the configurations of **Caller ID Stack**, **Status Message Stack**, and **Short Message Stack** of each communication protocol, and the presence of data.

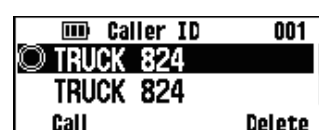
● If data is stored and 2 or more items among Caller ID Stack, Status Message Stack, and Short Message Stack are enabled

The category appears. Proceed to step 2.



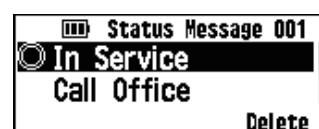
● If data is stored and only Caller ID Stack is enabled

The stored Caller ID list appears. Proceed to step 3.



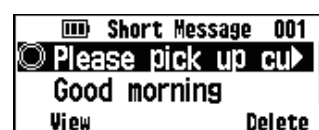
● If data is stored and only Status Message Stack is enabled

The stored Status list appears. Proceed to step 3.



● If data is stored and only Short Message Stack is enabled

The stored Short Message list appears. Proceed to step 3.

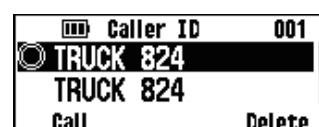
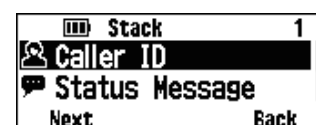


Note

- If no data is stored, "Empty" appears on the display for 1 sec, and the transceiver cannot enter Stack Mode.

2 Select "Caller ID", "Status Message" or "Short Message" and press the **Menu** ([**□**]) or [*****] button.

The selected category list appears.



The number of the stored stack data appears at the upper right of the display. Depending on the type of stack data, the following icons appear at the left end of each stack data:

Table 4-8 Stack Mode

Message Type	Display	
	Unread	Read
Caller ID		
Status Message		
Short Message		
All		-

3 Press the [▲] or [▼] button to select the data, and then confirm the data.

Refer to “Selecting or Clearing Data from a List” for selection methods.

For a Short Message, pressing the **Menu** (□) or [*] button sounds a Button Beep A (1 beep) from the transceiver and the selected Short Message appears.



Note

- When the Short Message does not appear on one screen, press the [▲] or [▼] button to move the line up or down to confirm all of the text.

● Switching the message display

Press the [◀] or [▶] button.

The display switches as follows:

[◀] button:

- Caller ID
Caller ID list → receive channel list → receive date and time list → Caller ID list → ...
- Status/ Short Message
Status/ Short Message list → Caller ID list → receive channel list → receive date and time list → Status/ Short Message list → ...

[▶] button:

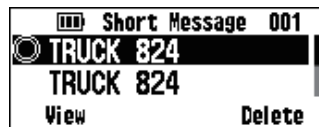
- Caller ID
Caller ID list → receive date and time list → receive channel list → Caller ID list → ...
- Status/ Short Message
Status/ Short Message list → receive date and time list → receive channel list → Caller ID list → Status/ Short Message list → ...

● Status/ Short Message list



The received Status Messages and Short Messages are displayed.

- **Caller ID Name list**



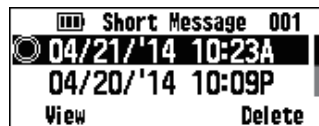
The ID Names of the transceivers which sent messages are displayed. If a Caller ID is displayed, press the **PTT** switch to respond. (Only if the type of the stored message is Caller ID.)

- **Receive channel list**



The channel names of the transceivers which received messages are displayed.

- **Receive date and time list**



The dates and times of received messages are displayed.

Note

- The receive date and time list is displayed only if **Time Stamp** is enabled. (Refer to [Time Stamp](#).)
- Refer to [Selecting or Clearing Data from a List](#) for instructions on how to clear stack data.
- For Caller ID Stack, if **System Type** of the selected channel when the transceiver enters Stack Mode does not match **System Type** of the stack data, a Warning Tone A (continuous beep) sounds from the transceiver and transmission is unavailable even if the **PTT** switch is pressed. Also in this case, even if the **Menu** ($\square$) button is pressed, a Button-entry Error Tone (1 beep) sounds from the transceiver and transmission is unavailable.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Caller ID Stack**
 - ([See](#) Radio Configuration > Protocol Options > NXDN > General > Common Options > Stack > Voice)
 - ([See](#) Radio Configuration > Protocol Options > DMR > General > Stack > Voice)
 - ([See](#) Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Voice)
 - ([See](#) Radio Configuration > Protocol Options > FleetSync > General > RX Options > Voice)
- Configuring **Status Message Stack** to be enabled or disabled
 - ([See](#) Radio Configuration > Protocol Options > NXDN > General > Common Options > Stack > Message)
 - ([See](#) Radio Configuration > Protocol Options > DMR > General > Stack > Message)
 - ([See](#) Radio Configuration > Protocol Options > FleetSync > General > RX Options > Message)
- Configuring **Short Message Stack** to be enabled or disabled
 - ([See](#) Radio Configuration > Protocol Options > NXDN > General > Common Options > Stack > Message)
 - ([See](#) Radio Configuration > Protocol Options > DMR > General > Stack > Message)
 - ([See](#) Radio Configuration > Protocol Options > FleetSync > General > RX Options > Message)

Configuring the Display Order of Data in Stack Mode (Stack Order)

Stack Order is the display order of data in Stack Mode.

Data in Stack Mode is displayed as follows according to the configuration of **Stack Order**:

Table 4-9 Stack Order

Configuration	Description
Descending	The newest data is displayed on the first line of a list.
Ascending	The oldest data is displayed on the first line of a list.

Configuration using KPG-D3/ D3N

Configuring **Stack Order** ( See Radio Configuration > Global Options > Basics > Stack/Recording > Status/Short Message > Stack Condition)

Enabling Storage of Redundant Data (Repeated Calls Stack)

Repeated Calls Stack is the function to enable storage of redundant data.

By enabling **Repeated Calls Stack**, the Caller ID or message is stored in the stack memory of the transceiver as new data even if a Caller ID or message identical to a previously received Caller ID or message is received.

Configuration using KPG-D3/ D3N

Configuring **Repeated Calls Stack** to be enabled or disabled ( See Radio Configuration > Global Options > Basics > Stack/Recording > Status/Short Message > Stack Condition)

Displaying the Caller ID While a Message Appears (Caller ID for Message)

Caller ID for Message is the function to display the Caller ID of the stored data while a Status Message or a Short Message appears in Stack Mode.

Configuration using KPG-D3/ D3N

Configuring **Caller ID for Message** to be enabled or disabled ( See Radio Configuration > Global Options > Basics > Stack/Recording > Status/Short Message > Message Display)

Displaying the Receive Channel (Channel Name (Message Display))

Channel Name (Message Display) is the function to display the receive channel of the stored data in Stack Mode.

Configuration using KPG-D3/ D3N

Configuring **Channel Name (Message Display)** to be enabled or disabled ( **See** Radio Configuration > Global Options > Basics > Stack/Recording > Status/Short Message > Message Display)

Deleting All Stack Data

All stack data stored in the transceiver can be deleted when a delete Stack command is received from the communication port.

Storage Procedure of the Receive History (Old Message Overwrite)

Old Message Overwrite is the method to store received Caller IDs, Status Messages, or Short Messages in the stack memory of the transceiver.

Table 4-10 Old Message Overwrite

Configuration	Description
Enabled	The transceiver stores the maximum number of received IDs or messages in the stack memory in the order of receipt. If an ID or a message is received exceeding the maximum number of IDs and messages, the oldest stored ID or message is deleted and the new ID or message is stored in the stack memory. In Stack Mode, the newest stack data is displayed as list number 1.
Disabled	The transceiver stores the maximum number of received IDs or messages in the stack memory in the order of receipt. If an ID or a message is received exceeding the maximum number of IDs and messages, the ID or message is not stored in the stack memory. In Stack Mode, the oldest stack data is displayed as list number 1.

Configuration using KPG-D3/ D3N

Configuring **Old Message Overwrite** to be enabled or disabled ( **See** Radio Configuration > Global Options > Basics > Recording > Status/Message > Stack Condition)

Caller ID Stack

Caller ID Stack is the function to store IDs of callers in the stack memory.

The transceiver can store a maximum of 250 Caller IDs.

By selecting a Caller ID and pressing the **PTT** switch while in Stack Mode, the transceiver can respond to the Caller ID.

When the transceiver receives a call, the "☑" icon blinks to notify that the ID is being saved. If the transceiver enters Stack Mode, a user can check the stored IDs.

The transceiver behaves as follows according to the configuration in **Caller ID Stack**:

Table 4-11 Caller ID Stack

Configuration	Description
None	The Caller ID is not stored even if a call is received.
Individual Call	Only the Caller ID of an Individual Call or Paging Call is stored.
Any Call	The Caller IDs of all calls are stored. However, the Caller IDs of Unaddressed Calls and Broadcast Group Calls are not stored in a DMR Conventional system.

Note

- The transceiver stores in combination a maximum of 250 Caller IDs and Status Messages in the stack memory. If no Status Message is stored, the transceiver stores up to 250 Caller IDs. If no Caller ID is stored, the transceiver can store up to 250 Status Messages.
- If the transceiver receives the Unit ID Name by **Over-the-Air Alias**, the received Unit ID Name is also stored.
- The storage method varies depending on the configurations in **Old Message Overwrite** and **Repeated Calls Stack**.
- In an NXDN system, if the transceiver receives a Group Call from a telephone, the Caller ID is replaced with "Phone Call" and stored in the stack memory.
- In a DMR system, if the transceiver receives a Group Call from a telephone, the Caller ID is replaced with "PABX" or "PSTN" and stored in the stack memory.
- In an NXDN system and DMR system, the Caller ID stored in the stack memory by the transceiver receiving a Group Call from a telephone cannot be called.
- In a DMR Conventional system, if the transceiver receives an Individual Call from a telephone, the Caller ID is replaced with "PABX" or "PSTN" and stored in the stack memory.
- In a DMR Conventional system, the Caller ID stored in the stack memory by the transceiver receiving an Individual Call from a telephone cannot be called.

Configuration using KPG-D3/ D3N

Configuring Caller ID Stack

( See) Radio Configuration > Protocol Options > NXDN > General > Common Options > Stack > Voice)

( See) Radio Configuration > Protocol Options > DMR > General > Stack > Voice)

( See) Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Voice)

( See) Radio Configuration > Protocol Options > FleetSync > General > RX Options > Voice)

Time Stamp

Time Stamp is the function to store a Caller ID, Status Message or Short Message with the stamp of the received time in the stack memory.

Configuration using KPG-D3/ D3N

Configuring **Time Stamp** ( See Radio Configuration > Global Options > Basics > Stack/Recording > Status/Short Message > Stack Condition)

Retain Stacked Message

Retain Stacked Message is the function to retain the stored Caller IDs, Status Messages, or Short Messages in the stack memory of the transceiver even after the transceiver is turned OFF.

Configuration using KPG-D3/ D3N

Configuring **Retain Stacked Message** ( See Radio Configuration > Global Options > Basics > Stack/Recording > Status/Short Message > Stack Condition)

Clear Caller ID Stack on Reply

Clear Caller ID Stack on Reply is the function to clear a Caller ID from the stack memory of the transceiver if the Caller ID stored in the stack memory is selected and called.

This function is used if not storing used Caller IDs in the stack memory of the transceiver.

If this function is enabled, a Caller ID is cleared from the stack memory of the transceiver if the Caller ID stored in the stack memory is selected and called. The Caller ID is cleared from the stack memory even if a call cannot be initiated since the channel is busy. If the transceiver receives a response from the target party, the Caller ID is not stored in the stack memory while the **Auto Reset Timer** is counting down.

Also, the Caller ID of the calling party is stored in the stack memory when the transceiver receives a call, but the Caller ID is cleared from the stack memory if a response is initiated while the **Auto Reset Timer** is counting down. Subsequently, the Caller ID is not stored in the stack memory even if a call from the same party is received while the **Auto Reset Timer** is counting down.



- This function can be used only in an NXDN system and DMR system.

Configuration using KPG-D3/ D3N

Configuring **Clear Caller ID Stack on Reply** to be enabled or disabled

( See Radio Configuration > Protocol Options > NXDN > General > Common Options > Stack > Voice)

( See Radio Configuration > Protocol Options > DMR > General > Stack > Voice)

4.8 Operating the Transceiver in Each Mode (Common Operation)

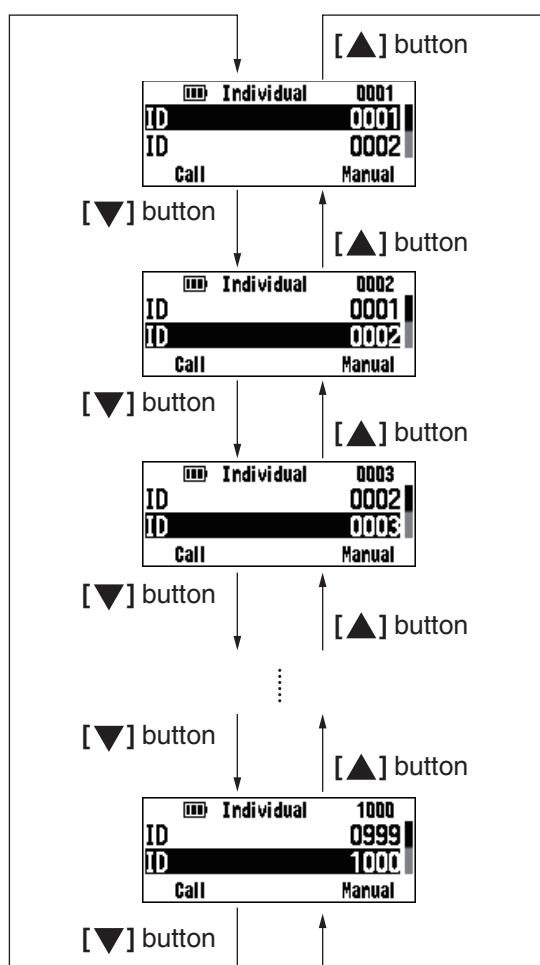
Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

This section describes operations common to transceivers, such as list selection, character entry, etc.

Selecting or Clearing Data from a List

This section explains operations using operating examples for Individual Call Mode and Stack Mode.

- **Selecting data from a list by using the [▲] or [▼] button**



Note

- The list number automatically scrolls up or down continuously while the [▲] or [▼] button is pressed and held.
- The displays above are the displays when **Individual Call Acknowledge Request** in an NXDN Conventional system is enabled.

● Selecting data from a list by using the keypad (Shortcut Entry)

The following are the operation examples for selecting “ID 0002”, “ID 0024” or “ID 0245” from a Unit ID List in Individual Call Mode:

Selecting “ID 0002”:

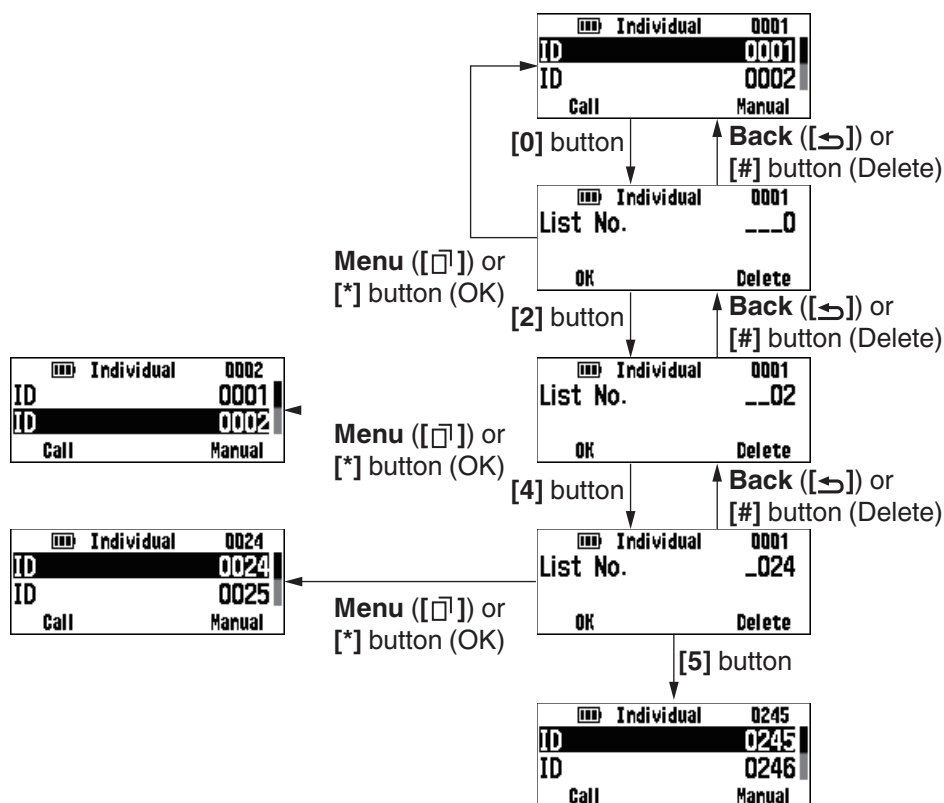
Press the **[0]** and **[2]** buttons on the keypad in this order, and then press the **Menu** (**[⇐]**) or **[*]** button (OK) to fix.

Selecting “ID 0024”:

Press the **[0]**, **[2]**, and **[4]** buttons on the keypad in this order, and then press the **Menu** (**[⇐]**) or **[*]** button (OK) to fix.

Selecting “ID 0245”:

Press the **[0]**, **[2]**, **[4]**, and **[5]** buttons on the keypad in this order.

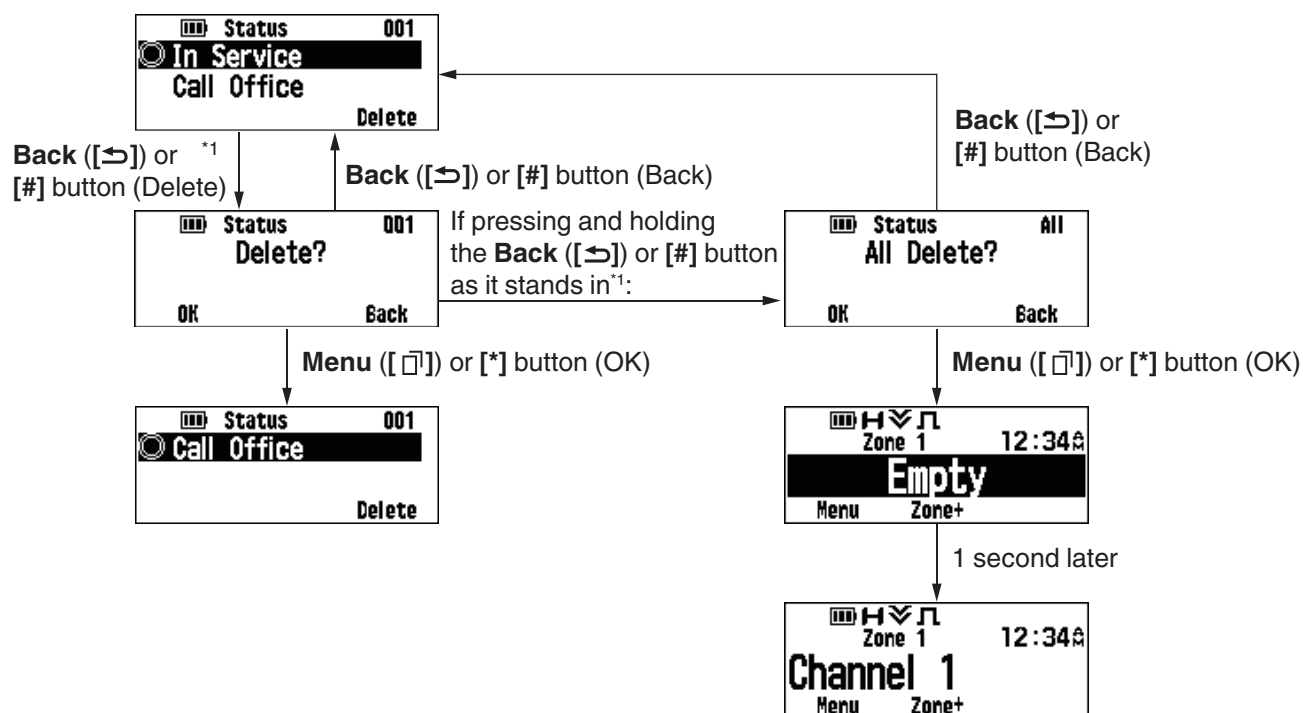


Note

- The following are the main buttons to be used for these operation examples:
 - To confirm: the **Menu** (**[⇐]**) or **[*]** button
 - To delete one character: the **Back** (**[↵]**) or **[#]** button
- The number of digits to be entered varies as follows depending on the highest list number configured in the transceiver:
 - If the highest list number is lower than 10: one digit
 - If the highest list number is 10 or higher and lower than 100: two digits
 - If the highest list number is 100 or higher and lower than 1000: three digits
 - If the highest list number is 1000 or higher: four digits
- If the entered number does not exist when it is determined, the transceiver restores the previous display prior to entering the number.
- The displays above are the displays when **Individual Call Acknowledge Request** in an NXDN Conventional system is enabled.

● Clearing data from a list

The following are the operation examples for clearing recorded data in Stack Mode:



Note

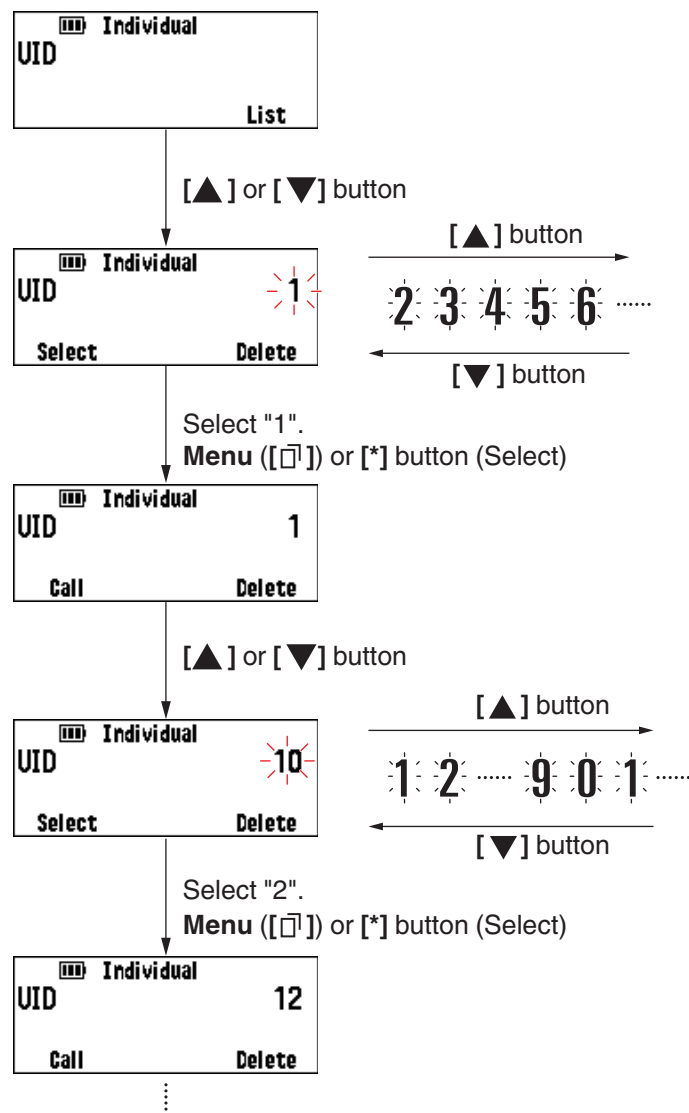
- The following are the main buttons to be used for these operation examples:
 - To clear one piece of data: Press the **Back ([↵])** or **[#]** button.
 - To clear all data: Press and hold the **Back ([↵])** or **[#]** button.
 - To confirm: the **Menu ([□])** or **[*]** button

Entering or Deleting a Code

This section explains operations using operating examples for Individual Call Mode. The displays used in this section are the displays when **Individual Call Acknowledge Request** in an NXDN Conventional system is enabled.

• Entering a code using the [▲] or [▼] button

The following is the operation example to enter "ID 12" in Individual Call Mode:

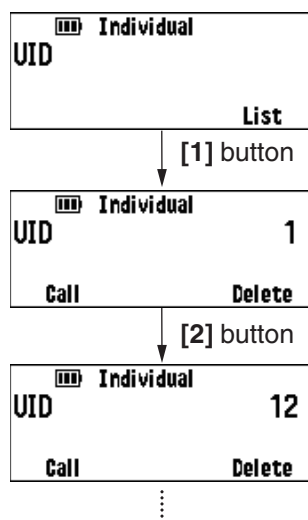


Note

- The following are the main buttons to be used for these operation examples:
 To select a code: the [▲] or [▼] button
 To confirm: the **Menu** ([□]) or [*] button
- Pressing and holding the [▲] or [▼] button continuously scrolls the code up or down.
- The code that can be entered varies depending on the mode and the number of entered digits.

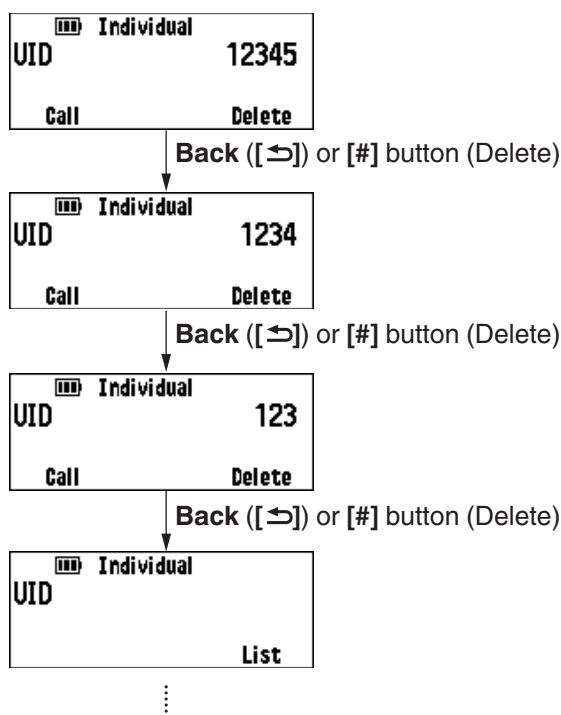
● Entering a code using the keypad

The following is the operation example to enter “ID 12” in Individual Call Mode:



● Deleting the entered code

Pressing the **Back** ([↶]) or **#** button clears the lowest digit of the code. If the **Back** ([↶]) or **#** button remains pressed and held, all the codes are cleared.

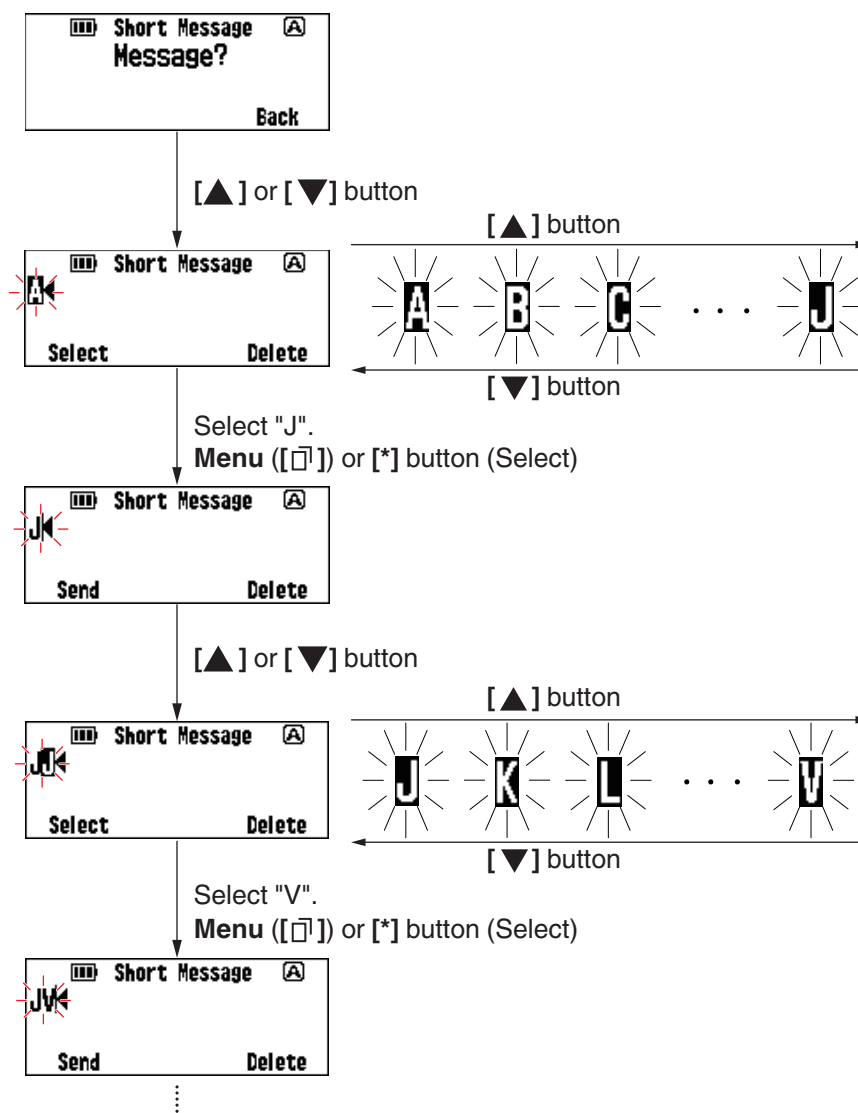


Entering or Deleting Characters

This section explains operations using operating examples for Short Message Mode.

• Entering characters using the [▲] or [▼] buttons

The following is the operation example to enter "JVC" in Short Message Mode.

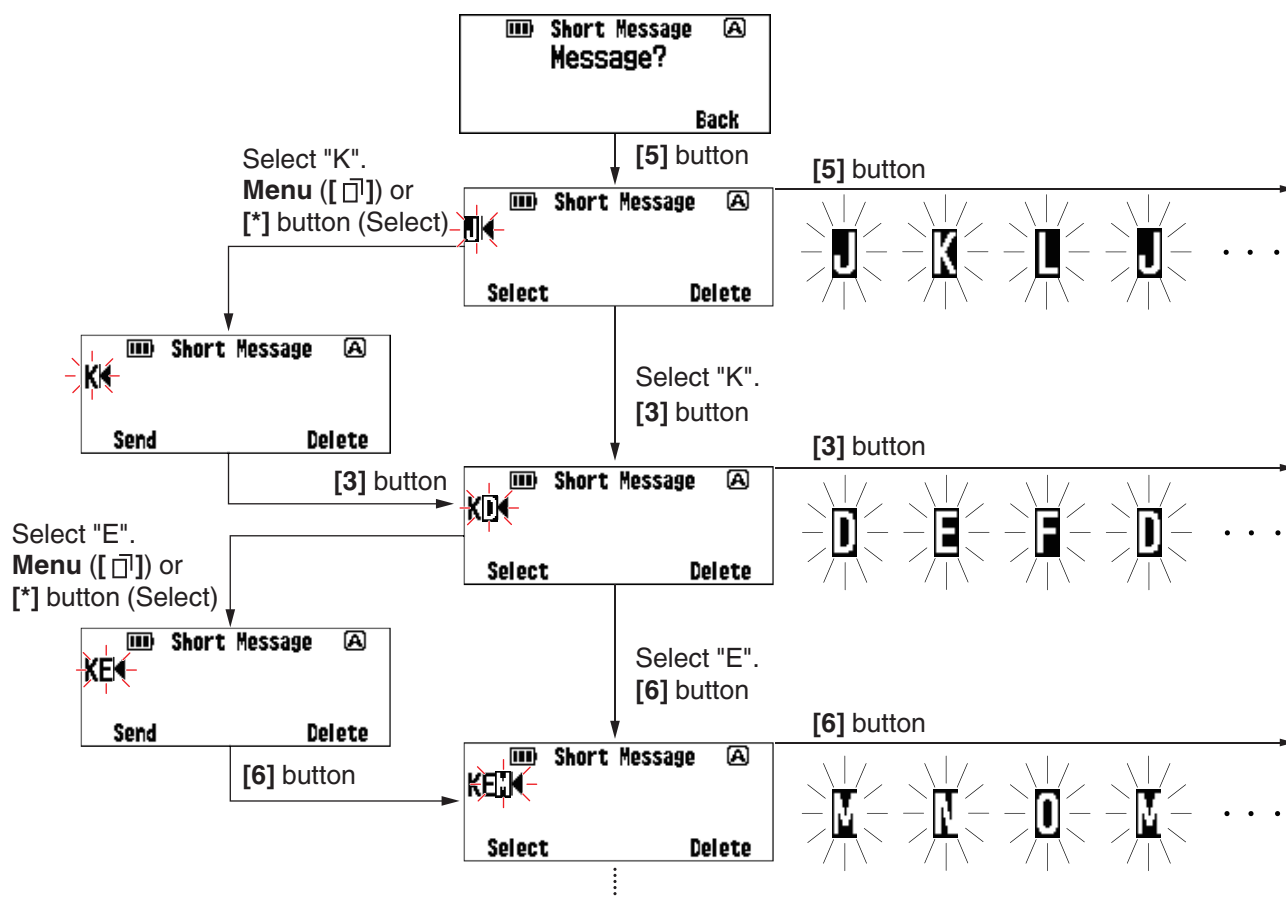


Note

- The following are the main buttons to be used for these operation examples:
 - To select a character: the [▲] or [▼] button
 - To confirm: the **Menu** ([□]) or [*] button
- Pressing and holding the [▲] or [▼] button continuously scrolls the character up or down.
- Characters to be entered can be changed by the configuration in **Character Entry**. (Refer to [Character Entry](#).)
- ◀ at the end of the entered string of text is the mark indicating the end position.

- **Entering characters using the keypad**

The following is the operation example to enter “KENWOOD” in Short Message Mode.

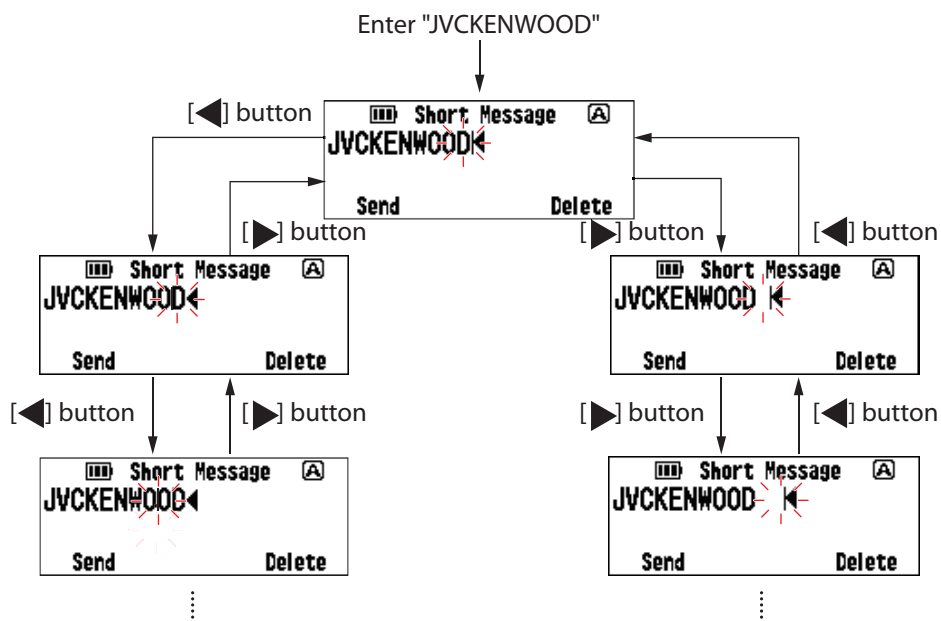


Note

- The following are the main buttons to be used for these operation examples:
 - To select a character: each button on the keypad
 - To confirm: the **Menu** () or [*****] button
- Characters to be entered can be changed by the configuration in **Character Entry**. (Refer to [Character Entry](#).)

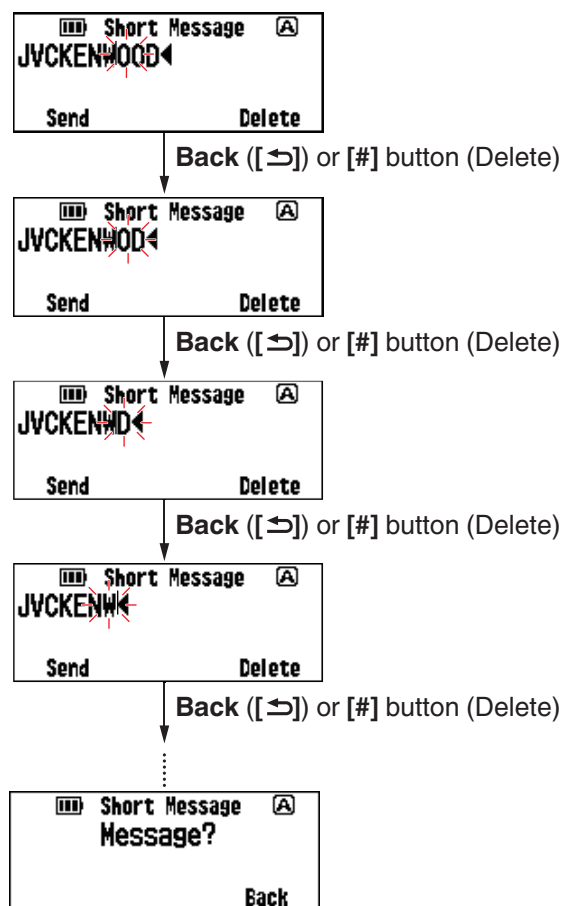
● Moving the cursor

Pressing the [◀] button moves the cursor to left, and pressing the [▶] button moves the cursor to right. Pressing and holding the [◀] or [▶] button continuously moves the cursor.



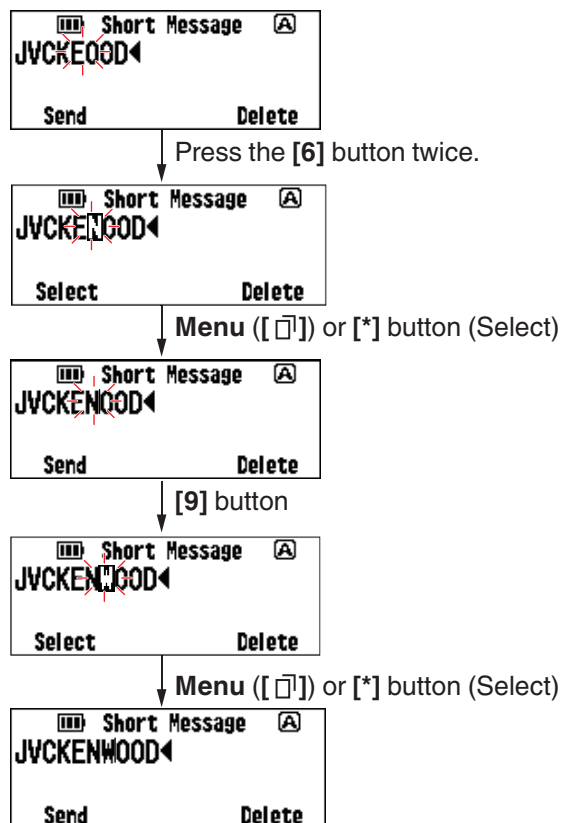
● Deleting characters

Pressing the **Back** ([↵]) or [#] button deletes one character. If the **Back** ([↵]) or [#] button remains pressed and held, all the characters are cleared.



● Inserting characters

The following is the operation example to correct “JVCKEOOD” to “JVCKENWOOD” in Short Message Mode.

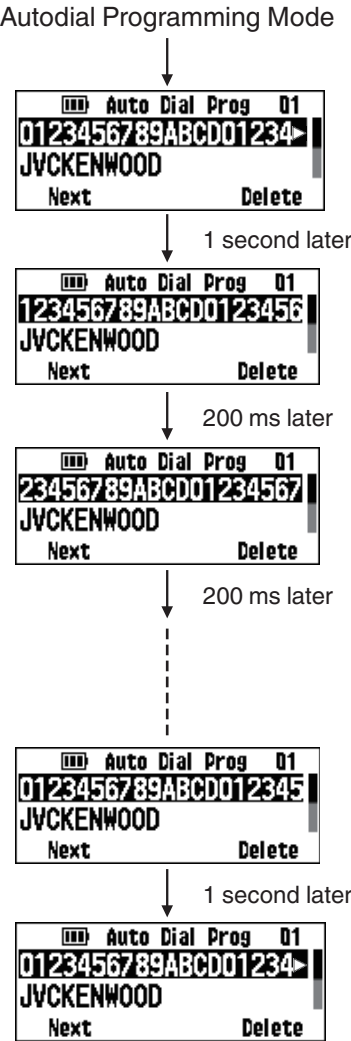


Note

- The following are the main buttons to be used for these operation examples:
 To select a character: each button on the keypad
 To confirm: the **Menu** ([□]) or [*] button
- Characters to be entered can be changed by the configuration in **Character Entry**. (Refer to [Character Entry](#).)

Scroll Display

An example of the display of DTMF code (0123456789ABCD0123456789ABCD012345) is as follows:



Character Entry

Character Entry is the function to enter alphanumeric characters and symbols by using the [0] to [9], [▲] or [▼] buttons.

Symbols, lowercase letters, etc. can be entered by using the [0] to [9], [▲] or [▼] buttons on the keypad. The number of button operations for entering characters can be minimized by configuring only necessary characters.

A maximum of 16 alphanumeric characters and symbols, namely 8 characters of **Capital Font** and 8 characters of **Small Font**, can be configured for each of the [0] to [9] buttons on the keypad.

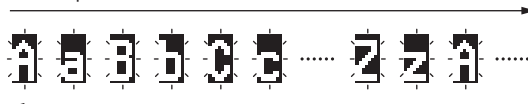
A maximum of 80 alphanumeric characters and symbols can be configured for the [▲] or [▼] button on the keypad.

Character Entry can be used to enter a message in Short Message Mode.

Operating the Transceiver (Operation Examples for Portable)

- If “AaBbCc...Zz” is configured for the [▲] and [▼] buttons

Each time the **Up** button is pressed, a focused letter varies in the predetermined order.



Each time the **Down** button is pressed, a focused letter varies in the opposite order to the predetermined order.

- If “ABCabc2” is configured for the [2] button

Each time the [2] button is pressed, a focused letter varies in the predetermined order.



Note

- When the **Function** ([O]) or [*] button is pressed, the entry mode switches as follows:
Uppercase characters > lowercase characters > numbers > uppercase characters ...
- If “Line Up/Down” is configured for the behavior of the [▲]/ [▼] button, the [▲]/ [▼] button can be used to move the cursor up and down, and characters cannot be entered.
- Refer to “[Operating the Transceiver in Each Mode \(Common Operation\)](#)” for operation methods.

Configuration using KPG-D3/ D3N

Configuring **Character Entry** ([See](#) Radio Configuration > Global Options > Button Assignment > Character Entry)

4.9 Locking the Transceiver Buttons (Button Lock)

Button Lock is the function to disable the transceiver button operation.

This function prevents the incorrect operation of the transceiver by physical contact while carrying the transceiver, such as around the waist.

Pressing the **Button Lock** button toggles Button Lock between activated and deactivated.

Even if a button on the transceiver is pressed while the Button Lock is enabled, a Button-entry Error Tone (1 beep) sounds from the transceiver and it has no effect on the transceiver. If the **PTT** switch is operated, a Warning Tone sounds from the transceiver. If the **Selector** or **Volume** control is operated, a tone does not sound.

Whether each button operation is targeted for the Button Lock can be configured by using KPG-D3/ D3N. The following buttons are targeted for the Button Lock when each configuration is enabled:

Table 4-12 Button Lock

Portable/ Mobile	Configuration	Buttons targeted for the Button Lock
Portable	PTT Switch	PTT switch
	Selector ^{*1}	Selector
	Front Keypad/ Buttons ^{*1}	Menu ([]), Back ([]), Function ([]), Home ([]), [▲], [▼], [◀], [▶], [0] to [9], [*], [#] ^{*2}
	Side Buttons	AUX , Side 1 , and Side 2
	Mic Keypad/Buttons	PF 1 , PF 2 , PF 3
	Volume Control	Volume control (excludes the ON/ OFF of power)
Mobile	PTT Switch	PTT switch
	Control Head Buttons	Menu ([]), Back ([]), Home ([]), [▲], [▼], [◀], [▶], [+], [-], and AUX
	Mic Keypad/Buttons	[0] to [9], [*], [#], [A] to [D]

^{*1} Portable (Full Key Model/ Standard Key Model) only

^{*2} [**0**] to [**9**], [*****], and [**#**] are for Portable (Full Key Model) only

Note

- Buttons assigned with the following functions can be used even while the Button Lock is enabled:
 - Emergency
 - Backlight
 - LCD Brightness
 - Battery Status
 - Call Response
 - Clear
 - Function
 - Button Lock
 - Monitor
 - Monitor Momentary
 - Squelch Off
 - Squelch Off Momentary
 - Zeroize

Also, the following functions even while the Button Lock is enabled:

- **PTT** switch of the speaker microphone (Portable only)
- Mic Hook (Mobile only)
- AUX Input port (Mobile Only)
- Manual Dialing (DTMF)
- Power ON/ OFF

Operating the transceiver

● Activating the Button Lock

Press the **Button Lock** button while the Button Lock is disabled.

The Button Lock is enabled.



● Deactivating the Button Lock

Press the **Button Lock** button while the Button Lock is enabled.

The Button Lock is disabled.



Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)
- Configuring **Button Lock** to be enabled or disabled ( See Radio Configuration > Global Options > Button Assignment > General > Button Lock)

Auto Button Lock Timer

Auto Button Lock Timer is the function to automatically enable the Button Lock when no button is operated after the Button Lock is disabled.

If no button is operated for the amount of time configured in **Auto Button Lock Timer** after the Button Lock is disabled, the Button Lock is automatically enabled.

Either 15 sec or 30 sec can be configured in **Auto Button Lock Timer** by using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

Configuring **Auto Button Lock Timer** ( See Radio Configuration > Global Options > Basics > General > Control)

4.10 Switching the Display Language

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

The language of the characters that appear on the transceiver display and of the voice guide can be configured as a language other than English, such as Spanish or French. Also, the language can be changed by the operation of the transceiver, such as from English to Spanish or from French to English.

The language to be used for the string of text of **Display Customization** and for the audio of **Voice Announcement (Voice Announcement Type = Standard)** can be configured in **Voice and Display Language** of KPG-D3/ D3N.

Table 4-13 Voice and Display Language

Configuration	Description
Language 1	Configures the main language to be used. After the configuration data is written to the transceiver, the language configured in Language 1 is applied for the characters that appear on the transceiver display and for the voice guide, as long as the language is not changed by operating the transceiver. The languages that can be configured are as follows: English, Spanish (Spain), Spanish (Latin America), French, German, Italian, Dutch, Russian, Portuguese (Brazil), Traditional Chinese* ¹
Language 2	Configures the language that is changed by the transceiver operation. From the following languages, a language other than the language of Language 1 can be configured: English, Spanish (Spain), Spanish (Latin America), French, German, Italian, Dutch, Russian, Portuguese (Brazil) If the language is not changed by the transceiver operation, "None" is configured.
Language 3	Configures the language that is changed by the transceiver operation. From the following languages, a language other than the languages of Language 1 and Language 2 can be configured: English, Spanish (Spain), Spanish (Latin America), French, German, Italian, Dutch, Russian, Portuguese (Brazil) If the language is not changed by the transceiver operation, or if switching is only with 2 languages, "None" is configured.

*¹ Can be selected only for the K-type.

In Menu Mode, the language of the characters that appear on the display and of the voice guide can be changed.

Pressing the **Menu** button to enter Menu Mode and then executing "Language" places the transceiver in Language Mode. In Language Mode, the language can be changed to the language configured in **Language 1** to **Language 3**. (Refer to [Using Menu Mode](#).)

Note

- The language configuration changed by button operation is stored in the transceiver.
- If "User Programmable" is configured in **Voice Announcement Type**, by changing the language by button operation, the changed language is applied to only the display. In this case, the language used for the voice guide is not changed.
- If "User Programmable" is configured in **Voice Announcement Type**, the language used for the voice guide does not depend on the configuration of Language Mode (Language 1 to Language 3). If a language is changed in Language Mode, only the text string of **Display Customization** is changed.
- For Portable (Basic Model), only **Language 1** can be configured.

Configuration using KPG-D3/ D3N

Configuring **Voice and Display Language** ( See Radio Configuration > Global Options > Basics > Display/Language > Voice and Display Language)

5.1 Transmit/ Receive Frequencies

Transmit and receive frequencies are pairs of frequencies used for transmitting and receiving.

In Analog Conventional, NXDN Conventional, and DMR Conventional systems, transmit and receive frequencies can be configured for each channel (Individually).

In an LTR Trunking system, transmit and receive frequencies can be configured in **Repeater Information** in each system.

In an NXDN Trunking system, transmit and receive frequencies to be used for communication with a repeater structuring the NXDN Trunking system can be configured in the **Frequency Table** of the NXDN Trunking system.

In a DMR-based Trunking system, transmit and receive frequencies to be used for communication with a repeater structuring the DMR-based Trunking system can be configured in the **Frequency Table** of the DMR-based Trunking system.

Table 5-1 Transmit/ Receive Frequency Range and Step Size

Model	Transmit/ Receive Frequencies	
	Range	Step
NX-3200/ NX-3220/ NX-3720/ NX-3720G/ NX-3720H/ NX-3720HG	136 MHz to 174 MHz	2.5 kHz, 3.125 kHz, 5 kHz, 6.25 kHz, 7.5 kHz
NX-3300/ NX-3320	400 MHz to 520 MHz	3.125 kHz, 5 kHz, 6.25 kHz
NX-3820/ NX-3820G	400 MHz to 470 MHz	3.125 kHz, 5 kHz, 6.25 kHz
NX-3820H/ NX-3820HG	450 MHz to 520 MHz 400 MHz to 470 MHz	3.125 kHz, 5 kHz, 6.25 kHz
NX-3400/ NX-3420	TX: 806 MHz to 825 MHz 896 MHz to 902 MHz TX/ RX: 851 MHz to 870 MHz 935 MHz to 941 MHz	3.125 kHz/ 6.25 kHz/ 12.5 kHz/ 25 kHz (Except 900 MHz)
NX-3920G	TX: 806 MHz to 825 MHz TX/ RX: 851 MHz to 870 MHz	3.125 kHz/ 6.25 kHz/ 12.5 kHz/ 25 kHz
NX-3921G	TX: 896 MHz to 902 MHz TX/ RX: 935 MHz to 941 MHz	3.125 kHz/ 6.25 kHz/ 12.5 kHz

Configuration using KPG-D3/ D3N

- Configuring the transmit and receive frequencies for a channel
( **See** Radio Configuration > System Properties > Systems)
( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone-channel Table)
- Configuring the transmit and receive frequencies of the **Frequency Table** in an NXDN Trunking system ( **See** Radio Configuration > System Properties > Trunking Network > NXDN Frequency Table > Frequency Table)
- Configuring the transmit and receive frequencies in **Frequency Table** in a DMR-based Trunking system ( **See** Radio Configuration > System Properties > Channel Plan > DMR Trunked Channel Plan > Flexible > Frequency Table)

5.2 Transmit Power

Transmit Power is the transmission power of the transceiver. A user can use the transceiver by switching the transmission power to high power, medium power or low power.

If the transceiver is located near repeaters or target party, a user can change the transmission power to low power in order to avoid causing unnecessary radio interference to other transceivers. Also, for Portable, the battery operating time of the transceiver is extended by reducing power consumption.

Table 5-2 Transmit Power

Model	Transmit Power		
	Low	Medium	High
NX-3200/ NX-3300/ NX-3220/ NX-3320	1 W	4 W	5 W
NX-3400/ NX-3420	1 W	-	3 W
NX-3720/ NX-3720G	5 W	-	25 W
NX-3720H ^{*1} / NX-3720HG ^{*1}	5 W	30 W	50 W
NX-3820/ NX-3820G	5 W	-	25 W
NX-3820H ^{*1} / NX-3820HG ^{*1}	5 W	30 W	45 W
NX-3920G/ NX-3921G ^{*1}	5 W	-	15 W

^{*1} For the K-type only

The “H” icon appears in the icon display area of the transceiver when a channel configured “High” for the transmission power is selected, the “M” icon appears in the icon display area of the transceiver when a channel configured “Medium” for the transmission power is selected, and the “L” icon appears in the icon display area of the transceiver when a channel configured “Low” for the transmission power is selected.

The methods of configuring the transmission power and changing the transmission power by using the transceiver vary depending on the system as follows:

Analog Conventional/ NXDN Conventional/ DMR Conventional/ LTR Trunking system

In Analog Conventional, NXDN Conventional, DMR Conventional, and LTR Trunking systems, “High”, “Medium”, or “Low” can be configured for the transmission power on each channel (Individually).

The transmission power can be switched among “High”, “Medium”, or “Low” by the following methods:

● Low Transmit Power

The transmission power can be switched to “Low” by selecting a channel where “High” or “Medium” is configured for the transmission power and operating one of the following:

- Press the **Low Transmit Power** button.
- Select “On” or “Off” after pressing the **Menu** button to enter Menu Mode and then selecting “Low Transmit Power”.

With one of the operations, the transmission power of the selected channel is “Low” by enabling **Low Transmit Power**, and the transmission power of the selected channel returns to the previous configuration (“High” or “Medium”) by disabling **Low Transmit Power**.

● Medium Transmit Power

The transmission power can be switched to “Medium” by selecting a channel where “High” or “Low” is configured for the transmission power and operating one of the following:

- Select “On” or “Off” after pressing the **Menu** button to enter Menu Mode and then selecting “Medium Transmit Power”.

The transmission power of the selected channel is “Medium” by enabling **Medium Transmit Power**, and the transmission power of the selected channel returns to the previous configuration (“High” or “Low”) by disabling **Medium Transmit Power**.

● High Transmit Power

The transmission power can be switched to “High” by selecting a channel where “Medium” or “Low” is configured for the transmission power and operating one of the following:

- Press the **High Transmit Power** button.
- Select “On” or “Off” after pressing the **Menu** button to enter Menu Mode and then selecting “High Transmit Power”.

With one of the operations, the transmission power of the selected channel is “High” by enabling **High Transmit Power**, and the transmission power of the selected channel returns to the previous configuration (“Medium” or “Low”) by disabling **High Transmit Power**.

NXDN Trunking/ DMR-based Trunking system

In NXDN Trunking and DMR-based Trunking systems, “High”, “Medium”, “Low”, or “Auto” can be configured for the transmission power in each system.

If “Auto” is configured for the transmission power, the transceiver automatically switches the transmission power to “High” or “Low” by comparing the threshold value of signal strength level configured in **Power Threshold** with the current received signal strength level.

Also, the transmission power can be switched manually among “High”, “Medium”, or “Low” by the following methods:

● Low Transmit Power

The transmission power can be switched to “Low” by selecting a channel in a system where “High”, “Medium”, or “Auto” is configured for the transmission power and operating one of the following:

- Press the **Low Transmit Power** button.
- Select “On” or “Off” after pressing the **Menu** button to enter Menu Mode and then selecting “Low Transmit Power”.

With one of the operations, the transmission power of the system to which the selected channel belongs is “Low” by enabling **Low Transmit Power**, and the transmission power of the system to which the selected channel belongs returns to the previous configuration (“High”, “Medium”, or “Auto”) by disabling **Low Transmit Power**.

● Medium Transmit Power

The transmission power can be switched to “Medium” by selecting a channel in a system where “High”, “Low”, or “Auto” is configured for the transmission power and operating one of the following:

- Select “On” or “Off” after pressing the **Menu** button to enter Menu Mode and then selecting “Medium Transmit Power”.

The transmission power of the system to which the selected channel belongs is “Medium” by enabling **Medium Transmit Power**, and the transmission power of the system to which the selected channel belongs returns to the previous configuration (“High”, “Low”, or “Auto”) by disabling **Medium Transmit Power**.

● High Transmit Power

The transmission power can be switched to “High” by selecting a channel in a system where “Medium”, “Low”, or “Auto” is configured for the transmission power and operating one of the following:

- Press the **High Transmit Power** button.
- Select “On” or “Off” after pressing the **Menu** button to enter Menu Mode and then selecting “High Transmit Power”.

With one of the operations, the transmission power of the system to which the selected channel belongs is “High” by enabling **High Transmit Power**, and the transmission power of the system to which the selected channel belongs returns to the previous configuration (“Medium”, “Low”, or “Auto”) by disabling **High Transmit Power**.

Note

- Enabling one of High Transmit Power, **Medium Transmit Power**, and **Low Transmit Power** automatically disables the configurations of the other transmission powers.
- For the 800 MHz/ 900 MHz model, the 800 MHz model, and the 900 MHz model, **Medium Transmit Power** cannot be configured.
- For the 900 MHz model, if the frequency is configured in the range between 901 MHz and 902 MHz in **TX Frequency**, or if the frequency is configured in the range between 940 MHz and 941 MHz in **RX Frequency** and **Talk Around** is enabled, the transceiver behaves in **Low Transmit Power** regardless of the configuration in **Transmit Power** of KPG-D3/ D3N. In this case, the icon configured by using the FPU appears for the **Transmit Power** icon of the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Transmit Power** in an Analog Conventional system
( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > General)
( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > General)
- Configuring **Transmit Power** in an LTR Trunking system
( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > General)
- Configuring **Transmit Power** in an NXDN Conventional system
( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > General)
( [See](#) Radio Configuration > System Properties > Systems > NXDN Site NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > General)
- Configuring **Transmit Power** in a DMR Conventional system
( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > General)
( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > General)
- Configuring **Transmit Power** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)
- Configuring **Transmit Power** in a DMR-based Trunking system ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > TX Options)
- Configuring **Power Threshold** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)
- Configuring **Power Threshold** in a DMR-based Trunking system ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > TX Options)

5.3 Channel Spacing

Channel Spacing is the channel spacing used by the transceiver to transmit and receive.

Channel spacing is the spacing of frequencies between adjacent channels.

Bandwidths of the channel spacing are as follows:

Table 5-3 Channel Spacing

Channel Spacing	Bandwidth
25.0 (Wide)	25.0 kHz
25.0 (Wide 5k)* ¹	
20.0 (Wide 4k)* ²	20.0 kHz
12.5 (Narrow)	12.5 kHz
6.25 (Very Narrow)	6.25 kHz

*¹ If the 900 MHz band is configured in RX Frequency or TX Frequency, the channel spacing cannot be configured.

*² Available only for the E-type, 800 MHz/ 900 MHz, and 800 MHz models. However, if the 900 MHz band is configured in RX Frequency or TX Frequency, the channel spacing cannot be configured.

The available channel spacing varies as follows depending on the communication system:

Analog Conventional system

In an Analog Conventional system, “25.0”, “20.0”, or “12.5 ” can be configured for the channel spacing on each channel (Individually).

LTR Trunking system

In an LTR Trunking system, “25.0”, “20.0”, or “12.5 ” can be configured for the channel spacing in each system.

NXDN Conventional system

In an NXDN Conventional system, “12.5” or “6.25” can be configured for the channel spacing on each channel (Individually).

DMR Conventional system

In a DMR Conventional system, the channel spacing is fixed at “12.5”.

NXDN Trunking system

In the Frequency Table of an NXDN Trunking system, “12.5” or “6.25” can be configured for the channel spacing.

DMR-based Trunking system

In a DMR-based Trunking system, the channel spacing is fixed at “12.5”.

 Note

- For KPG-D3N, “25.0” cannot be configured for the channel spacing if a receive frequency or transmit frequency is configured in the following ranges:
VHF: above 149.98750 MHz and less than 174.01250 MHz
UHF: above 420.98750 MHz and less than 470.01250 MHz

Configuration using KPG-D3/ D3N

- Configuring **Channel Spacing** in an Analog Conventional system
( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > General)
( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > General)
- Configuring **Channel Spacing** in an LTR Trunking system ( **See** Radio Configuration > System Properties > Systems > LTR Trunking > General > Common Options)
- Configuring **Channel Spacing** in an NXDN Conventional system
( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > NXDN)
( **See** Radio Configuration > System Properties > Systems > NXDN Site NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > NXDN)
- Configuring **Channel Spacing** in an NXDN Trunking system ( **See** Radio Configuration > System Properties > Trunking Network > NXDN Frequency Table > Frequency Table)

5.4**Displaying the Signal Strength Level (RSSI Level, BER) (Maintenance Display)**

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Maintenance Display is the function to check the signal strength level (RSSI level), site information, and simplified BER by displaying them on the transceiver's LCD as rough indications when structuring a system or executing maintenance of the system.

Pressing the **Maintenance** button places the transceiver in Maintenance Display Mode.

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then selecting “Maintenance” will cause the transceiver to enter Maintenance Display Mode.

About BER

The BER in this function is used for an area check, and for a status check when an abnormal noise sounds.

An area check can also be checked for the signal strength level, but a higher signal strength level may be displayed if interfering signals are close-by.

Because communication is actually unavailable at the location where the BER deteriorates even if the signal strength is sufficient, the BER can be used to check an area for actual use, and as a guide to measure the sensitivity capability.

In this way, the purpose of use of the BER in this function differs from the purpose of use of the BER measurement in Test Mode.

Analog Conventional, NXDN Conventional, and DMR Conventional systems

1 Press the **Maintenance** button.

The transceiver enters Maintenance Display Mode and then the RSSI level appears. Display of the RSSI level is renewed every 500 ms.

The following operations are the same even if the transceiver enters Maintenance Display Mode by pressing the **Menu** button:

If the RSSI level is -96 dBm

 Maintenance	----
RSSI Level	-96dBm
BER	0.0

If the RSSI level is less than -120 dBm

 Maintenance	----
RSSI Level	*****dBm
BER	*****

If the RSSI level is more than -70 dBm

 Maintenance	----
RSSI Level	>-70dBm
BER	0.0

Note

- Nothing appears in Line 2 of the LCD for an Analog Conventional channel.
- “*****” appears for the BER value while an Analog signal is being received in Mixed Mode.

For Mobile, “>-80dBm” appears if the RSSI level is more than -80 dBm.

2 Press the **Home** button to exit the mode.

If Maintenance Display Mode is entered by using the **Menu** button, pressing and holding the **Home** button restores Menu Mode.

NXDN Trunking system

1 Press the **Maintenance** button.

The transceiver enters Maintenance Display Mode, and then the Frequency No. of the acquired control channel or the Frequency No. of the selected channel appears in the title line. The RSSI level appears in the first line, and the Site ID or site name appears in the second line.

- If a channel of DFA is selected, “DFA” appears instead of a channel number.
- If the transceiver is in a Roaming System by using the SKF for roaming in the Multi-System Roaming function, “Roam” appears instead of a channel number.

The following operations are the same even if the transceiver enters Maintenance Display Mode by pressing the **Menu** button:

 Maintenance	1
RSSI Level	-96dBm
Site No.	1

2 Switch the frequency display or channel.

Switching to the frequency display

Pressing the [◀] or [▶] button switches the display to the frequency display. The receive frequency of the control channel currently acquired or the receive frequency of the selected channel appears in the first line, and the transmit frequency appears in the second line.

If **Multi-System Hunt** is enabled, pressing the [◀] button toggles the display in the following order:

RSSI/ BER display → system name/ site number display → frequency display ...

Pressing the [▶] button toggles the display in the following order:

Frequency display → system name/ site number display → RSSI/ BER display ...

Switching channels

Pressing the [▲] or [▼] button switches the channel number of the channel configured in **Frequency Table**. If the selected channel number satisfies the conditions to acquire a control channel, the channel number or site name appears in the second line of the display.

If the selected channel number does not satisfy the conditions for acquiring a control channel, the transceiver enters the Out of Service state, and then the RSSI icon blinks. In this case, the Site ID or site name does not appear.

Maintenance		1
RX	462.250000MHz	
TX	469.250000MHz	

Maintenance		1
System A		
Site No.	1	

Maintenance		1
RSSI Level	-96dBm	
BER	0.0	

DMR-based Trunking system

1 Press the **Maintenance** button.

The transceiver enters Maintenance Display Mode, and then the Frequency No. of the acquired control channel or the Frequency No. of the selected channel appears in the title line. The RSSI level appears in the first line, and the Site ID or site name appears in the second line.

The following operations are the same even if the transceiver enters Maintenance Display Mode by pressing the **Menu** button:

Maintenance		1
RSSI Level	-96dBm	
Site ID	1	
Back		

2 Switch the display such as of the frequency or switch the channel.

Switching to the frequency display

Pressing the [▶] button switches the display to the frequency display.

Pressing the [◀] button while the RSSI/ BER display is displayed switches the display to the frequency display.

The receive frequency of the control channel currently acquired or the receive frequency of the selected channel appears in the first line, and the transmit frequency appears in the second line.

Maintenance		1
RX	462.250000MHz	
TX	469.250000MHz	
Back		

Switching to the RSSI/ BER display

Pressing the **[▶]** button while the frequency display is displayed switches the display to the RSSI/ BER display. Pressing the **[◀]** button while the Power Save display is displayed switches the display to the RSSI/ BER display. The BER appears on the second line.

Maintenance 1	
RSSI Level	-96dBm
BER	0.0
Back	

Switching to the Power Save display (Trunking 2.5 system and DMR Tier III Trunking system only)

Pressing the **[▶]** button while the RSSI/ BER display is displayed switches the display to the Power Save display. Pressing the **[◀]** button while the RSSI/ Site ID display is displayed switches the display to the Power Save display.

The configuration status of Power Save of the transceiver, either enabled or disabled, appears in the first line. The status of Power Save appears in the second line.

Maintenance 1	
Power Save	On
Status	Active
Back	

Switching channels

Pressing the **[▲]** button or **[▼]** button causes the list number configured in Normal Hunt Control Channel to be increased or decreased, and the transceiver behaves according to the configuration of the list number. If the selected channel number satisfies the conditions to acquire a control channel, the Site ID or site name appears in the second line of the display.

Maintenance 5	
RSSI Level	-88dBm
Site ID	1
Back	

If the selected channel number does not satisfy the conditions for acquiring a control channel, the transceiver enters the Out of Service state, and then the RSSI icon lights. In this case, the Site ID or site name does not appear.

Maintenance 4	
RSSI Level	-119dBm
Site ID	***
Back	

Note

- In an NXDN Trunking system, if the transceiver is in Failsoft mode, the channel number of the Failsoft channel appears. In this case, the site number or site name does not appear.
- If the transceiver is in a Roaming System by using the SKF for roaming in the Multi-System Roaming function, Failsoft does not function.
- In NXDN Trunking and DMR-based Trunking systems, pressing the **PTT** switch while the transceiver is in Maintenance Display Mode starts a Group Call with the Maintenance Display Mode displayed. If the transceiver migrates to a traffic channel, the display of the channel number is changed to the channel number of the traffic channel. If the transceiver receives a Group Call while in Maintenance Display Mode, the transceiver receives the Group Call with the Maintenance Display Mode displayed in the same way.
- The **PTT** switch can be used even if the transceiver is in Maintenance Display Mode. However, in NXDN Trunking and DMR-based Trunking systems, the **PTT** switch cannot be used if the transceiver is in the Out of Service state.
- While this function is in use, Battery Saver is disabled. (Portable only, except DMR-based Trunking)
- For the signal strength (RSSI Level), the display is renewed at intervals of 500 ms.
- In NXDN Trunking and DMR-based Trunking systems, a Button-entry Error Tone (1 beep) sounds and the channel cannot be changed even if the **[▲]** button or **[▼]** button is pressed while a traffic channel is switched by a communication.
- If the transceiver enters Maintenance Display Mode while the Site Lock is enabled, the Site Lock is temporarily disabled. In this case, the Site Lock is enabled when the transceiver exits Maintenance Display Mode.
- If the transceiver enters Maintenance Display Mode while the transceiver is outside of the communication area, the channel number retained in the transceiver appears.
- While the transceiver is in Maintenance Display Mode, the ID display during Selcall reception of FleetSync/ MDC-1200/ NXDN/ DMR, ID display by **Caller ID Display**, and message display during Status/ Short Message reception do not appear.

- In a DMR-based Trunking system, the following behaviors cannot be done if the transceiver is in Maintenance Display Mode:
 - Background Hunt
 - Passive Scan
 - Vote Now
 - The following behavior when the control channel is migrated
(Example: Behavior of the Control Channel Switching. When P_Move is received by using Active Hunt, if another channel is changed to the control channel while a control channel becomes a traffic channel in Composite Control Channel)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

The transceiver has the following indicator and display.

- LED (TX/ Busy)
- LCD
- Light Bar
- Selective Call Alert LED

6.1 Busy LED

Busy LED is the function to notify a user visually that the transceiver has received a signal.

The LED lights green while the transceiver is receiving a signal in an Analog Conventional system, NXDN Conventional system, and DMR Conventional system.

The LED lights only when the transceiver is on a traffic channel in NXDN Trunking and DMR-based Trunking systems. The Busy LED does not light when the transceiver is on a control channel.

Also, whether the Busy LED will light while the transceiver receives in Emergency Mode can be configured.

Configuration using KPG-D3/ D3N

- Configuring **Busy LED** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > Audio/ Indicator > Indicator)
- Configuring **TX/RX LED in Emergency** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > Profiles > Options)

6.2 Transmit LED

Transmit LED is used to notify a user visually that the transceiver is transmitting.

The Transmit LED lights red while the transceiver is transmitting.

Also, whether the Transmit LED will light while the transceiver transmits in Emergency Mode can be configured.

Configuration using KPG-D3/ D3N

- Configuring **Transmit LED** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > Audio/ Indicator > Indicator)
- Configuring **TX/RX LED in Emergency** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > Profiles > Options)

6.3 Light Bar

Supported Models: Portable

Light Bar is the function to identify the group of the selected channel when selecting a channel or of the channel that receives when receiving by the color of the Light Bar.

In the state where a user carries the transceiver around the waist, the currently selected channel or received channel can be identified from above.

Configuration for the Light Bar

The color of the Light Bar that lights when the Zone-channel is changed or when the speaker of the transceiver opens during reception can be configured for each channel by using KPG-D3/ D3N. One of the following 7 colors can be configured for each channel:

- Yellow
- Purple
- Blue
- Light Blue
- Red
- Green
- White

The behavior configurations to light the Light Bar are as follows:

Table 6-1 Behavior Configurations of the Light Bar

Configuration	Description
Channel Select	Whether or not the Light Bar lights when the Zone-channel is changed can be configured in Channel Select . If Channel Select is enabled, when the Zone-channel is changed, the Light Bar lights for 2 sec in the color configured in Light Bar Color for the channel after the change.
Speaker Unmute	Whether or not the Light Bar lights when the speaker of the transceiver opens during reception can be configured in Speaker Unmute . If Speaker Unmute is enabled, the Light Bar lights in the color configured in Light Bar Color for the corresponding channel when the speaker of the transceiver opens during reception. The Light Bar remains lit while the speaker is open. The Light Bar turns off when the speaker is closed.

Configuration using KPG-D3/ D3N

- Configuring **Light Bar Color**
( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone-channel Table > Channel Table)
( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > General)
- Configuring **Channel Select** to be enabled or disabled ( **See** Radio Configuration > Global Options > Basics > Audio/Indicator > Light Bar)
- Configuring **Speaker Unmute** to be enabled or disabled ( **See** Radio Configuration > Global Options > Basics > Audio/Indicator > Light Bar)

6.4 Selective Call Alert LED

Selective Call Alert LED is used to notify a user visually that the transceiver has received various calls.

When receiving various calls, such as NXDN or DMR Individual Calls and Group Calls, the LED can flash any of the following 7 colors, and the flashing color can be configured for each type of call:

- Yellow
- Purple
- Blue
- Light Blue
- Red
- Green
- White

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** in an NXDN Conventional system ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **Selective Call Alert LED** in a DMR Conventional system ( [See](#) Radio Configuration > Protocol Options > DMR > DMR > Alert Tone/ LED > Conventional)
- Configuring **Selective Call Alert LED** in an NXDN Trunking system ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **Selective Call Alert LED** in a DMR-based Trunking system ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking)
- Configuring **Selective Call Alert LED** for MDC-1200 ( [See](#) Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Selcall)
- Configuring **Selective Call Alert LED** for FleetSync ( [See](#) Radio Configuration > Protocol Options > FleetSync > General > RX Options)
- Configuring **Selective Call Alert LED** for DTMF ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/ Decode > Decode)
- Configuring **Selective Call Alert LED** for 2-tone
 - ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1)
 - ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Decode > 2-tone 1)

6.5 Optional Signaling LED

Optional Signaling LED is the function to notify a user visually that the Optional Signaling matches, or that the transceiver is communicating with a telephone by the LED flashing yellow.

Optional Signaling LED is the function to notify visually by flashing the LED yellow when the received Optional Signaling matches the Optional Signaling configured in the transceiver, or that the transceiver is in the state of voice communication to a telephone.

A user can tell from the LED that the transceiver is receiving a call.

If the matching state of Optional Signaling is disabled when the buttons on the transceiver are pressed, or when the time configured in **Auto Reset Timer** elapses, the LED is turned off.

However, if **Selective Call Alert LED** or **Telephone Call Alert LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED** or **Telephone Call Alert LED** even when **Optional Signaling LED** is enabled.

Configuration using KPG-D3/ D3N

- Configuring **Optional Signaling LED** in an NXDN Conventional system ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **Optional Signaling LED** in a DMR Conventional system ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Conventional)
- Configuring **Optional Signaling LED** in an NXDN Trunking system ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **Optional Signaling LED** in a DMR-based Trunking system ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking)
- Configuring **Optional Signaling LED** of MDC-1200 ( [See](#) Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Alert Tone/LED)
- Configuring **Optional Signaling LED** of FleetSync ( [See](#) Radio Configuration > Protocol Options > FleetSync > General > RX Options > Alert Tone/LED)
- Configuring **Optional Signaling LED** of DTMF ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/ Decode > Decode)
- Configuring **Optional Signaling LED** of 2-tone
 - ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1)
 - ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1)

6.6 Lighting the Backlight (Backlight)

Supported Models: Portable (Full Key Model/ Standard Key Model)

The backlight is equipped on the back side of the LCD on the transceiver. By lighting the backlight, the LCD can be viewed in dark places or at night.

Pressing the **Backlight** button toggles the backlight between On and Off.

Auto Backlight is enabled, the backlight lights when operating any button of the transceiver, or when receiving a call. The conditions for lighting the backlight by the Auto Backlight function can be configured by using KPG-D3/ D3N.

● PTT Press

If **PTT Press** is enabled, the backlight lights when the **PTT** switch is pressed.

● Any Operation

If **Any Operation** is enabled, the backlight lights when any button other than the **PTT** switch is operated.

● Call/Message Reception

If **Call/Message Reception** is enabled, the backlight lights when the transceiver receives the following various calls and messages:

Table 6-2 List of Calls Lighting the Backlight when Call/Message Reception Is Enabled

NXDN	Conventional	Individual Call
		Individual Call Acknowledge Request
		Group Call
		Paging Call
		Status Message
		Short Message
	Trunking	Individual Call
		Individual Call (Message Trunked (Enhanced))
		Group Call/ Broadcast Group Call
		Group Call/ Broadcast Group Call (Message Trunked (Enhanced))
		Paging Call
		Telephone Call
		Status Message
		Short Message
DMR	Conventional	Individual Call
		Individual Call Acknowledge Request
		Group Call
		Paging Call
		Emergency Alarm
	Trunking	Individual Call
		Group Call/ Broadcast Group Call
		Emergency Alarm
		Telephone Call

Analog	Emergency Call (MDC-1200)
	Selcall (FleetSync/ MDC-1200)
	Call Alert (MDC-1200)
	Paging Call (FleetSync)
LTR Trunking	Selcall (FleetSync/ MDC-1200)
	Call Alert (MDC-1200)
	Paging Call (FleetSync)
	Emergency Call (MDC-1200)

After the backlight is turned On, the backlight will automatically be turned Off upon the elapse of the time configured in **Backlight Timer**. If a button is operated or the call of a condition to light is received before the time configured in **Backlight Timer** elapses, the lighting time of the backlight is extended by the time configured in **Backlight Timer**.

 Note

- When **Backlight Timer** is configured “Off”, the backlight remains lit until the **Backlight** button is pressed to turn off the backlight.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( **See** Radio Configuration > Global Options > Button Assignment)
- Configuring **Auto Backlight** to be enabled or disabled ( **See** Radio Configuration > Global Options > Basics > Display/ Language > Auto Backlight)

6.7 Changing the Brightness of the Backlight (LCD Brightness)

Supported Models: Mobile

The transceiver can be used in dark places or at night by obscuring the brightness of the backlight.

The brightness of the backlight can be configured in **LCD Brightness** by using KPG-D3/ D3N. This configuration can be changed by operating the transceiver.

● LCD Brightness Button

Pressing the **LCD Brightness** button gradates the brightness of the backlight as follows:

High → Low → Off → High

● Menu Button

Pressing the **Menu** button to enter Menu Mode, the brightness can be changed by executing “LCD Brightness” and then selecting the backlight brightness from the following selections:

High, Low, Off

Status of the backlight’s brightness that was changed is retained even after the transceiver is turned OFF.

Also, the brightness of the backlight can be configured when the transceiver is in Emergency Mode.

Note

- The backlight lights with the brightness of High in **LCD Brightness** when the transceiver is in Firmware Programming Mode.

Configuration using KPG-D3/ D3N

- Configuring **LCD Brightness** ( See Radio Configuration > Global Options > Basics > Display/Language > Display)
- Configuring **LCD Brightness (Emergency Mode)** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)
- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

6.8 The Icons on the LCD

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

The following icons are displayed in the icon display area of the LCD:

Table 6-3 Icon List

Icons	Description
	- RSSI Icon - Indicates the signal strength level.
	- Battery Status Icon (Portable only) - Indicates the battery power level.
	- High Transmit Power Icon - Appears when the channel configured to high power transmission is selected.
	- Medium Transmit Power Icon - Appears when the channel configured to medium power transmission is selected.
	- Low Transmit Power Icon - Appears when the channel configured to low power transmission is selected.
	- Analog Icon - Appears when an analog channel is selected.
	- Digital Icon - Appears when a digital Conventional channel is selected.
	- Analog (Mixed Mode) Icon - Appears when a Mixed channel with "Analog" configured in Transmit Mode is selected.
	- Digital (Mixed Mode) Icon - Appears when a Mixed channel with "Digital" configured in Transmit Mode is selected.
	- Bluetooth Icon - Appears when the Bluetooth is enabled. There are 2 states as follows: Lighted: Bluetooth is enabled and BLE Scan is disabled BLE Scan is enabled (advertising) Blinking: Bluetooth is enabled (processing)
	- Bluetooth Connection Icon - Appears when connected to a Bluetooth device. - Appears when BLE Scan is enabled (when not advertising).
	- GPS Icon - Appears when the GPS is enabled. There are 2 states as follows: Lighted: GPS is enabled (positioning state) Blinking: GPS is enabled (non-positioning state)
	- Scan Icon - The scan status appears. There are 2 states as follows: Lighted: Scanning Blinking: Scan is paused
	- Priority-channel/ Priority Monitor ID Icon - Appears when the Priority Channel or Priority Monitor ID is selected. P1: Priority 1 Channel/ Priority Monitor ID 1 P2: Priority 2 Channel/ Priority Monitor ID 2 P3: Priority Monitor ID 3 P4: Priority Monitor ID 4

6.8 The Icons on the LCD

Icons	Description
	Channel Add Icon Appears when the channel to be scanned is selected.
	Zone Add Icon Appears when the zone to be scanned is selected.
	Scrambler Icon Appears when the Scrambler is enabled.
	Encryption Icon Appears when the Encryption of the bit scrambling format is enabled. There are 2 states as follows: Lighted: No carrier message is received Blinking: When an encrypted carrier message is received Also, this icon lights when the transceiver is in the Key Fail state, even for Encryption in the AES/ DES format.
	Encryption (AES) Icon Appears when the Encryption (AES) is enabled. There are 2 states as follows: Lighted: When no carrier message is received or sent Blinking: When an encrypted carrier message is received
	Encryption (DES) Icon Appears when the Encryption (DES) is enabled. There are 2 states as follows: Lighted: When no carrier message is received or sent Blinking: When an encrypted carrier message is received
	Encryption (ARC4) Icon Appears when the Encryption (ARC4) is enabled. There are 2 states as follows: Lighted: When no carrier message is received or sent Blinking: When an encrypted carrier message is received
	Talk Around Icon Appears when the Talk Around is enabled.
	Monitor Open/ Squelch Off Icon Appears when the transceiver is unmuted, or when signaling is disabled.
	External Speaker Icon Appears when the external speaker is enabled.
	External Speaker (Internal + External) Icon (Mobile only) Appears when the internal speaker and external speaker are enabled.
	Call Icon Indicates the status of the signaling. There are 2 states as follows: Lighted: The state where the PTT switch is pressed and the Optional Signaling is disabled. Blinking: The state where Optional Signaling matches (including when communications by NXDN Voice Call is determined)
	Message Stack Icon Appears when the received message is stored in the transceiver stack memory. There are 2 states as follows: Lighted: The state where no messages are unread Blinking: The state where one or more messages are unread
	VOX Icon Appears while VOX is activated.
	Horn Alert Icon (Mobile only) Appears when the Horn Alert is enabled.

Icons	Description
	Site Lock Icon Appears when the Site Lock is enabled.
	System Lock Icon Appears when the System Lock is enabled.
	Broadcast Icon Appears when the Broadcast is enabled.
	Surveillance Icon Appears when the Surveillance is enabled.
	Telephone ID Icon There are 2 states as follows: Lighted: Indicates the status of the Telephone ID and RIC (Repeater Interconnect). Blinking: Indicates the status of Auto Telephone Search.
	Tactical Zone Icon Appears when Tactical Zone is selected.
	AUX A Icon (For Portable, NX-3200/ NX-3300/ NX-3400 only) Appears when the AUX A port is active.
	AUX B Icon (Mobile only) Appears when the AUX B port is active.
	AUX C Icon (Mobile only) Appears when the AUX C port is active.
	Public Address Icon (Mobile only) Appears when the Public Address is enabled.
	Lone Worker Icon Appears when the Lone Worker is enabled.
	Activity Detection Icon (Portable only) Appears when the Activity Detection is enabled.
	OVCM Icon Appears when OVCM is enabled.
	OST Icon Appears when the OST is enabled.
	Auto Recording Icon Appears while the Auto Recording is executing.
	Vibrator Icon (NX-3200/ NX-3300/ NX-3400 only) Indicates the status of the Vibrator. There are the following 2 statuses: Lighted: Vibrator is enabled Blinking: Vibrator is not functioning
	Task Request Icon Lighted: All of the stored Task Request data are read. Blinking: Some of the stored Task Request data are unread.

6.9 Displaying the Signal Strength (Signal Strength Indicator)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Signal Strength Indicator can be used to display the signal strength of the received signal.

The RSSI icon indicating the signal strength appears in the following manner depending on the signal level of the received signal.

Table 6-4 Signal Strength Indicator

Icons	Status	Signal Strength
	High	Above -80 dBm
	Medium	-95 dBm to -80 dBm
	Low	-110 dBm to -95 dBm
	• Very weak • While searching (DMR-based Trunking system)	With a carrier less than -110 dBm
Disabled	No signal	No carrier
	Lighted: Outside of the communication area(DMR-based Trunking system)	
	Blinking: Outside of the communication area(NXDN Trunking system)	

Note

- The signal strength references are rough indicators of room temperature.

6.10 Display Functions of the Display

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

The following functions are relevant to the display.

- Zone Name display
- Display Format
- Power-on Text
- Sub-LCD Display
- Sub-LCD Display Priority
- Clock Display
- Display Type (Portable only)

Zone Name Display

Zone Name Display is the function to display the Zone Name on the display.



Note

- If the Zone Name is not configured, the zone number is displayed.

Configuration using KPG-D3/ D3N

Configuring **Zone Name Display** to be enabled or disabled ( See Radio Configuration > Global Options > Basics > Display/Language > Display)

Display Format

Display Format is the function to display the Channel Name or both the zone number and channel number on the display.

Table 6-5 Display Format

Configuration	Description
Channel Name	Displays the Channel Name.
Zone-Channel Number	Displays both the zone number and channel number.

Pressing the **Display Format** button can change the display. Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the display can be changed by selecting the “Display Format”. (Refer to [Using Menu Mode.](#))

Configuration using KPG-D3/ D3N

- Configuring **Display Format** ( See Radio Configuration > Global Options > Basics > Display/Language > Display)
- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Power-on Text

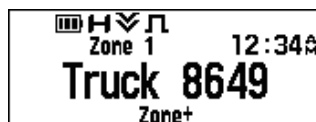
Power-on Text is the function to display characters when the transceiver is turned ON.

If **Power-on Text** is configured, the configured characters appear for 2 sec when the transceiver is turned ON.

If “Preset Text” is configured in **Type (Power-on > Text)**, the configured text appears.

Example:

Preset Text = “Truck 8649”



If “%” is used in a string of text when “Unit ID” is configured in **Type (Power-on > Text)**, “%” appears replaced with the Unit ID (Own) of the system configured in **Preset System**.

Example:

Unit ID (Own)/ NXDN = 60000

Power-on Text = “Taxi %%%%%%%%%”



When “Unit ID Name” is configured in **Type (Power-on > Text)**, the string of the Unit ID Name (Own) of the system configured in **Preset System** appears. If no Unit ID Name (Own) of the system is configured in **Preset System**, nothing appears.

Example:

Unit ID Name (Own) = “Truck 8649”

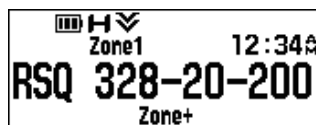


Example:

Unit ID (Own) (NP-FIN-IN)/ DMR = 328-20-200

Power-on Text = “RSQ %%%-%%%-%%%”

(If Fleet Dialing Plan is enabled in a DMR Tier III Trunking system and S-Trunking system)



Note

- In a DMR system, if Fleet Dialing Plan is disabled, “%” appears replaced with the Unit ID (Own) of the system configured in **Preset System Number**.
- In a DMR Tier III Trunking system and S-Trunking system, if Fleet Dialing Plan is enabled, “%” appears replaced with the Number Prefix (NP), Fleet Individual Number (FIN) and Individual Number (IN) of the system configured in the DMR Tier III Trunking system or S-Trunking system.

If “%” is used in a string of text when “Preset Text with FleetSync ID” is configured in **Type (Power-on > Text)**, “%” appears replaced with the Fleet (Own) and ID (Own) of the system configured in **Preset System**.

Example:

Fleet (Own) = 110

ID (Own) = 1911

Power-on Text = “NYPD %%%-%%%”



Note

- Pressing a button while the Power-on Text appears causes the Power-on Text to disappear.
- The transceiver prioritizes the display of Power-on Text even while transmitting a Power-on Status Message.

Configuration using KPG-D3/ D3N

- Configuring **Power-on Text** and **Preset Text** ( See Radio Configuration > Global Options > Basics > General > Power-on)
- Configuring **Preset System** ( See Radio Configuration > Global Options > Basics > General > Power-on)

Sub-LCD Display

Sub-LCD Display is the function to display the transceiver information on the display while the transceiver is in the normal state.

Table 6-6 Sub-LCD Display

Configuration	Description
None	Nothing appears.
Zone Number	The zone number appears.
Channel Number	The channel number appears.
OST List Number	The OST List number appears.
Site Number	The Site No. and Site ID of the fixed site appear while Site Lock is enabled. The Site No. and Site ID of the current site appear if the transceiver has acquired a control channel while Site Lock is disabled. The Site No. and Site ID do not appear if the transceiver does not acquire a control channel while Site Lock is disabled.
System Code	The System Code of the fixed system appears while Site Lock is enabled. The System Code of the current system appears if the transceiver has acquired a control channel while Site Lock is disabled. The System Code does not appear if the transceiver does not acquire a control channel while Site Lock is disabled.

Note

- Site Number can be used only in an NXDN Trunking system and DMR-based Trunking system, and System Code can be used only in an NXDN Trunking system.

Configuration using KPG-D3/ D3N

Configuring **Sub-LCD Display** ( See Radio Configuration > Global Options > Basics > Display/Language > Display)

Sub-LCD Display Priority

Sub-LCD Display Priority is the function to display the sub-display prioritizing the display contents configured in **Sub-LCD Display**.

Table 6-7 Sub-LCD Display Priority

Configuration	Description
High	The number display configured in Sub-LCD Display has the highest priority. If a function to display on the sub-display is activated while a function number configured in Sub-LCD Display appears on the sub-display, after the string of text corresponding to the function is displayed for 1 sec, the number display configured in Sub-LCD Display is restored. However, if a function to display on the sub-display is activated while Sub-LCD Display is configured as follows, the string of text corresponding to the function is displayed until the function is reset: • When “None” is configured in Sub-LCD Display • When “OST List Number” is configured in Sub-LCD Display and nothing appears on the sub-display, such as when the OST function is disabled or when the transceiver is on a digital channel
Low	The number display configured in Sub-LCD Display has the lowest priority. If a function to display on the sub-display is activated, the string of text corresponding to the function is displayed until the function is reset.

Configuration using KPG-D3/ D3N

Configuring **Sub-LCD Display Priority** ( See Radio Configuration > Global Options > Basics > Display/Language > Display)

Clock Display

Clock Display is the function to display the clock on the display.

Configuration using KPG-D3/ D3N

Configuring **Clock Display** to be enabled or disabled ( See Radio Configuration > Global Options > Basics > Display/Language > Display)

Display Type

Supported Models: Portable (Full Key Model/ Standard Key Model)

Display Type is the function to toggle the display format of the LCD display. To make the display larger in order to improve visibility, "Simple Type" is selected. To confirm multiple display information, select "Normal Type".

In **Display Type** of KPG-D3/ D3N, either "Normal Type" or "Simple Type" can be configured for the display format of the LCD display. (Refer to [About LCD](#).)

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the display format of the LCD display can be toggled by selecting "Display Type". (Refer to [Using Menu Mode](#).)

In this manual, the appearance of the LCD display is described in "Normal Type". (Portable only)

Configuration using KPG-D3/ D3N

Configuring **Display Type** ( [See](#) Radio Configuration > Global Options > Basics > Display/Language > Display)

6.11 Customizing a Displayed Text String (Display Customization)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Using KPG-D3/ D3N, this function can be used to change a string of text which appears on the LCD of the transceiver, such as Function Mode and Button Guide.

The string of text that appears on the LCD of the transceiver can be changed to the function names used in other models.

Configuration using KPG-D3/ D3N

Changing the string of text that appears on the LCD of the transceiver ( [See](#) Radio Configuration > Special Settings > Customization > Display Customization)

6.12 Displaying a Bitmap Image When the Transceiver is Turned ON (Custom Start-up Screen)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Custom Start-up Screen is the function to display a bitmap image when the transceiver is turned ON. The image of a company name, logo, or simple message can be converted into bitmap image data and it can be displayed for 2 sec when the transceiver is turned ON. (Refer to [Turning the Transceiver ON](#).)

Bitmap images of the following sizes can be used:

Portable: 168 horizontal dots and 65 vertical dots

Mobile: 304 horizontal dots and 92 vertical dots

Configuration using KPG-D3/ D3N

Configuring **Custom Start-up Screen** ( [See](#) Radio Configuration > Global Options > Basics > General > Power-on)

7.1 Tones that Sound When a User Operates the Transceiver or When the Transceiver Status Is Changed

The following are the tones that sound from the transceiver:

Table 7-1 Tone List

Tone	Description and Type	Remarks
Power-on Tone	Power-on Tone A Power-on Tone B	The volume levels of each tone can be configured using KPG-D3/ D3N.
Control Tone	Button Beep A	
	Button Beep B	
	Button Beep C	
	Button-entry Error Tone	
	Rollover Tone	
	Stop Tone	
	Password Authorization Tone	
	Queue Tone	
	Free System Ringback Mode Tone	
	Ringer Tone	
	Priority-channel Tone	
	Scan Stop Tone	
	Individual Call Tone	
	Fleet Call Tone	
	Group Call Tone	
	Search Mode Tone	
	Out of Range Tone	
	In-service Tone	
	Call Request Tone	
	Zone 1 Select Tone	
	Zone 2 Select Tone	
	Zone 3 Select Tone	
	Zone 4 Select Tone	
	OTAP Reactivation Tone	
	Call In Progress Tone	
	Disconnect Indication Tone	
	Key Load Alert Tone	
	Transaction Confirmed Tone	
	Bluetooth Find Device Mode Tone	
	Bluetooth Connect Tone	
	Bluetooth Disconnect Tone	
	Complete Tone	
	Playback End Tone	

Tone	Description and Type	Remarks
Warning Tone	Warning Tone A Warning Tone B Warning Tone C Battery Warning Tone TOT Pre-alert Tone PLL Unlock Tone Busy Tone Busy Tone 2 Timed Power-off Pre-alert Tone A Timed Power-off Pre-alert Tone B Timed Power-off Pre-alert Tone C Call Queue Tone System Busy Tone System Search Tone System Search End Tone System Select Tone Call Invalid Tone No Reply Tone Delay Tone Intercept Tone Intercept Tone 2 Deny Tone Call Fail Tone Call Deny Tone Lone Worker Tone Group-registration Invalid Tone Group Subscription Invalid Indicator Tone Call Processing Tone Network Failure Tone A Network Failure Tone B Man-down Pre-alert Stationary Pre-alert Tone Motion Pre-alert Tone Key Fail Alert Tone Trunking Tone Invalid Dialing Entry Tone Bluetooth No Response Tone Bluetooth Connect Denied Tone Bluetooth Connect Invalid Tone Bluetooth No Service Tone Battery Level Tone Advanced GPS Report Error Tone	The volume levels of each tone can be configured using KPG-D3/ D3N.

Tone	Description and Type	Remarks
Locator Tone	Emergency Locator Tone	The volume levels of each tone can be configured using KPG-D3/ D3N.
Sidetone	Proceed Tone	
	VOX Proceed Tone	
Alert Tone	PTT ID Sidetone	
	Special Alert Tone	
Volume Level Tone	Unencrypted Call Alert Tone	
	Fixed Volume Button Tone	
Transmit Tone	Volume Button Tone	
	Transpond Tone	
	Stun-on Tone	
	Stun-off Tone	
	PTT Release Tone	
	Background Tone	

Power-on Tone

A Power-on Tone sounds from the transceiver when the transceiver is turned ON.

The volume level of Power-on Tone can be configured using KPG-D3/ D3N. (Refer to [Configuring the Volume Level of Various Tones \(Level Customization\)](#).)

Table 7-2 Power-on Tone

Function	Description
Power-on Tone A	This tone sounds from the transceiver when the transceiver is turned ON.
Power-on Tone B (Mobile only)	This tone sounds when the transceiver is turned ON by pressing and holding the Power switch while “Ignition & Switch” is configured in Ignition Sense . In this case, Timed Power-off is not activated.

Configuring the tone to sound when the transceiver is turned ON

The tone pattern (frequency and length) of Power-on Tone A that sounds from the transceiver when the transceiver is turned ON can be configured by using KPG-D3/ D3N. When the tone of the transceiver of another company and the tone of Power-on Tone are different, the function is useful for matching with the tone of the transceiver of the other company.

The default values of Power-on Tone A are a frequency of 1480 Hz and length of 500 ms. The tone length can be extended to a maximum of 1000 ms.

Configuration using KPG-D3/ D3N

Configuring **Power-on Tone** ( See Radio Configuration > Special Settings > Customization > Tone > Power-on Tone)

Control Tone

A Control Tone sounds when a function is activated by a user operating the transceiver.

The volume level of Control Tone can be configured using KPG-D3/ D3N. (Refer to [Configuring the Volume Level of Various Tones \(Level Customization\)](#).)

Table 7-3 Control Tone

Function	Description
Button Beep A	This tone sounds from the transceiver when a function is enabled by pressing a button.
Button Beep B	This tone sounds from the transceiver when a function is disabled by pressing a button.
Button Beep C	This tone sounds from the transceiver when Home Channel or Direct Channel is changed using the Home Channel Select or Direct Channel Select button, or when the time in the transceiver is changed in Clock Adjustment Mode.
Button-entry Error Tone	This tone sounds from the transceiver when the operation activated by pressing a button is denied.
Rollover Tone	This tone sounds from the transceiver when the lowest zone or channel number is selected. Also, this tone sounds if the lowest list number is selected in various list modes, or if the smallest font or lowest value is selected while entering characters or code. (Refer to Rollover/End Stop .)
Stop Tone	This tone sounds from the transceiver if “End Stop” is configured in Rollover/End Stop . This tone sounds from the transceiver if the zone or channel number is decreased while the zone or channel having the lowest number is selected. Or, this tone sounds from the transceiver if the zone or channel number is increased while the zone or channel having the lowest number is selected. (Refer to Rollover/End Stop .)
Password Authorization Tone	This tone sounds from the transceiver if the entered password matches the password preconfigured for the transceiver.
Queue Tone	This tone sounds from the transceiver while the transceiver is searching with the Auto Telephone in an LTR Trunking system for an available RIC repeater to be connected. This tone sounds from the transceiver every 1 sec until an available RIC repeater to be connected is found or Auto Telephone is terminated if the transceiver cannot find an available RIC repeater within 60 sec.
Free System Ringback Mode Tone	This tone sounds from the transceiver when the transceiver enters Free System Ringback Mode in an LTR Trunking system.
Ringer Tone	This tone sounds from the transceiver when a repeater is temporarily available in Free System Ringback Mode in an LTR Trunking system.
Priority-channel Tone	This tone sounds from the transceiver when the scan is paused on a Priority-channel.
Scan Stop Tone	Pressing the Home Channel or Direct Channel button during the scan pauses the scan, and the transceiver migrates to the Home Channel or Direct Channel. Also, pressing the Channel Recall button during the scan pauses the scan, and the transceiver migrates to the last called Zone-channel. This tone sounds from the transceiver at 30-sec intervals while the scan pauses.
Individual Call Tone	This tone sounds from the transceiver when the transceiver initiates a FleetSync Individual Call.
Fleet Call Tone	This tone sounds from the transceiver when the transceiver initiates a FleetSync Fleet Call.
Group Call Tone	This tone sounds from the transceiver when the transceiver initiates a FleetSync Group Call.
Search Mode Tone	This tone sounds from the transceiver when the transceiver initiates Forced Search in an NXDN Trunking system. This tone sounds from the transceiver when the transceiver starts searching for the repeaters that can be synchronized in a DMR Conventional system.

Function	Description
Out of Range Tone	NXDN Conventional/ NXDN Site Roaming/ DMR Conventional/ DMR Site Roaming system: This tone sounds from the transceiver when the transceiver is outside the service area. NXDN Trunking/ DMR-based Trunking system: This tone sounds from the transceiver when no available control channel has been acquired even after 10 sec (60 sec in a DMR-based Trunking system) have elapsed since the search for a control channel has started. (Refer to NXDN Function Part Out of Range Indicator, DMR Function Part Out of Range Indicator.)
In-service Tone	After an Out of Range Tone (1 beep) sounds from the transceiver which continues to be unable to acquire a control channel in an NXDN Trunking system or DMR-based Trunking system, this tone sounds from the transceiver when the transceiver is able to acquire an available control channel.
Call Request Tone	NXDN Conventional/ NXDN Trunking/ DMR Conventional/ DMR-based Trunking system: This tone sounds from the transceiver when the transceiver initiates an Individual Call, Group Call, or Telephone Call by pressing the PTT switch. NXDN Conventional/ DMR Conventional system: This tone sounds from the transceiver when the transceiver initiates an Individual Call (Individual Call Acknowledge Request) by pressing the PTT switch.
Zone 1 Select Tone	For Portable (Basic Model), this tone sounds from the transceiver when zone 1 is selected.
Zone 2 Select Tone	For Portable (Basic Model), this tone sounds from the transceiver when zone 2 is selected.
Zone 3 Select Tone	For Portable (Basic Model), this tone sounds from the transceiver when zone 3 is selected.
Zone 4 Select Tone	For Portable (Basic Model), this tone sounds from the transceiver when zone 4 is selected.
OTAP Reactivation Tone	This tone sounds from the transceiver when OTAP Reactivation completes.
Call In Progress Tone	This tone sounds from the transceiver if the transceiver initiates a Telephone Call, Individual Call (Individual Call Acknowledge Request), Individual Call (Message Trunked (Enhanced)), or Group Call (Message Trunked (Enhanced)) and the transceiver is available for communications.
Disconnect Indication Tone	This tone sounds from the transceiver if the transceiver terminates communications with a Telephone Call, Individual Call (Message Trunked (Enhanced)), or Group Call (Message Trunked (Enhanced)).
Key Load Alert Tone	This tone sounds from the transceiver when Key Data is written to the transceiver or when Key Data is deleted is from the transceiver.
Transaction Confirmed Tone	In a DMR Conventional system, this tone sounds from the transceiver when the transceiver detects that no carrier is present after sending a Call Interrupt request message.
Bluetooth Find Device Mode Tone	This tone sounds from the transceiver when Bluetooth Find Device is executed in Bluetooth Device Mode and a Bluetooth-compatible device is searched.
Bluetooth Connect Tone	This tone sounds from the transceiver when the transceiver successfully connects to a Bluetooth-compatible device.
Bluetooth Disconnect Tone	This tone sounds from the transceiver when the connection to a Bluetooth-compatible device is disconnected.
Complete Tone	This tone sounds from the transceiver when the transmission successfully sends a Status Message, Short Message, GPS data or Paging Call by operating the buttons on the transceiver.
Playback End Tone	This tone sounds from the transceiver when the playback of audio data by pressing the Playback (Last Recording) button ends.

Warning Tone

Warning Tone is a tone that sounds from the transceiver before or when the transceiver is disabled to transmit, when the transceiver becomes unable to transmit, or when the transceiver attempts to transmit while the transceiver is unable to transmit.

The volume level of Warning Tone can be configured using KPG-D3/ D3N. (Refer to [Configuring the Volume Level of Various Tones \(Level Customization\)](#).)

Table 7-4 Warning Tone

Function	Description
Warning Tone A	This tone sounds from the transceiver while an unprogrammed channel is selected. This tone sounds from the transceiver until the PTT switch is released if the transmission is terminated by the Time-out Timer , or if the transceiver cannot transmit. This tone sounds from the transceiver until the PTT switch is released if Busy Channel Lockout is activated in an Analog Conventional and NXDN Conventional system.
Warning Tone B	This tone sounds from the transceiver when the VOX transmission is terminated by Time-out Timer .
Warning Tone C	This tone sounds from the transceiver when the automatic transmission is terminated by Time-out Timer .
Battery Warning Tone	This tone sounds from the transceiver when the Battery voltage level drops to the adjusted reduced-voltage level. (Refer to Warning that the Battery Voltage Is Low (Condition) .)
TOT Pre-alert Tone	This tone sounds from the transceiver when the transmit inhibit period configured in Time-out Timer is about to expire.
PLL Unlock Tone	This tone sounds from the transceiver when PLL is unlocked.
Busy Tone	This tone sounds from the transceiver if data cannot be sent by pressing the PTT switch since the channel is busy.
Busy Tone 2	This tone sounds from the transceiver if data communication is disabled since the channel is busy. This tone sounds from the transceiver when the transceiver receives a response message from the system that notifies of the busy state of the receiving transceiver in an NXDN Trunking system and DMR-based Trunking system.
Timed Power-off Pre-alert Tone A (Mobile only)	This tone sounds from the transceiver 1 min before the time preconfigured in Timed Power-off .
Timed Power-off Pre-alert Tone B (Mobile only)	This tone sounds from the transceiver 10 sec before the time preconfigured in Timed Power-off .
Timed Power-off Pre-alert Tone C (Mobile only)	This tone sounds from the transceiver 2 sec before the time preconfigured in Timed Power-off .
Call Queue Tone	This tone sounds from the transceiver when the transceiver receives a response message from the system that indicates a queued state in an NXDN Trunking system and DMR-based Trunking system.
System Busy Tone	This tone sounds from the transceiver when the transceiver receives a response message from the system indicating that no traffic channel is available in an NXDN Trunking system and DMR-based Trunking system.
System Search Tone	This tone sounds from the transceiver when the transceiver initiates System Search and changes the system in an LTR Trunking system.
System Search End Tone	This tone sounds from the transceiver when there is no repeater that can connect by using System Search in an LTR Trunking system.
System Select Tone	This tone sounds from the transceiver when the transceiver finds an available system by using System Auto Select and registration is successful in an NXDN Trunking system. This tone sounds from the transceiver when the transceiver searches for the repeaters that can be synchronized and a synchronized Personality is found in a DMR Conventional system.
Call Invalid Tone	This tone sounds from the transceiver when the transceiver receives from the system a response message, such as a response message that service is disabled, in an NXDN Trunking system or DMR-based Trunking system.
No Reply Tone	This tone sounds from the transceiver when the transceiver receives a message from the system that notifies that no response has been received from the receiving transceiver in an NXDN Trunking system or DMR-based Trunking system.
Call Fail Tone	This tone sounds from the transceiver when the transceiver receives no message from the system in an NXDN Trunking system or DMR-based Trunking system.

7.1 Tones that Sound When a User Operates the Transceiver or When the Transceiver Status Is Changed

Function	Description
Call Deny Tone	NXDN Conventional system: In an Individual Call (Individual Call Acknowledge Request), this tone sounds from the transceiver if a cancellation notification message is received from the receiving transceiver while waiting to receive a response from the receiving transceiver. NXDN Trunking system: In an Individual Call (Message Trunked (Enhanced)), this tone sounds from the transceiver if a cancellation notification message is received from the receiving transceiver while waiting to receive a response from the receiving transceiver. DMR-based Trunking system: In an Individual Call, this tone sounds from the transceiver if a cancellation notification message is received from the receiving transceiver while waiting to receive a response from the receiving transceiver.
Lone Worker Tone	This tone sounds from the transceiver when the amount of time configured in Lone Worker Interval elapses after the transceiver enters Lone Worker Mode.
Group-registration Invalid Tone	In an NXDN Trunking system, this tone sounds at 30-sec intervals from the transceiver upon receipt of a response message from the system indicating a failure in Group ID registration.
Group Subscription Invalid Indicator Tone	In a DMR-based Trunking system, this tone sounds at 30-sec intervals from the transceiver upon receipt of a response message from the system indicating a failure in Group ID registration although registration was successful.
Call Processing Tone	NXDN Trunking/ DMR-based Trunking system: When the transceiver initiates an Individual Call or Group Call by pressing the PTT switch, this tone sounds from the transceiver while the PTT switch is pressed and held. However, when sending an Individual Call (Message Trunked (Enhanced)) in an NXDN Trunking system, the tone from the transceiver continues to sound even if the PTT switch is released. NXDN Conventional system: This tone sounds from the transceiver when the transceiver initiates an Individual Call (Individual Call Acknowledge Request) by pressing the PTT switch. The tone from the transceiver continues to sound even if the PTT switch is released.
Network Failure Tone A	In an NXDN Trunking system and DMR-based Trunking system, this tone sounds at 5-sec intervals from the transceiver while the transceiver is in Network Failure Mode.
Network Failure Tone B	In an NXDN Trunking system and DMR-based Trunking system, this tone sounds from the transceiver when the transceiver exits Network Failure Mode.
Man-down Pre-alert (Portable only)	After the transceiver is detected to be in a tilted state by using the Man-down Detection function, this tone sounds from the transceiver when the time configured in Man-down Pre-alert elapses.
Stationary Pre-alert Tone (Portable only)	After the transceiver is detected to be in a stationary state by using the Stationary Detection function, this tone sounds from the transceiver when the time configured in Stationary Pre-alert elapses.
Motion Pre-alert Tone (Portable only)	After the transceiver is detected to be in a vigorously moving state by using the Motion Detection function, this tone sounds from the transceiver when the time configured in Motion Pre-alert elapses.
Key Fail Alert Tone	This tone sounds from the transceiver if the transceiver transmits using the Encryption function in the AES/ DES format or the Enhanced Encryption format when the Encryption key corresponding to the Multi-key List Number is not configured.
Trunking Tone	In a DMR-based Trunking system, if the transceiver is migrating to an Alternate Zone-Channel, this tone sounds from the transceiver when the transceiver returns to the control channel of a DMR-based Trunking system from the Alternate Zone-Channel.
Invalid Dialing Entry Tone	In a DMR-based Trunking system, this tone sounds from the transceiver when the disabled Dialing Code is entered and then the [#] button, PTT switch, or Menu ([F7]) button is pressed.
Bluetooth No Response Tone	This tone sounds from the transceiver if no response is received from a Bluetooth-compatible device when approximately 10 sec elapses after pairing with the Bluetooth-compatible device is started.
Bluetooth Connect Denied Tone	This tone sounds from the transceiver if pairing is denied by a Bluetooth-compatible device after pairing is started.
Bluetooth Connect Invalid Tone	This tone sounds from the transceiver if the PIN Code or Fixed PIN entered in the transceiver is detected to be different from the PIN Code entered in a Bluetooth-compatible device after pairing with the Bluetooth-compatible device is started.
Bluetooth No Service Tone	This tone sounds from the transceiver if pairing occurs with a Bluetooth-compatible device which is not compatible with the transceiver.
Battery Level Tone (Portable only)	This tone sounds from the transceiver according to the battery status.

Function	Description
Delay Tone	This tone sounds from the transceiver between the 3rd and 6th attempts to access a repeater by pressing the PTT switch in an LTR Trunking system, in order to notify a user that the connection to the repeater has been delayed.
Intercept Tone	This tone sounds from the transceiver when the transceiver accesses a repeater by pressing the PTT switch in an LTR Trunking system, and a user fails to connect to the repeater.
Intercept Tone 2	This tone sounds from the transceiver when the PF button to which Call 1 to Call 6 is assigned is pressed or when the repeater is accessed for automatic transmission, such as of a Status Message, and the connection to the repeater fails in an LTR Trunking system.
Deny Tone	This tone sounds from the transceiver if the transceiver cannot connect to an available RIC repeater within 60 sec by using Auto Telephone in an LTR Trunking system.
Advanced GPS Report Error Tone	In an NXDN Trunking system, this tone sounds from the transceiver at 30-sec intervals when the channel for GPS data transmission becomes unavailable.

Locator Tone

Locator Tone is the tone sounding from the transceiver before the transceiver starts automatic transmission in Emergency Mode, and after the transceiver ends automatic transmission in Emergency Mode.

The volume level of Locator Tone can be configured using KPG-D3/ D3N. (Refer to [Configuring the Volume Level of Various Tones \(Level Customization\)](#).)

Table 7-5 Locator Tone

Function	Description
Emergency Locator Tone	A Locator Tone 1 sounds from the transceiver before the transceiver starts automatic transmission in Emergency Mode. A Locator Tone 2 sounds from the transceiver after the transceiver ends automatic transmission in Emergency Mode. In Emergency Mode, the transceiver repeats an automatic communication only the number of times configured in Emergency Cycle.

Sidetone

Sidetone sounds from the transceiver when the transceiver can communicate or the transceiver completes a transmission.

The volume level of Sidetone can be configured using KPG-D3/ D3N. (Refer to [Configuring the Volume Level of Various Tones \(Level Customization\)](#).)

Table 7-6 Sidetone

Function	Description
Proceed Tone	This tone sounds from the transceiver when a connection to a repeater completes by pressing the PTT switch in an NXDN Trunking system or DMR-based Trunking system. In an NXDN Conventional system and DMR Conventional system, this tone is used to prevent missing the beginning of the audio to be transmitted. This tone can be used with Proceed Tone Delay Time at the same time.
VOX Proceed Tone	This tone sounds from the transceiver when the transceiver starts transmitting by using the VOX function.
PTT ID Sidetone	This tone sounds from the transceiver when the transceiver starts transmitting a FleetSync PTT ID and MDC-1200 PTT ID.

Alert Tone

Alert Tone sounds from the transceiver when the transceiver receives various types of calls, Status Message, or Short Message. (Refer to [Tones that Sound When the Transceiver Receives a Call](#).)

The volume level of Alert Tone can be configured using KPG-D3/ D3N. (Refer to [Configuring the Volume Level of Various Tones \(Level Customization\)](#).)

Table 7-7 Alert Tone

Function	Description
Special Alert Tone	This tone sounds from the transceiver when the transceiver receives various types of calls, Status Message, or Short Message. A maximum of 8 types of tones can be arbitrarily configured or changed. (Refer to Configuring the Alert Tone (Special Alert Tone) .)
Unencrypted Call Alert Tone	This tone sounds from the transceiver when the transceiver starts transmitting without encrypting audio data.

Volume Level Tone

Volume Level Tone sounds from the transceiver when the volume level is changed.

Table 7-8 Volume Level Tone

Function	Description
Fixed Volume Button Tone	This tone sounds from the transceiver when the volume level is changed by using the Fixed Volume button.
Volume Button Tone (Mobile only)	This tone sounds from the transceiver when the volume level is changed by pressing the Volume Up or Volume Down button.

Transmit Tone

Transmit Tone is a tone sent to the communicating party.

Table 7-9 Transmit Tone

Function	Description
Transpond Tone	This tone is sent to the other transceiver after receiving a call by 2-tone or DTMF code. This tone is sent to the other transceiver after receiving a call in an LTR Trunking system.
Stun-on Tone	This tone is sent to the other transceiver after receiving a Stun code.
Stun-off Tone	This tone is sent to the other transceiver after receiving a Revive code while the transceiver is in the Stun state.
PTT Release Tone	This tone is sent to the other transceiver when the PTT switch is pressed to send and then released after the call ends.
Background Tone	This tone is sent to the other transceiver every 1 sec during voice transmission in Emergency Mode.

7.2 Tones that Sound When the Transceiver Receives a Call

An Alert Tone sounds from the transceiver such as when the transceiver receives a call using an Individual Call or a Group Call, a Status Message, or a Short Message and notifies the user of the reception.

The Alert Tone pattern can be configured by selecting from 8 types of tones configured in **Special Alert Tone**. (Refer to [Configuring the Alert Tone \(Special Alert Tone\)](#).)

Following are the types of Alert Tone.

Table 7-10 Alert Tone

NXDN Conventional	
Alert Tone (Individual Call)	This tone sounds from the transceiver when the transceiver receives an Individual Call.
Alert Tone (Individual Call Incoming)	If Automatic Response is disabled, this tone sounds from the transceiver when the transceiver receives an Individual Call (Individual Call Acknowledge Request).
Alert Tone (Group Call)	This tone sounds from the transceiver when the transceiver receives a Group Call.
Alert Tone (Paging Call)	This tone sounds from the transceiver when the transceiver receives a Paging Call.
Alert Tone (Status/Short Message Call)	This tone sounds from the transceiver when the transceiver receives a Status Message or a Short Message.
Alert Tone (Emergency Response)	If Alert Tone is enabled for Emergency Status Response , this tone sounds from the transceiver when the transceiver receives an Emergency Call.
Alert Tone (Task Request)	This tone sounds from the transceiver when the transceiver receives a Task Request message.
DMR Conventional	
Alert Tone (Individual Call)	This tone sounds from the transceiver when the transceiver receives an Individual Call.
Alert Tone (Group Call)	This tone sounds from the transceiver when the transceiver receives a Group Call.
Alert Tone (Broadcast Group Call)	This tone sounds from the transceiver when the transceiver receives a Broadcast Group Call.
Alert Tone (Paging Call)	This tone sounds from the transceiver when the transceiver receives a Paging Call.
Alert Tone (Status/ Short Message Call)	This tone sounds from the transceiver when the transceiver receives a Status Call/ Short Message Call.
Alert Tone (Emergency Response)	This tone sounds from the transceiver when the transceiver receives an Emergency Status.
Alert Tone (Task Request)	This tone sounds from the transceiver when the transceiver receives a Task Request message.

NXDN Trunking	
Alert Tone (Individual Call)	This tone sounds from the transceiver when the transceiver receives an Individual Call in an NXDN Trunking system.
Alert Tone (Individual Call Incoming)	If Automatic Response is disabled, this tone sounds from the transceiver when the transceiver receives an Individual Call (Message Trunked (Enhanced)).
Alert Tone (Telephone Individual Call)	This tone sounds from the transceiver when the transceiver receives a Telephone Individual Call in an NXDN Trunking system.
Alert Tone (Conference Group Call)	This tone sounds from the transceiver when the transceiver receives a Conference Group Call in an NXDN Trunking system.
Alert Tone (Broadcast Group Call)	This tone sounds from the transceiver when the transceiver receives a Broadcast Group Call in an NXDN Trunking system.
Alert Tone (Paging Call)	This tone sounds from the transceiver when the transceiver receives a Paging Call in an NXDN Trunking system.
Alert Tone (Telephone Group Call)	This tone sounds from the transceiver when the transceiver receives a Group Call from a telephone in an NXDN Trunking system.
Alert Tone (Status/Short Message Call)	This tone sounds from the transceiver when the transceiver receives a Status Message or a Short Message.
Alert Tone (Emergency Response)	If Alert Tone is enabled for Emergency Status Response , this tone sounds from the transceiver when the transceiver receives an Emergency Call.
Alert Tone (Task Request)	This tone sounds from the transceiver when the transceiver receives a Task Request message.
DMR-based Trunking	
Alert Tone (Individual Call)	This tone sounds from the transceiver when the transceiver receives an Individual Call in a DMR-based Trunking system.
Alert Tone (Individual Call Incoming)	This tone sounds from the transceiver when the transceiver receives an Individual Call (FOACSU behavior).
Alert Tone (Telephone Individual Call)	This tone sounds from the transceiver when the transceiver receives a Telephone Individual Call in a DMR-based Trunking system.
Alert Tone (Conference Group Call)	This tone sounds from the transceiver when the transceiver receives a Conference Group Call in a DMR-based Trunking system.
Alert Tone (Broadcast Group Call)	This tone sounds from the transceiver when the transceiver receives a Broadcast Group Call in a DMR-based Trunking system.
Alert Tone (Telephone Group Call)	This tone sounds from the transceiver when the transceiver receives a Group Call from a telephone in a DMR-based Trunking system.
Alert Tone (Status/Short Message Call)	This tone sounds from the transceiver when the transceiver receives a Status Message or a Short Message.
Alert Tone (Emergency Response)	If Alert Tone is enabled for Emergency Status Response , this tone sounds from the transceiver when the transceiver receives an Emergency Call.
Alert Tone (Task Request)	This tone sounds from the transceiver when the transceiver receives a Task Request message.

DTMF	
Alert Tone	This tone sounds from the transceiver when the transceiver receives a call using a DTMF code.
2-tone	
Alert Tone (Analog/ Digital)	This tone sounds from the transceiver when the transceiver receives a call using a 2-tone code.
MDC-1200	
Alert Tone (Individual Call)	This tone sounds from the transceiver when the transceiver receives an MDC-1200 Individual Call.
Alert Tone (Group Call)	This tone sounds from the transceiver when the transceiver receives an MDC-1200 Group Call.
Alert Tone (Fleet Call)	This tone sounds from the transceiver when the transceiver receives an MDC-1200 Fleet Call.
Alert Tone (All Call)	This tone sounds from the transceiver when the transceiver receives an MDC-1200 All Call.
FleetSync	
Alert Tone (Individual Call)	This tone sounds from the transceiver when the transceiver receives a FleetSync Individual Call.
Alert Tone (Other Selective Calls)	This tone sounds from the transceiver when the transceiver receives a FleetSync Group Call, FleetSync Fleet Call, FleetSync Supervisor Call or FleetSync Broadcast Call.
Alert Tone (Paging Call)	This tone sounds from the transceiver when the transceiver receives a FleetSync Paging Call.
Alert Tone (Status/Short Message Call)	This tone sounds from the transceiver when the transceiver receives a FleetSync Status/Short Message Call.
Alert Tone (Emergency Response)	If Alert Tone is enabled for Emergency Status Response , this tone sounds from the transceiver when the transceiver receives a FleetSync Emergency Call.

Configuration using KPG-D3/ D3N

- Configuring various **Alert Tones** (NXDN Conventional) ( See Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring various types of **Alert Tone** (DMR Conventional) ( See Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Conventional)
- Configuring various types of **Alert Tone** (NXDN Trunking) ( See Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring various types of **Alert Tone** (DMR-based Trunking) ( See Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking)
- Configuring various **Alert Tones** (DTMF) ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode)
- Configuring various **Alert Tones** (2-tone (Analog)) ( See Radio Configuration > Protocol Options > 2-tone > Analog Decode)
- Configuring various **Alert Tones** (2-tone (Digital)) ( See Radio Configuration > Protocol Options > 2-tone > Digital Decode)
- Configuring various **Alert Tones** (MDC-1200) ( See Radio Configuration > Protocol Options > MDC-1200 > General > RX Options)
- Configuring various **Alert Tones** (FleetSync) ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options)

Configuring the Alert Tone (Special Alert Tone)

Special Alert Tone is the alert tone pattern when receiving a call with the optional signaling. An Alert Tone that is suitable for a user's environment can be selected.

Special Alert Tone can be used to select an Alert Tone from 8 patterns of Alert Tones. An Alert Tone pattern consists of 16 tones.

Special Alert Tone can be configured by using KPG-D3/ D3N. The following table shows the configuration items for the Autodial List.

Table 7-11 Special Alert Tone

Special Alert Tone	Description
Frequency	The tone frequency can be configured. A frequency between 400 Hz and 2500 Hz can be configured in steps of 10 Hz. Gap can be configured if "No Tone" is selected.
Length	The tone length can be configured. A tone length between 10 ms and 2500 ms can be configured in steps of 10 ms. No tone sounds if 0 ms is configured.
Cycle	This function can be used to configure the number of times for the Alert Tone that sounds from the transceiver. A number from 1 to 255 can be configured. The Alert Tone sounds from the transceiver until it is manually stopped if "Infinite" is configured. If it is intended for the Alert Tone to sound multiple times, the Alert Tone does not sound from the transceiver while the transceiver unmutes the speaker. Or, if the matching state of Optional Signaling is reset, Alert Tone will also be disabled.
Interval	This function can be used to configure the timing to repeat the Alert Tone that sounds from the transceiver. A time between 0 s and 255 s can be configured in steps of 1 s.

Configuration using KPG-D3/ D3N

Configuring **Special Alert Tone** ( See [Radio Configuration > Special Settings > Customization > Tone](#))

7.3

Tones that Sound When the Communication Starts/ Ends

These tones sound when the communication starts or ends and notifies the user of it.

Using Sound to Notify the Timing to Start Communications (PTT Proceed Tone)

PTT Proceed Tone is the tone that sounds from the transceiver when the transceiver becomes available by a user pressing the **PTT** switch.

In an LTR Trunking system, NXDN Trunking system, and DMR-based Trunking system, a user needs to start speaking when the repeater becomes available after pressing the **PTT** switch. Since this duration is not always the same, it is difficult for a user to know when to start speaking after pressing the **PTT** switch. In this case, if a user starts speaking when a PTT Proceed Tone (3 beeps) sounds from the transceiver, communication can be initiated without losing the beginning of a call. In an Analog Conventional system, NXDN Conventional system, and DMR Conventional system, the PTT Proceed Tone is used to delay the start of a voice call by the transmitting transceiver when reception takes time, such as when the receiving transceiver is scanning or when Battery Saver is used.

A PTT Proceed Tone (3 beeps) sounds from the transceiver when the length of time configured in **Proceed Tone Delay Time** elapses after the transceiver starts transmission and enters the enabled state to modulate the audio signals.

 Note

- The transceiver does not transmit audio signals until the PTT Proceed Tone (3 beeps) stops sounding even if the transceiver transmits upon pressing the **PTT** switch.

Configuration using KPG-D3/ D3N

- Configuring **PTT Proceed Tone** (NXDN Trunking) to be enabled or disabled ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)
- Configuring **PTT Proceed Tone** (Conventional) to be enabled or disabled ( See Radio Configuration > Global Options > Basics > Audio/Indicator > Alert Tone > Conventional)
- Configuring **PTT Proceed Tone** (LTR Trunking) to be enabled or disabled ( See Radio Configuration > Protocol Options > LTR > PTT Proceed Tone)
- Configuring **Proceed Tone Delay Time** (Conventional) ( See Radio Configuration > Global Options > Basics > Audio/Indicator > Alert Tone > Conventional)
- Configuring **Proceed Tone Delay Time** (LTR Trunking) ( See Radio Configuration > Protocol Options > LTR > PTT Proceed Tone)

Using Sound to Notify the Other Party that the Communication Ends (PTT Release Tone)

PTT Release Tone is the function to notify the receiving party by audible tone that a communication ended by releasing the **PTT** switch when the communication ends. With this function, knowing an audible tone marks the end of a call will allow the receiving party to easily recognize the timing to transmit next.

The transceiver transmits the PTT Release Tone (1 beep) and then ends the actual transmission when the call finishes by releasing the **PTT** switch.

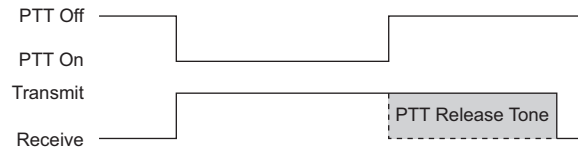


Figure 7-1 PTT Release Tone

The volume level of PTT Release Tone can be configured in **Transmit Tone Level**.

Configuration of PTT Release Tone in an LTR Trunking system

In an LTR Trunking system, the enabling and disabling of **PTT Release Tone** when transmitting a Dispatch ID and the enabling and disabling of **PTT Release Tone** when transmitting a Telephone ID can each be configured. This can be configured individually in order to avoid double beeping when using a Telephone ID, since some repeaters have a function similar to Telephone ID.

Note

- If EOT for DTMF or MDC-1200 is configured, the PTT Release Tone is sent after the EOT is sent. If EOT for FleetSync is configured, a PTT Release Tone is sent after the EOT is sent.

Configuration using KPG-D3/ D3N

- Configuring **PTT Release Tone** (NXDN Trunking) to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)
- Configuring **PTT Release Tone** (Conventional) to be enabled or disabled ([See](#) Radio Configuration > Global Options > Basics > Audio/Indicator > Alert Tone > Conventional)
- Configuring **PTT Release Tone** (LTR Trunking) to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > LTR > PTT Release Tone)
- Configuring **Transmit Tone Level** ([See](#) Radio Configuration > Global Options > Basics > Audio/Indicator > Volume Level > Tone)

7.4 Functions Related to the Volume Configuration

The following functions are relevant to the volume configuration.

- Minimum Volume
- Maximum Volume
- Offset Level
- Level Customization
- Selectable Tone Level
- Speaker Attenuation

Configuring the Minimum Volume Level (Minimum Volume)

Minimum Volume varies depending on the configuration in **Minimum Volume Type**.

- If “Preset” is configured in **Minimum Volume Type**:

Minimum Volume is the function to enable the volume level configured in **Minimum Volume** to be applied when the transceiver is turned ON again after the volume level is turned fully down and the transceiver is turned OFF.

- If “Lowest Limit” is configured in **Minimum Volume Type**:

Minimum Volume is the function to maintain an audible volume level even if the volume level is turned down.

The resulting audio volume prevents the user from failing to hear received audio even if the volume level is erroneously turned down fully. Turning up the volume causes the volume level to be increased from the audio level configured in **Minimum Volume**. If **Minimum Volume** is not configured, turning the volume level fully down will result in the audio being inaudible.

Configuration using KPG-D3/ D3N

- Configuring **Minimum Volume** ( See Radio Configuration > Global Options > Basics > Audio/Indicator > Volume Level)
- Configuring **Minimum Volume Type** ( See Radio Configuration > Global Options > Basics > Audio/Indicator > Volume Level)

Configuring the Maximum Volume Level (Maximum Volume)

Maximum Volume is the function to limit the volume level from exceeding the configured volume level even if the volume control is turned up.

This prevents a user from discomfort caused by an excessive volume level when wearing a headset.

Configuration using KPG-D3/ D3N

Configuring **Maximum Volume** ( See Radio Configuration > Global Options > Basics > Audio/Indicator > Volume Level)

Configuring the Offset Value for Volume Level (Offset Level)

Tone Volume Offset is the function to adjust how much the standard tone volume level can be increased or decreased from the fixed volume position. This function can be used to adjust the volume level of a tone depending on the situation.

Offset Level is the function to adjust how much the standard tone volume level can be increased or decreased from the fixed volume position. This function can be used to adjust the volume level of a tone depending on the situation.

Configuration using KPG-D3/ D3N

Configuring **Offset Level** ( [See](#) Radio Configuration > Global Options > Basics > Audio/Indicator > Volume Level > Tone)

Configuring the Volume Level of Various Tones (Level Customization)

Level Customization is the function to adjust the volume level of various tones.

This function can be used to maintain the volume level of the tones at a constant level depending on the situation or mute tones.

Level Customization for the following tones can be configured using KPG-D3/ D3N:

- Power-on Tone
- Control Tone
- Warning Tone
- Alert Tone
- Sidetone
- Locator Tone

The following are the types of **Level Customization** that can be configured:

Table 7-12 Types of Level Customization That Can Be Configured

Level Customization	Description
Volume Linked	The Tone Volume varies in conjunction with the current volume level.
1 to 31	The tone sounds from the transceiver with a fixed tone volume. Higher values result in greater volume.
Off	The tone does not sound from the transceiver.
Selectable	The tone volume switches in conjunction with the Fixed Volume button. (Refer to Changing the Tone Volume Level with a Single Touch.)

Configuration using KPG-D3/ D3N

Configuring **Level Customization** of each tone ( [See](#) Radio Configuration > Global Options > Basics > Audio/Indicator > Volume Level > Tone > Level Customization)

Changing the Tone Volume Level with a Single Touch

The tone volume can be changed by using the **PF** button.

Pressing the **Fixed Volume** button causes the volume level to be changed to **Fixed Level (Low)** or **Fixed Level (High)** configured using KPG-D3/ D3N.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “Fixed Volume” enables Tone Volume to be changed. (Refer to [Using Menu Mode](#).)

Operating the transceiver

1 Press the **Fixed Volume** button.

The tone volume switches in the following order: Low Volume Level (Fixed Volume) → High Volume Level (Fixed Volume) → Off → Low Volume Level (Fixed Volume) ...

2 Press the **Home** button to exit the mode.

If Menu Mode is entered by using the **Menu** button, pressing and holding the **Home** button restores Menu Mode.

Configuration using KPG-D3/ D3N

- Configuring **Fixed Level (Low)** and **Fixed Level (High)** ( [See](#) Radio Configuration > Global Options > Basics > Volume Level > Tone)
- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Temporarily Reducing the Volume Level of the Speaker Microphone (Speaker Attenuation)

Speaker Attenuation is the function to temporarily reduce the volume level of the speaker microphone, speaker of the transceiver, and speaker connected by Bluetooth to the transceiver.

This function can be used while the transceiver is in use in a quiet place. This function is normally activated and the transceiver can pause **Speaker Attenuation** only if making an important call, such as an emergency call.

Pressing the **Speaker Attenuation** button toggles Speaker Attenuation between activated and deactivated.

Operating the transceiver

● Activating Speaker Attenuation

Press the **Speaker Attenuation** button while the Speaker Attenuation is deactivated.

Speaker Attenuation is activated and then the volume level will be decreased by approximately 10 dB.

● Deactivating Speaker Attenuation

Press the **Speaker Attenuation** button while the Speaker Attenuation is activated.

Speaker Attenuation is deactivated and then the volume level will restore to the previous level.



- The status of Speaker Attenuation is retained if the speaker microphone is removed while Speaker Attenuation is activated.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the speaker microphone ( [See](#) Radio Configuration > Global Options > Button Assignment)

7.5 Using the Transceiver as a Megaphone (Public Address)

Supported Models: Mobile

Public Address enables the transceiver to be used in place of a megaphone.

Pressing and holding the **PTT** switch while Public Address is enabled causes the audio spoken into the microphone to be emitted from the external speaker (KES-5/ KES-5A) for Public Address that is connected to the rear panel of the transceiver. However, if the external speaker (KES-5/ KES-5A) for Public Address is not connected to the rear panel of the transceiver, the received audio (audio input from the microphone) is not emitted from any speaker.

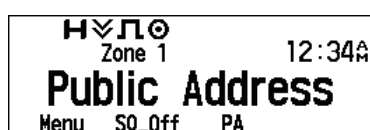
The received audio is emitted from the internal speaker of the transceiver when the **PTT** switch is released. If the speaker (KES-3) is connected to a 3.5 mm phone jack, the received audio is emitted from the connected speaker (KES-3).

Operating the transceiver

● Enabling the Public Address

Press the **Public Address** button while Public Address is disabled.

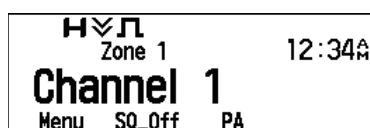
Public Address is enabled, and then the “” icon appears.



● Disabling the Public Address

Press the **Public Address** button while Public Address is enabled.

Public Address is disabled, and then the “” icon disappears.



 Note

- Pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the status of Public Address can be toggled between enabled and disabled by selecting “Public Address”. (Refer to [Using Menu Mode.](#))
- To use Public Address, an external speaker (KES-5/ KES-5A) for Public Address is required.
- In an NXDN Trunking system (Message Trunked (Enhanced)), **Public Address** is disabled when the reception of a call is initiated by using a traffic channel, such as an Individual Call, Group Call, Broadcast Group Call, or Telephone Call. On the other hand, even if the transceiver receives a call initiated by using only a control channel such as a Data Call, **Public Address** will not be disabled.
- **Public Address** is disabled if a zone or channel is changed.
- In an NXDN Conventional system, if an Individual Call ACK request message is received when **Automatic Response** is disabled, **Public Address** is disabled.
- In a DMR-based Trunking system, **Public Address** is disabled when the reception of the call is initiated by using a traffic channel for a call such as an Individual Call, Group Call, Broadcast Group Call, or Telephone Call. On the other hand, for Data Call, **Public Address** will not be disabled even if the transceiver receives a call.
- If Public Address is used by operating the **PTT** switch or External PTT (Voice) port, the mic input line behaves according to the configuration in **Modulation Line** (MI, MI2, DI). If Public Address is used by operating the External PTT (PA) port, the mic input line is the MI2 Line.
- If a Bluetooth-compatible device connecting by Headset Profile exists, the Mic Line of the Bluetooth-compatible device is enabled. Therefore, if audio is inputted into the Mic Line of the Bluetooth-compatible device by operating one of the **PTT** switch, External PTT (Voice) port, External PTT (PA) port, or the **PTT** switch of the Bluetooth-compatible device while **Public Address** is enabled, audio is emitted from the transceiver regardless of the configuration of **Bluetooth Speaker**.
- Even if **Public Address** is enabled and the **PTT** switch is pressed while Dropout Delay Time or Dwell Time of Scan is counting down, the timer is not extended.
- If **Public Address** is enabled and the **PTT** switch is pressed while the **Auto Reset Timer** of each call is counting down, the **Auto Reset Timer** extends while the **PTT** switch is pressed and held.
- **Public Address** and **External Speaker** cannot be used at the same time.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( **See** Radio Configuration > Global Options > Button Assignment)

7.6 Restricting an Alert Tone When Consecutively Receiving a Call (Alert Tone Inhibit from 2nd Call)

Alert Tone Inhibit from 2nd Call is the function that disables the functions such as the storing of a Caller ID in the transceiver stack memory and the activation of various alerts, if the transceiver consecutively receives an Individual Call from the transceiver having the same Individual ID, or receives a Group Call with the same Group ID after the transceiver receives an Individual Call or a Group Call.

For instance, emitting an Alert Tone from the transceiver every time the transceiver repeatedly and frequently receives a call from the same party may be annoying. In that case, this function can be used to disable the Alert Tone for sounding from the transceiver even if the transceiver receives a call from the same party in succession.

This function prevents these functions from activating as follows even if these functions are enabled or configured to be enabled when the transceiver receives a call from the same party in succession.

- **Alert Tone**

An Alert Tone does not sound from the transceiver even if the transceiver receives a call from the same party in succession.

- **Selective Call Alert LED**

A Selective Call Alert LED does not blink even if the transceiver receives a call from the same party in succession.

- **Horn Alert (Mobile only)**

The headlights or the horn of a vehicle being connected to the Horn Alert port does not light or sound even if the transceiver receives a call from the same party in succession.

- **Caller ID Stack**

The Caller ID cannot be stored in the transceiver stack memory even if the transceiver receives a call from the same party in succession.

When the transceiver receives an Individual Call or Group Call using this function, the transceiver behaves as follows.

- **Behavior examples of when the transceiver receives an Individual Call**

If the transceiver receives an Individual Call, an Alert Tone does not sound from the transceiver even when the transceiver receives an Individual Call again from the transceiver having the same Individual ID before the time configured in **Auto Reset Timer** elapses.

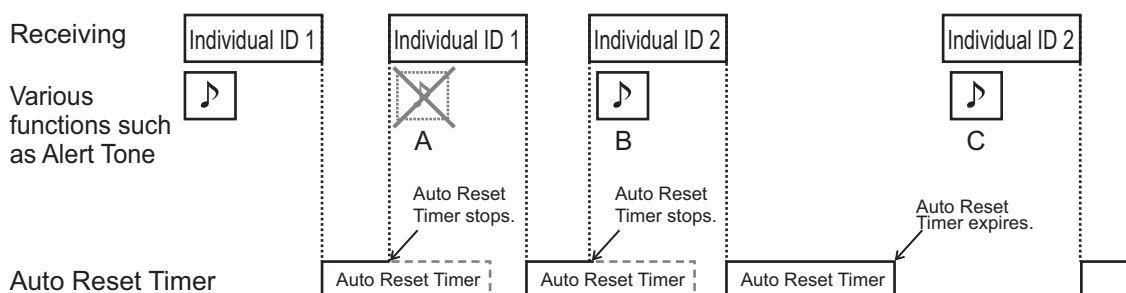


Figure 7-2 Alert Tone Inhibit from 2nd Call (Individual Call)

- A: Because the transceiver receives an Individual Call from the transceiver (Individual ID 1) having the same Individual ID before the time configured in **Auto Reset Timer** elapses, various functions such as Alert Tone will not be activated.
- B: Even before the time configured in **Auto Reset Timer** elapses, because the transceiver receives an Individual Call from the transceiver (Individual ID 2) having a different Individual ID, various functions such as Alert Tone will be activated.
- C: Even if the transceiver receives an Individual Call from the transceiver (Individual ID 2) again, because the time configured in **Auto Reset Timer** elapsed, various functions such as Alert Tone will be activated.

● Behavior examples of when the transceiver receives a Group Call

If the transceiver receives a Group Call, various functions such as Alert Tone are not activated when the transceiver receives a Group Call again using the same Group ID while the amount of time configured in **Auto Reset Timer** elapses. In this case, even if the Individual ID of the transmitting transceiver is either the same or different, various functions such as Alert Tone will not be activated when the Group ID for the Group Call received second time or later is the same as the Group ID for the Group Call received first time.

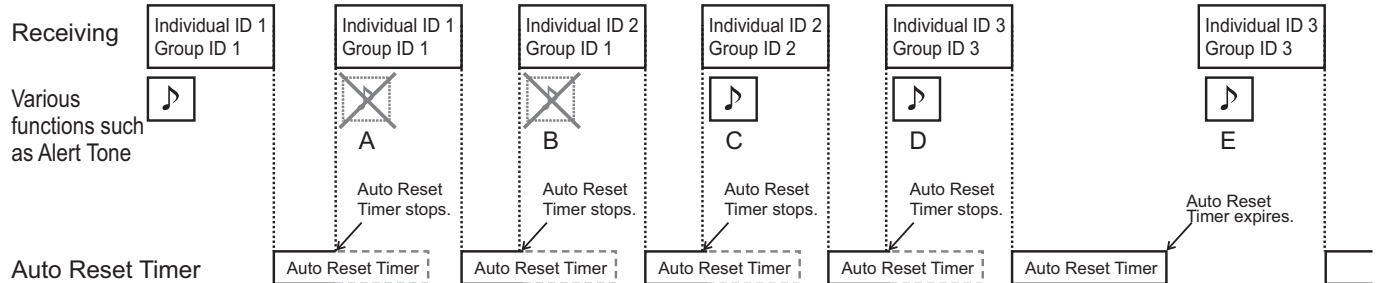


Figure 7-3 Alert Tone Inhibit from 2nd Call (Group Call)

- A: Because the transceiver receives a Group Call using the same Group ID from the transceiver (Individual ID 1) having the same Individual ID before the time configured in **Auto Reset Timer** elapses, various functions such as Alert Tone will not be activated.
- B: Even if the transmitting transceiver has a different Individual ID, because the transceiver receives a Group Call using the same Group ID before the time configured in **Auto Reset Timer** elapses, various functions such as Alert Tone will not be activated.
- C: Even if the transmitting transceiver has the same Individual ID, because the transceiver receives a Group Call using a different Group ID before the time configured in **Auto Reset Timer** elapses, various functions such as Alert Tone will be activated.
- D: Because the transceiver receives a Group Call using a different Group ID from the transceiver having the different Individual ID before the time configured in **Auto Reset Timer** elapses, various functions such as Alert Tone will be activated.
- E: Even if the transceiver receives a Group Call using the same Group ID, because the time configured in **Auto Reset Timer** has already elapsed, various functions such as Alert Tone will be activated.

Note

- If **Alert Tone Inhibit from 2nd Call** is enabled, various functions such as Alert Tone will not be activated upon the reception of the second and subsequent calls from the same transceiver even if “Off” is configured in **Auto Reset Timer**.
- If “0” configured in **Auto Reset Timer**, **Alert Tone Inhibit from 2nd Call** will not be activated.

Configuration using KPG-D3/ D3N

- Configuring **Alert Tone Inhibit from 2nd Call** to be enabled or disabled (See Radio Configuration > Protocol Options > NXDN > General > Common Options)
- Configuring **Alert Tone Inhibit from 2nd Call** to be enabled or disabled (See Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED)

7.7

Configuring Audio Profile (Audio Profile)

The received audio sounds different depending on the usage environment of the transceiver, characteristics of devices, such as the microphone to be combined with the transceiver and external devices, or the tone of voice and manner of speaking of the speaker. Also, the received audio sounds different depending on the output method, such as using a speaker of the transceiver or an earphone, to hear the received audio.

By having multiple configuration states of audio characteristics and noise cancellation for transmission and reception, **Audio Profile** is the function to enable the transceiver to switch among preset audio profiles according to the usage environments, situations, and preferences of the transceiver.

By designating each configuration of each of the following category as one audio profile, a total of 6 types of audio profiles can be used by switching:

- General
- RX Digital Audio Response
- TX Digital Audio Response
- Active Noise Reduction

The configuration items included in each category are as follows:

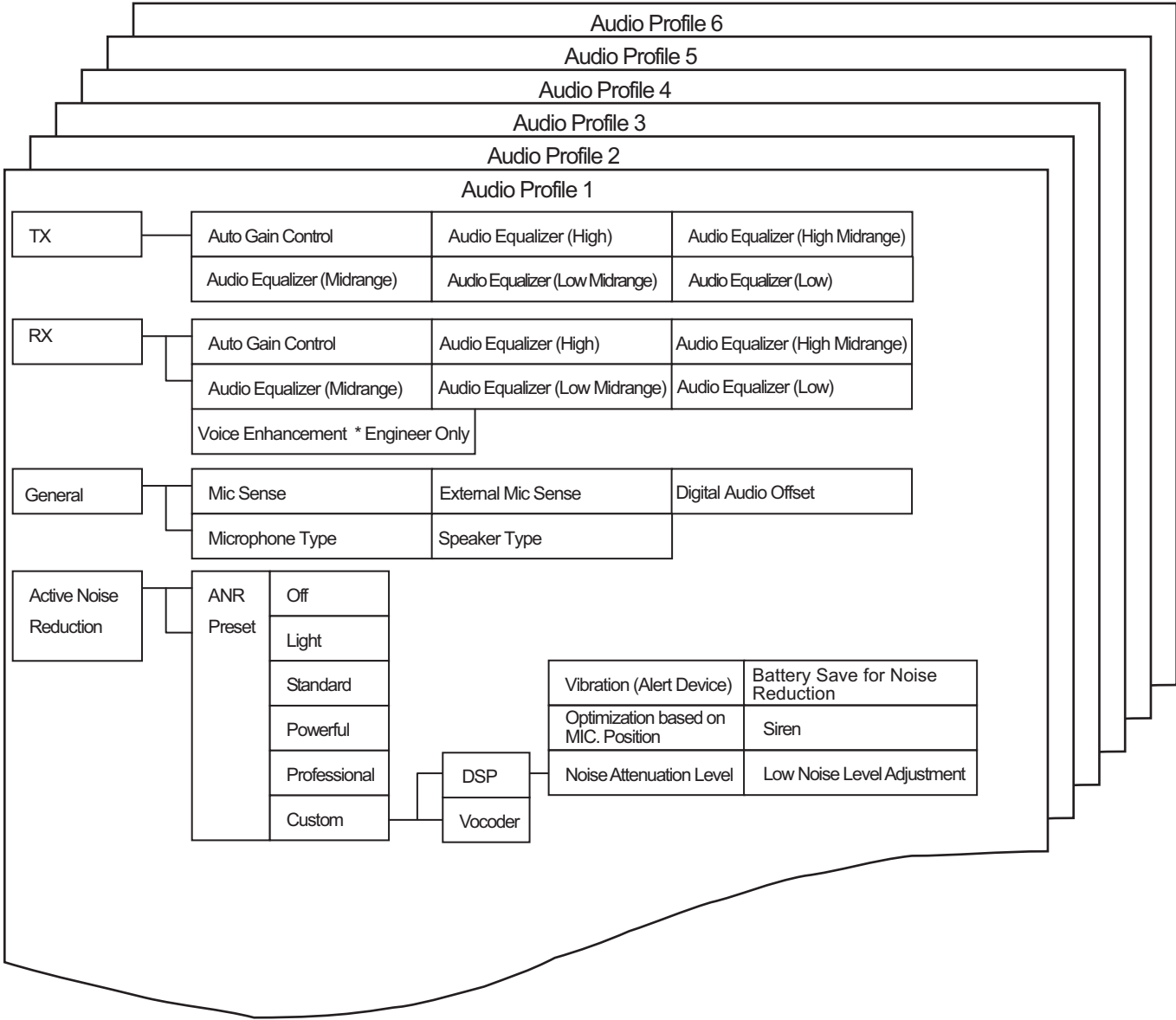


Figure 7-4 Audio Profile

An audio profile used for the transceiver can be configured using KPG-D3/ D3N. Also, the audio profile to be used can be changed in Audio Profile Mode by operating the transceiver.

Pressing the **Menu** button to enter Menu Mode, and then selecting “Audio Profile” places the transceiver in Audio Profile Mode. (Refer to [Using Menu Mode](#).)

Configuration using KPG-D3/ D3N

- Configuring **Audio Profile** ( [See](#) Radio Configuration > Special Settings > Customization > Audio Profiles)
- Configuring the number of **Audio Profile** used for the transceiver ( [See](#) Radio Configuration > Global Options > Basics > Audio/Indicator > Audio Profile)

General

The following are the common functions of the audio profile:

- Speaker Type
- Microphone Type
- Microphone Sense
- External Microphone Sense
- Digital Audio Offset

Speaker Type (digital channels only)

Speaker Type is the function to configure the type of external speaker to be connected to the transceiver and keep the audio in optimum condition.

The external speakers to be connected to the transceiver have different audio characteristics. Using this function equalizes audio characteristics that differ for each speaker, and can correct the demodulated sound when a digital signal is received.

Table 7-13 Speaker Type

Speaker Type	Description
None	Disables the capability to adjust audio characteristics. This configuration is used when not wanting to change the audio characteristics.
Internal Speaker	Portable: Configuration is not available. Mobile: Internal speaker
Speaker 1	Enables the optimum audio characteristics of the following speakers: Portable: KMC-45, KMC-45D, KMC-54WD, KMC-70 Mobile: KES-3
Speaker 2	Enables the optimum audio characteristics of the following speakers: Portable: KMC-21, KMC-21S, KMC-41, KMC-41D, KMC-42W, KMC-42WD, KMC-46EX, KMC-72 Mobile: KES-5, KES-5A
Speaker 3	Enables the optimum audio characteristics of the following speakers: Portable: KMC-25, KMC-25S, KMC-26, KMC-48GPS Mobile: Configuration is not available.

Speaker Type	Description
Speaker 4	Enables the optimum audio characteristics of the following speakers: Portable: KHS-1, KHS-7, KHS-7A, KHS-8BE, KHS-8BL, KHS-9BE, KHS-9BL, KHS-11BE, KHS-11BL, KHS-12BE, KHS-12BL, KHS-14, KHS-21, KHS-22, KHS-25, KHS-26, KHS-27, KHS-31, KHS-31C, EMC-11, EMC-12 Mobile: Configuration is not available.
Speaker 5	Enables the optimum audio characteristics of the following speakers: Portable: KHS-15-BH, KHS-15-OH, KHS-23, KHS-29F, KHS-35F Mobile: Configuration is not available.
Speaker 6	Enables the optimum audio characteristics of the following speakers: Portable: KHS-10BH, KHS-10OH Mobile: Configuration is not available.
Speaker 7	Enables the optimum audio characteristics of the following speakers: Portable: KHS-8NC, KMC-51D, KMC-52, KMC-52D Mobile: Configuration is not available.

 Note

- If using an external speaker unlisted in the table above, configuring “None” in **Speaker Type** is recommended.
- Pressing the **Menu** button places the transceiver in Menu Mode, and then the transceiver enters Speaker Type Mode by selecting “Speaker Type”. In Speaker Type Mode, the configuration in **Speaker Type** can be changed.

Configuration using KPG-D3/ D3N

Configuring **Speaker Type** ( **See** Radio Configuration > Special Settings > Customization > Audio Profiles)

Microphone Type (digital channels only)

Microphone Type is the function to configure the type of external microphone to be connected to the transceiver and keep the audio quality in optimum condition.

The external microphones to be connected to the transceiver have different audio characteristics. Use of this function equalizes audio characteristics and corrects the condition to be optimum for digitalization.

Table 7-14 Microphone Type

Microphone Type	Description
None	Disables the capability to adjust audio characteristics. This configuration is used when not wanting to change the audio characteristics.
Microphone 1	Enables the optimum audio characteristics of the following microphones: Portable: KMC-45, KMC-45D, KMC-54WD Mobile: KMC-35, KMC-36, KMC-65, KMC-66
Microphone 2	Enables the optimum audio characteristics of the following microphones: Portable: KMC-21, KMC-21S, KMC-41, KMC-41D, KMC-42W, KMC-42WD, KMC-46EX Mobile: KMC-30, KMC-32, KMC-60, KMC-62

Microphone Type	Description
Microphone 3	Enables the optimum audio characteristics of the following microphones: Portable: KMC-25, KMC-25S, KMC-26, KMC-48GPS Mobile: KMC-53
Microphone 4	Enables the optimum audio characteristics of the following microphones: Portable: KHS-1, KHS-7, KHS-7A, KHS-8BE, KHS-8BL, KHS-9BE, KHS-9BL, KHS-11BE, KHS-11BL, KHS-12BE, KHS-12BL, KHS-14, KNS-21, KHS-22, KHS-25, KHS-26, KHS-27, KHS-31, KHS-31C, EMC-11, EMC-12 Mobile: KMC-9C
Microphone 5	Enables the optimum audio characteristics of the following microphones: Portable: KHS-15-BH, KHS-15-OH, KHS-23, KHS-29F, KHS-35F, KMC-70, KMC-72 Mobile: KMC-27A, KMC-27B
Microphone 6	Enables the optimum audio characteristics of the following microphones: Portable: KHS-10BH, KHS-10OH Mobile: KMC-28A
Microphone 7	Enables the optimum audio characteristics of the following microphones: Portable: KHS-8NC, KMC-51D, KMC-52, KMC-52D Mobile: KCT-73MIC

Note

- If using an external microphone unlisted in the table above, configuring “None” in **Microphone Type** is recommended.
- To use Portable in a DMR Conventional system, always use KMC-45D. Burst noise may occur if an external microphone other than KMC-45D is used.
- Pressing the **Menu** button places the transceiver in Menu Mode, and then the transceiver enters Microphone Type Mode by selecting “Microphone Type”. In Microphone Type Mode, the configuration in **Microphone Type** can be changed.

Configuration using KPG-D3/ D3N

Configuring **Microphone Type** ( See Radio Configuration > Special Settings > Customization > Audio Profiles)

Microphone Sense/ External Microphone Sense

Microphone Sense and **External Microphone Sense** are the input sensitivity of the microphone.

Within the range between -20 dB and +20 dB, the microphone sensitivity of the internal microphone can be configured in **Microphone Sense**, and the microphone sensitivity of the external microphone can be configured in **External Microphone Sense**.

The appropriate level of microphone sensitivity for normal operation is 0 dB. Based on this level, the parameter of the microphone sensitivity can be configured.

On a digital channel, configuring **Digital Audio Offset** enables the transceiver to function after the offset value configured in Digital Audio Offset is added to or deleted from the configuration values in **Microphone Sense** and **External Microphone Sense**.

Note

- If a level lower than “0 dB” is configured in **Microphone Sense** or **External Microphone Sense**, Modulation Limiting (minimum) in Analog FM is lowered because the amplitude limit level is also simultaneously lowered.
- Pressing the **Menu** button places the transceiver in Menu Mode, and then the transceiver enters Mic Sense Mode by selecting “Mic Sense”. In Mic Sense Mode, the configuration in **Microphone Sense** can be changed.
- Pressing the **Menu** button places the transceiver in Menu Mode, and then the transceiver enters External Mic Sense Mode by selecting “External Mic Sense”. In External Mic Sense Mode, the configuration in **External Microphone Sense** can be changed.
- For Mobile, the Mic sensitivity of when “Mic Line” is configured for the Modulation Line can be configured in **Microphone Sense**, and the Mic sensitivity of when “MI2 Line” or the Mic Line of a Bluetooth-compatible device is configured for the Modulation Line can be configured in **External Microphone Sense**.

Configuration using KPG-D3/ D3N

- Configuring **Microphone Sense** ( See Radio Configuration > Special Settings > Customization > Audio Profiles > Customization > Microphone Sense)
- Configuring **External Microphone Sense** ( See Radio Configuration > Special Settings > Customization > Audio Profiles > Customization > Microphone Sense)

Digital Audio Offset

Digital Audio Offset is the function to enable the transceiver to function after the offset value configured in **Digital Audio Offset** is added to or deleted from the configuration values in **Microphone Sense** and **External Microphone Sense**. This function is used when the microphone level used on digital channels and the microphone level used on analog channels are to be configured separately.

The configuration range of **Digital Audio Offset** is between -10 dB and +6 dB. On a digital channel, the transceiver functions with the combined value of the configuration value in **Microphone Sense** or **External Microphone Sense** and the configuration value in **Digital Audio Offset**.

Configuration using KPG-D3/ D3N

Configuring **Digital Audio Offset** ( See Radio Configuration > Special Settings > Customization > Audio Profiles > Customization > Microphone Sense)

RX Digital Audio Response

The following are the common functions of the audio profile related to reception:

- Auto Gain Control (RX Digital Audio Response)
- Audio Equalizer (RX Digital Audio Response)

These functions can be used only in an NXDN system and DMR system.

Auto Gain Control (RX Digital Audio Response)

Auto Gain Control (RX Digital Audio Response) is the function to adjust the volume level of the received audio. The received audio sounds better by amplifying or attenuating the received audio.

The volume level of the received audio may vary depending on the voice level of a user talking to the transmitting transceiver and the distance between the microphone and the mouth. In this case, this function allows a user to hear the received audio clearly since the received audio is automatically adjusted to a certain volume level according to the configuration for the volume level.

Table 7-15 Auto Gain Control (RX Digital Audio Response)

Auto Gain Control	Description
Off	Auto Gain Control (RX Digital Audio Response) is disabled and the volume level of the received audio is not automatically adjusted.
High	Auto Gain Control (RX Digital Audio Response) is enabled and the volume level of the received audio is automatically adjusted to a certain level according to the configuration for the current volume level. However, a background noise of the received audio may be played back loudly, or a howl may occur.
Low	Auto Gain Control (RX Digital Audio Response) is enabled and the volume level of the received audio is automatically adjusted to a certain level according to the configuration for the current volume level. However, the controlled volume level will be lower than the case if “High” is configured. Therefore, the range of the volume level to be automatically adjusted will be narrow, but the less effect on the background noise and howl will occur.

Note

- If **Auto Gain Control (RX Digital Audio Response)** is disabled in the receiving transceiver but **Auto Gain Control (TX Digital Audio Response)** is enabled in the transmitting transceiver, the volume level of the received audio is automatically adjusted to a certain level.
- Pressing the **Menu** button to enter Menu Mode, and then selecting “RX Auto Gain Control” places the transceiver in RX Auto Gain Control Mode. In RX Auto Gain Control Mode, the configuration in **Auto Gain Control (RX Digital Audio Response)** can be changed.

Configuration using KPG-D3/ D3N

Configuring **Auto Gain Control (RX Digital Audio Response)** ( See Radio Configuration > Special Settings > Customization > Audio Profiles > Customization > RX Digital Audio Response)

Audio Equalizer (RX Digital Audio Response)

Audio Equalizer (RX Digital Audio Response) is the function to adjust audio characteristics to be applied to playing back the received audio.

The received audio may sound differently depending on the usage environment of the transceiver and whether to use a speaker or headphones to play back the received audio. Also, the received audio may sound differently depending on the effect of a microphone equipped with the transmitting transceiver and external connector devices. Use of this function allows a user to adjust according to user convenience or preference an audio characteristic of the received audio sounding from the speaker.

By using KPG-D3/ D3N, the received audible characteristics can be configured in the range between -10 dB and +10 dB for each of the High, High Midrange, Midrange, Low Midrange and Low audio frequency.

Table 7-16 Audio Equalizer (RX Digital Audio Response)

Audio Equalizer	Description
High	The audible frequency characteristics for the high range can be configured.
High Midrange	The audible frequency characteristics for the middle to high range can be configured.
Midrange	The audible frequency characteristics for the middle range can be configured.
Low Midrange	The audible frequency characteristics for the middle to low range can be configured.
Low	The audible frequency characteristics for the low range can be configured.

Also, preset items with various types of received audio characteristics can be selected to be used as approximate indicators for configuration.

Table 7-17 Audio Equalizer (RX Digital Audio Response) (Preset)

Preset	Description
Flat	This is a standard audio characteristic.
High Boost	This audio characteristic emphasizes the received audio range which is higher than Flat. The quality of the received audio will be clear with the focus on hearing conversations for certain.
Mid Boost	This audio characteristic emphasizes the audible frequency of received audio higher than Flat. The audio will have a more stable, less distorted, and well-rounded tone.
Low Boost	This audio characteristic minimizes the received audio range which is higher than Flat and emphasizes the low range. The quality of the received audio will be natural.
Low Cut	Suppresses the audio of 300 Hz or lower. The distortion of audio when played back can be suppressed, and the muffling can be prevented.

 Note

- Pressing the **Menu** button to enter Menu Mode, and then selecting one of the following configurations places the transceiver in RX Audio Equalizer Mode. In RX Audio Equalizer Mode, the configuration of High, High Midrange, Midrange, Low Midrange or Low can be changed.
 - RX Audio Equalizer (High)
 - RX Audio Equalizer (High Midrange)
 - RX Audio Equalizer (Midrange)
 - RX Audio Equalizer (Low Midrange)
 - RX Audio Equalizer (Low)

Configuration using KPG-D3/ D3N

Configuring **Audio Equalizer (RX Digital Audio Response)** ( **See** Radio Configuration > Special Settings > Customization > Audio Profiles > Customization > RX Digital Audio Response > Audio Equalizer)

TX Digital Audio Response

The following are the common functions of the audio profile related to transmission:

- Auto Gain Control (TX Digital Audio Response)
- Audio Equalizer (TX Digital Audio Response)

These functions can be used only in an NXDN system and DMR system.

Auto Gain Control (TX Digital Audio Response)

Auto Gain Control (TX Digital Audio Response) is the function to adjust the volume level of the transmitted audio. When the volume level of the transmitted audio is adjusted by automatically increasing or decreasing the microphone sensitivity, the transmitted audio can be heard clearly in the receiving transceiver.

The volume level of the transmitted audio may vary depending on the voice level of a user talking to the transmitting transceiver and the distance between the microphone and the mouth. In this case, the use of this function automatically adjusts the microphone sensitivity, so that the transmitted audio can be heard clearly in the receiving transceiver.

If the background noise is loud, the microphone sensitivity may not be properly adjusted. In this case, a user needs to hold the microphone closer and speaks loudly.

Table 7-18 Auto Gain Control (TX Digital Audio Response)

Auto Gain Control	Description
On	Auto Gain Control (TX Digital Audio Response) is enabled and the volume level of the transmitted audio is automatically adjusted to the proper volume level.
Off	Auto Gain Control (TX Digital Audio Response) is disabled and the volume level of the transmitted audio is not automatically adjusted.

Note

- Pressing the **Menu** button to enter Menu Mode, and then selecting “TX Auto Gain Control” places the transceiver in TX Auto Gain Control Mode. In TX Auto Gain Control Mode, the configuration in **Auto Gain Control (TX Digital Audio Response)** can be changed.

Configuration using KPG-D3/ D3N

Configuring **Auto Gain Control (TX Digital Audio Response)** ( **See** Radio Configuration > Special Settings > Customization > Audio Profiles > Customization > TX Digital Audio Response)

Audio Equalizer (TX Digital Audio Response)

Audio Equalizer (TX Digital Audio Response) is the function to adjust audio characteristics to be applied when the transmitted audio is played back. **Audio Equalizer (TX Digital Audio Response)** is applied to a transmitted audio played back by the receiving transceiver.

Also, the received audio may sound differently depending on an usage environment of the transceiver, and effects of a microphone equipped with the transceiver and external connector devices. Use of this function allows a user to select according to user convenience or preference an audio characteristic of the transmitted audio inputted to a microphone.

By using KPG-D3/ D3N, the transmitted audible characteristics can be configured in the range between -10 dB and +10 dB for each of the High, High Midrange, Midrange, Low Midrange and Low audio frequency.

Table 7-19 Audio Equalizer (TX Digital Audio Response)

Audio Equalizer	Description
High	The audible frequency characteristics for the high range can be configured.
High Midrange	The audible frequency characteristics for the middle to high range can be configured.
Midrange	The audible frequency characteristics for the middle range can be configured.
Low Midrange	The audible frequency characteristics for the middle to low range can be configured.
Low	The audible frequency characteristics for the low range can be configured.

Also, preset items with various types of transmitted audio characteristics can be selected to be used as approximate indicators for configuration.

Table 7-20 Audio Equalizer (RX Digital Audio Response) (Preset)

Preset	Description
Flat	This is a standard audio characteristic.
High Boost	This audio characteristic emphasizes the transmitted audio range which is higher than Flat. The quality of the transmitted audio will be clear with the focus on hearing conversations for certain.
Mid Boost	This audio characteristic emphasizes the audible frequency of transmitted audio higher than Flat. The audio will have a more stable, less distorted, and well-rounded tone.
Low Boost	This audio characteristic minimizes the transmitted audio range which is higher than Flat and emphasizes the low range. The quality of the transmitted audio will be natural.
Low Cut	Suppresses the audio of 300 Hz or lower. The distortion of audio when played back can be suppressed, and the muffling can be prevented.

Note

- Pressing the **Menu** button to enter Menu Mode, and then selecting one of the following configurations places the transceiver in TX Audio Equalizer Mode. In TX Audio Equalizer Mode, the configuration of High, High Midrange, Midrange, Low Midrange or Low can be changed.
 - TX Audio Equalizer (High)
 - TX Audio Equalizer (High Midrange)
 - TX Audio Equalizer (Midrange)
 - TX Audio Equalizer (Low Midrange)
 - TX Audio Equalizer (Low)

Configuration using KPG-D3/ D3N

Configuring **Audio Equalizer (TX Digital Audio Response)** ( See Radio Configuration > Special Settings > Customization > Audio Profiles > Customization > TX Digital Audio Response > Audio Equalizer)

Active Noise Reduction

Active Noise Reduction (ANR) is the function to cancel the noise component of the collected audio in order to improve the transmitted audio quality.

The noise cancellation function can be collectively configured according to the usage environment. Also, selecting “Custom” enables the detailed configuration of the noise cancellation function.

Table 7-21 ANR Preset

ANR Preset	Description
Off	The noise cancellation characteristics cannot be configured.
Light	Reduces the background noise. Reduces the background noise less effectively than “Standard”. On an analog channel, the effect of the background noise reduction is the same as when “Off” is configured.
Standard	Reduces the background noise. Assuming a variety of environments, this configuration is for not deteriorating audio.
Powerful	Reduces the background noise more effectively than “Standard”. Audio may be slightly suppressed. Also, since the position of the microphone is being detected even while not transmitting, this configuration is suitable for a user using the transceiver in a noisy environment or with the microphone on the shoulder.
Professional	Reduces the background noise. This configuration reduces noise of a specific environment, such as a siren, and is also harmless to audio.
	The optimal noise cancellation effect is available by having the mouth of a transmitting user and the microphone positioned at an appropriate distance when the transceiver is used. This configuration is suitable for use in a fire department and a police station.
Custom	The following various functions of noise cancellation can be configured: Vocoder: In Vocoder, whether the transceiver transmits on a digital channel with or without reducing and eliminating the noise component of the background noise can be configured. If the transceiver is used in a noisy environment, enabling this function allows the transceiver to transmit by reducing and eliminating the noise components in the background noise, so that the noise at the receiving transceiver is eliminated or reduced. However, a part of the voice component is also reduced, and this reduction may cause the received audio to be fuzzy. In such case, disabling this function results in the transmitted audio resembling an analog voice signal, so the audio on the receiving transceiver may sound natural. DSP: In DSP, whether to reduce and eliminate the background noise or not while transmitting can be configured. This configuration can be configured according to the situation of the background noise or usage environment. Using a microphone consisting of 2 microphones can be more effective. Noise Attenuation Level: In Noise Attenuation Level, the amount of noise reduction can be configured. The standard configuration is 0 dB, and the sound quality is balanced with the amount of noise reduction. If -20 dB is configured, the noise can be most effectively reduced while the sound quality degrades more easily. If +10 dB is configured, the noise is least effectively reduced while the sound quality degrades less. Low Noise Level Adjustment: In Low Noise Level Adjustment, whether to stop the noise cancellation process automatically in an environment where background noise is low can be configured. If this function is enabled, the degradation of sound quality can be prevented in an environment where background noise is low. Siren: In Siren, whether to remove the siren audio component when a siren audio is detected can be configured.

ANR Preset	Description
Custom	Battery Save for Noise Reduction (Portable only): In Battery Save for Noise Reduction, whether to stop the noise cancellation process when the transceiver is not transmitting can be configured. If this function is enabled, the noise cancellation process functions while the transceiver is transmitting. This function takes longer to reduce the noise, but the function reduces battery power consumption. If this function is disabled, the noise cancellation process always functions, and the noise is reduced from the start of transmission. For Mobile, no configuration is required since the noise cancellation process always functions. However, microphones other than the microphone connected to the head may take time to reduce the noise in the same manner as when this function is enabled. Also, for Portable (2-pin connector), no configuration is required since the noise cancellation process always functions.

The tables show the configurations of the functions configured for each mode of ANR Preset.

According to the configuration of the ANR Preset, each function of the noise cancellation characteristic is automatically configured as the tables according to the type of a connected external microphone.

The tables related to ANR Preset are based on the type of microphone connection for Portable.

- Table 7-22 (Portable: KMC-54WD/ KMC-70 connected, or optional Speaker Microphone unconnected)
- Table 7-23 (Portable: Optional Speaker Microphone other than KMC-54WD/ KMC-70 connected)
- Table 7-24 (Portable: Bluetooth Speaker Microphone connected)
- Table 7-25 (Mobile)

Table 7-22 Automatic Configuration Using the ANR Preset
(Portable: KMC-54WD/ KMC-70 Connected, or Optional Speaker Microphone Unconnected)

Function	ANR Preset					
	Off	Light	Standard	Powerful	Professional	Custom
Vocoder	Uncheck	Check	Check	Check	Check	User configuration
Digital Signal Processor	Uncheck	Uncheck	Check	Check	Check	User configuration
Noise Attenuation Level	0 dB	0 dB	0 dB	-6 dB	-6 dB	User configuration
Low Noise Level Adjustment	Uncheck	Uncheck	Check	Uncheck	Check	User configuration
Optimization based on Microphone Position	Uncheck	Uncheck	Check	Check	Uncheck	User configuration
Siren	Uncheck	Uncheck	Uncheck	Uncheck	Check	User configuration
Vibration (Alert Device)	Uncheck	Uncheck	Uncheck	Uncheck	Check	User configuration
Battery Save for Noise Reduction	Uncheck	Check	Check	Uncheck	Uncheck	User configuration

Table 7-23 Automatic Configuration Using the ANR Preset
(Portable: Optional Speaker Microphone Other Than KMC-54WD/ KMC-70 Connected)

Function	ANR Preset					
	Off	Light	Standard	Powerful	Professional	Custom
Vocoder	Uncheck	Check	Check	Check	Check	User configuration
Digital Signal Processor	Uncheck	Uncheck	Check	Check	Check	User configuration
Noise Attenuation Level	0 dB	0 dB	0 dB	-6 dB	-6 dB	User configuration
Low Noise Level Adjustment	Uncheck	Uncheck	Check	Uncheck	Check	User configuration
Optimization based on Microphone Position	Uncheck	Uncheck	Uncheck	Uncheck	Uncheck	Uncheck
Siren	Uncheck	Uncheck	Uncheck	Uncheck	Check	User configuration
Vibration (Alert Device)	Uncheck	Uncheck	Uncheck	Uncheck	Check	User configuration
Battery Save for Noise Reduction	Uncheck	Check	Check	Uncheck	Uncheck	User configuration

Table 7-24 Automatic Configuration Using the ANR Preset (Portable: Bluetooth Speaker Microphone Connected)

Function	ANR Preset					
	Off	Light	Standard	Powerful	Professional	Custom
Vocoder	Uncheck	Check	Check	Check	Check	User configuration
Digital Signal Processor	Uncheck	Uncheck	Check	Check	Check	User configuration
Noise Attenuation Level	0 dB	0 dB	0 dB	-6 dB	-6 dB	User configuration
Low Noise Level Adjustment	Uncheck	Uncheck	Check	Uncheck	Check	User configuration
Optimization based on Microphone Position	Uncheck	Uncheck	Uncheck	Uncheck	Uncheck	Uncheck
Siren	Uncheck	Uncheck	Uncheck	Uncheck	Check	User configuration
Vibration (Alert Device)	Uncheck	Uncheck	Uncheck	Uncheck	Check	User configuration
Battery Save for Noise Reduction	Check	Check	Check	Check	Check	Check

Table 7-25 Automatic Configuration Using the ANR Preset (Mobile)

Function	ANR Preset					
	Off	Light	Standard	Powerful	Professional	Custom
Vocoder	Uncheck	Check	Check	Check	Check	User configuration
Digital Signal Processor	Uncheck	Uncheck	Check	Check	Check	User configuration
Noise Attenuation Level	0 dB	0 dB	0 dB	-6 dB	-6 dB	User configuration
Low Noise Level Adjustment	Uncheck	Uncheck	Check	Uncheck	Check	User configuration
Optimization based on Microphone Position	Uncheck	Uncheck	Uncheck	Uncheck	Uncheck	Uncheck
Siren	Uncheck	Uncheck	Uncheck	Uncheck	Check	User configuration
Vibration (Alert Device)	Uncheck	Uncheck	Uncheck	Uncheck	Check	User configuration
Battery Save for Noise Reduction	Uncheck	Uncheck	Uncheck	Uncheck	Uncheck	Uncheck

Note

- Pressing the **Menu** button places the transceiver in Menu Mode, and then selecting “ANR Preset” places the transceiver in ANR Preset Mode. In ANR Preset Mode, the configuration in **ANR Preset** can be changed.

Configuration using KPG-D3/ D3N

Configuring **ANR Preset** ( See Radio Configuration > Special Settings > Customization > Audio Profiles > Customization > Active Noise Reduction (ANR))

7.8 Using Voice Guidance (Voice Announcement)

Voice Announcement is the function to notify the following contents by voice:

- The selected Zone-channel number when the transceiver is turned ON and the new Zone-channel number when the Zone-channel is changed (Refer to [Zone-Channel Guide](#).)
- The function status and transceiver status when the **PF** button is operated (Refer to [Function Guide](#).)
- The reception status (Refer to [Status Guide](#).)

To use these voice guidance functions, the voice guidance method needs to be configured in **Voice Announcement Type**.

Note

- The audio for **Voice Announcement** sounds from the speaker of the transceiver. However, if the external speaker is connected to the transceiver, the audio sounds from the external speaker.
- The volume for **Voice Announcement** is set according to the configuration in **Control Tone**. **Voice Announcement** does not function if "Off" is configured in **Control Tone**. (Refer to [Configuring the Volume Level of Various Tones \(Level Customization\)](#).)
- **Voice Announcement** does not function while the transceiver is in Emergency Mode.
- **Voice Announcement** does not function if a zone or channel is changed by using the scan function.
- The received audio does not sound from the speaker while the audio for **Voice Announcement** sounds.

Configuring Voice Guidance Method (Voice Announcement Type)

Voice Announcement Type is the function to specify whether to execute various voice guidance by using fixed phrases or by using audio files arbitrarily configured by a user.

The transceiver behaves as follows according to the configuration in **Voice Announcement Type**:

Table 7-26 Voice Announcement Type

Configuration	Description
None	Voice guidance is not executed.
Standard	The Zone-channel number, button function status, and transceiver status are notified by using the fixed phrase audio. Voice guidance can be executed in 3 languages configured in Language 1 to Language 3 of Voice and Display Language. The languages that can be configured in Language 1 to Language 3 are as follows: English, Spanish (Spain), Spanish (Latin America), French, German, Italian, Dutch, Russian, Portuguese (Brazil), Traditional Chinese (China)
User Programmable	The Zone-channel name, button function status, transceiver status, and received status are notified by using the audio configured by a user. Configure the audio to be used by selecting from the audio files registered in Voice Announcement Library. Therefore, the audio files to be used for voice guidance need to be registered in Voice Announcement Library beforehand. Note • The audio file that can be registered in Voice Announcement Library is 8 k 16 bit monaural PCM data within 5 sec. When the total capacity of Voice Announcement Library reaches 3 MB, or when the total number of files reaches 240, no more audio files can be registered. To register a new audio file, a file registered in Voice Announcement Library needs to be deleted.

Configuration using KPG-D3/ D3N

- Configuring **Voice and Display Language** ( [See](#) Radio Configuration > Global Options > Basics > Display/Language > Voice and Display Language)
- Configuring **Voice Announcement Type** ( [See](#) Radio Configuration > Special Settings > Customization > Voice Announcement)
- Registering an audio file in **Voice Announcement Library** ( [See](#) Tools > Voice Announcement Library)

Zone-Channel Guide

Zone-Channel Guide is the function to notify by voice Zone-channel numbers such as the selected Zone-channel number when the transceiver is turned ON and the new Zone-channel number when the Zone-channel is changed.

If this function is enabled, the transceiver executes voice guidance according to the configuration in **Voice Announcement Type**. (Refer to [Configuring Voice Guidance Method \(Voice Announcement Type\)](#).)

● If “Standard” is configured in Voice Announcement Type:

When the transceiver is turned ON, when the zone is changed, or when the **Direct Channel** button (1 to 5) is operated, the new zone number and channel number are notified by voice as follows:

“Zone xxx, Channel yyy” (xxx: zone number, yyy: channel number)

If only one zone is configured in the transceiver, only a channel number is notified by voice as “yyy” (yyy: channel number).

When the channel is changed, or the **Home Channel** button is operated, the new channel number is notified by voice as “yyy” (yyy: channel number).

● If “User Programmable” is configured in Voice Announcement Type:

Whether to execute voice guidance can be configured for each zone and each channel.

Voice Announcement (Zone):

Table 7-27 Voice Announcement (Zone)

Configuration	Description
None	Voice guidance is not executed.
Audio file	Contents such as a zone name are notified by using the audio configured by a user. Configure the audio to be used by selecting from the audio files registered in Voice Announcement Library .

Voice Announcement (Channel):

Table 7-28 Voice Announcement (Channel)

Configuration	Description
None	Voice guidance is not executed.
Audio file	Contents such as a channel name are notified by using the audio configured by a user. Configure the audio to be used by selecting from the audio files registered in Voice Announcement Library .

When the transceiver is turned ON, when the zone is changed, or when the **Direct Channel** button (1 to 5) is operated, voice guidance is executed according to the configuration in **Voice Announcement** of the new zone and channel.

If only one zone is configured in the transceiver, voice guidance is executed according to the configuration in **Voice Announcement** of the new channel.

Also, when the channel is changed or when the **Home Channel** button is operated, voice guidance is executed according to the configuration in **Voice Announcement** of the new channel.

Configuration using KPG-D3/ D3N

- Configuring **Zone-Channel Guide** to be enabled or disabled ( **See** Radio Configuration > Special Settings > Customization > Voice Announcement)
- Configuring **Voice Announcement** for each zone ( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > General)
- Configuring **Voice Announcement** for each channel ( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone-channel Table > Channel Table)

Function Guide

Function Guide is the function to notify by voice the function status and transceiver status when the **PF** button is operated. If this function is enabled, the transceiver executes voice guidance according to the configuration in **Voice Announcement Type**. (Refer to [Configuring Voice Guidance Method \(Voice Announcement Type\)](#).)

● If “Standard” is configured in Voice Announcement Type:

The status of the following functions assigned to the **PF** buttons is notified by voice:

Table 7-29 Voice Announcement (Zone)

Button Function	Voice Guidance Contents (in English)	
	Button Function On	Button Function Off
Encryption	Encryption On	Encryption Off
Home Channel	Home Channel	Channel No.
Horn Alert	Horn Alert On	Horn Alert Off
Button Lock	Locked	Unlocked
Low Transmit Power	RF Low Power On	RF Low Power Off
Public Address	Public Address On	Public Address Off
Scrambler	Scrambler On	Scrambler Off
Scan	Scan On	Scan Off
Scan Normal	Scan On	Scan Off
Send the GPS Data	Send GPS	-
Site Lock	Site Locked	Site Unlocked
Speaker Attenuation	Speaker Attenuation On	Speaker Attenuation Off
System Search	System Search	-
Talk Around	Talk Around On	Talk Around Off
Transfer	Transfer On	Transfer Off
VOX	VOX On	VOX Off

The following transceiver statuses are notified by voice:

Table 7-30 Function Guide (Transceiver Status)

Item	Transceiver Status	Voice Guidance Contents (in English)
Transceiver Password	The transceiver was operated when in Transceiver Password Mode.	"Radio Locked"
Button Lock	The transceiver was operated when the Button Lock was enabled.	"Locked"
FleetSync	The target party did not receive the data or message.	"Message Denied"
NXDN	The target party did not receive the data or message.	"Message Denied"
DMR	The target party did not receive the data or message.	"Message Denied"

● If "User Programmable" is configured in Voice Announcement Type:

Function Guide (PF button):

Whether to execute voice guidance can be configured for each of the following button functions (On/ Off):

Table 7-31 Function Guide On/ Off

Button Function On	Button Function Off
Encryption On	Encryption Off
Home Channel	-
Horn Alert On	Horn Alert Off
Button Locked	Button Unlocked
Low Transmit Power On	Low Transmit Power Off
Public Address On	Public Address Off
Scrambler On	Scrambler Off
Scan On	Scan Off
Scan Normal On	Scan Normal Off
Send the GPS Data	-
Site Lock On	Site Lock Off
Speaker Attenuation On	Speaker Attenuation Off
System Search	-
Talk Around On	Talk Around Off
Transfer On	Transfer Off
VOX On	VOX Off

Table 7-32 On/ Off Configuration for Function Guide

Configuration	Description
None	Voice guidance is not executed.
Audio file	The function status when the PF button is operated is notified by audio configured by a user. Configure the audio to be used by selecting from the audio files registered in Voice Announcement Library .

Function Guide (Transceiver Status):

Whether to execute voice guidance can be configured for each of the following transceiver statuses:

Table 7-33 Function Guide (Transceiver Status)

Configuration	Description
Radio Locked	The transceiver was operated when in Transceiver Password Mode.
Status Message Denied	The target party did not receive the data or message.

Table 7-34 Configuration for Function Guide (Transceiver Status)

Configuration	Description
None	Voice guidance is not executed.
Audio file	The transceiver status is notified by using the audio configured by a user. Configure the audio to be used by selecting from the audio files registered in Voice Announcement Library .

Configuration using KPG-D3/ D3N

- Configuring **Function Guide** to be enabled or disabled ( **See** Radio Configuration > Special Settings > Customization > Voice Announcement)
- Configuring voice guidance when the **PF** button is operated (**On/ Off**) ( **See** Radio Configuration > Special Settings > Customization > Voice Announcement > Function Guide)
- Configuring voice guidance to notify the transceiver status (**Radio Locked/ Status Message Denied**) ( **See** Radio Configuration > Special Settings > Customization > Voice Announcement > Function Guide)

Status Guide

Status Guide is the function to notify the received status by using the audio configured by a user.

To use this function, “User Programmable” needs to be configured in **Voice Announcement Type**.

(Refer to [Configuring Voice Guidance Method \(Voice Announcement Type\)](#).)

Whether to execute voice guidance can be configured for each of the statuses registered in the Status List.

Also, whether to execute voice guidance can be configured when various Emergency Statuses (Emergency Status/ Man-Down Status/ Lone Worker Status/ Stationary Status/ Motion Status) are received.

Table 7-35 Voice Announcement (Status/ Emergency Status Response)

Configuration	Description
None	Voice guidance is not executed.
Audio file	Contents such as a status name are notified by using the audio configured by a user. Configure the audio to be used by selecting from the audio files registered in Voice Announcement Library .

If the transceiver receives a status, voice guidance is executed after an Alert Tone sounds from the transceiver. The number of times executing voice guidance corresponds to the configuration in **Cycle of Special Alert Tone**. However, if the Alert Tone is configured not to sound, the Alert Tone does not sound from the transceiver, and voice guidance is executed only once. (Refer to [Configuring the Alert Tone \(Special Alert Tone\)](#).)

Configuration using KPG-D3/ D3N

- Configuring **Voice Announcement** for each Status List

FleetSync ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > FleetSync Status > FleetSync Status List)

NXDN ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Status > NXDN Status List)

DMR ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > DMR Status > DMR Status List)

- Configuring **Voice Announcement of Emergency Status Response**

FleetSync ( [See](#) Radio Configuration > Protocol Options > FleetSync > General > RX Options > Emergency Status Response)

NXDN ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Common Options > Emergency Status Response)

DMR ( [See](#) Radio Configuration > Protocol Options > DMR > General > Emergency > Emergency Status Response)

For Portable, a user can be notified on the level of the remaining battery power on the LCD and by LED. And, a user can also use the function to save the battery consumption.

For Mobile, a user can be notified by the LED that the battery voltage of the vehicle battery is low.

8.1 Displaying the Remaining Battery Power Level (Battery Warning)

Portable

Battery Warning can be used to display a warning icon on the LCD and warn using LED when the remaining battery level is low.

Conditions to activate the **Battery Warning** vary depending on the configuration in **Condition**. (Refer to [Warning that the Battery Voltage Is Low \(Condition\)](#).)

Mobile

Battery Warning is the function to notify a user by the LED that transmission is restricted because the battery voltage of the vehicle battery is low.

Table 8-1 Battery Warning

Configuration	Description
Battery Icon (Portable (Full Key Model/ Standard Key Model) only)	If Battery Icon is enabled, the transceiver notifies a user by displaying the “Battery Status” icon on the LCD that the remaining battery power is low. Depending on the remaining battery capacity, the “Battery Status” icon displays the remaining battery level in 4 stages: Full, Sufficient, Low, and Very Low. However, the “Battery Status” icon does not appear if “While Transmitting” is configured in Condition .
LED	Portable: If LED is enabled, the transceiver notifies a user by a flashing red LED that the remaining battery power is low. Mobile: If LED is enabled, the transceiver notifies a user by flashing the red LED that transmission is restricted because the battery voltage of the vehicle battery is low.
Tone	Portable: If LCD is enabled, the transceiver notifies a user by sounding a tone from the transceiver that the remaining battery power is low. Mobile: If LCD is enabled, the transceiver notifies a user by sounding a tone from the transceiver that transmission is restricted because the battery voltage of the vehicle battery is low.

Table 8-2 Battery Status Icon (Portable only)

Icons	Status
	Full
	Sufficient
	Low
 (Flashing)	Very Low

Configuration using KPG-D3/ D3N

Configuring **Battery Warning** ( See Radio Configuration > Global Options > Basics > Audio/Indicator > Battery Warning)

8.2 Warning that the Battery Voltage Is Low (Condition)

Supported Models: Portable

Condition can be used to notify a user by emitting a beep or flashing the LED when the remaining battery power is low.

The transceiver always monitors whether the battery voltage goes low and notifies a user that the remaining battery power is low according to the configuration in **Battery Warning** when the battery voltage level goes lower than the warning voltage level. (Refer to [Displaying the Remaining Battery Power Level \(Battery Warning\)](#).)

Table 8-3 Condition

Configuration		Description
While Transmitting		The transceiver detects that the battery voltage is low while transmitting. When the battery voltage level goes lower than the warning voltage level (6.2 V), the transceiver notifies a user that the remaining battery power is low by a flashing red Transmit LED.
Always	Late Warning is enabled.	The transceiver always detects whether the battery voltage goes low while the transceiver is in use. When the battery voltage goes below the warning voltage level (during transmission: 6.2 V, non-transmission: 6.5 V), the transceiver notifies a user that the remaining battery power is low according to the Battery Warning configuration by changing the “Battery Status” icon, and by flashing a red Transmit LED.
	Late Warning is disabled.	The transceiver always detects whether the battery voltage goes low while the transceiver is in use. When the battery voltage goes below the warning voltage level (during transmission: 6.2 V, non-transmission: 7.0 V), the transceiver notifies a user that the remaining battery power is low according to the Battery Warning configuration by changing the “Battery Status” icon, and by flashing a red Transmit LED.

Also, if **Tone (Battery Warning)** is enabled, the transceiver notifies a user that the remaining battery power is low by making the Battery Warning Tone (3 beeps) sound from the transceiver if the **PTT** switch is not pressed when the battery voltage level goes lower than the warning voltage level.

Note

- If **Battery Icon**, **LED** and **Tone** in **Battery Warning** are all disabled, this function does not function.

Configuration using KPG-D3/ D3N

- Configuring **Condition** ( [See](#) Radio Configuration > Global Options > Basics > Audio/Indicator > Battery Warning)
- Configuring **Tone (Battery Warning)** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > Audio/Indicator > Battery Warning)

8.3 Warning the Battery Power of the Vehicle Battery Is Low

Supported Models: Mobile

If the battery power of the vehicle battery goes lower than the threshold (8.5 V), the LED flashes red and a Battery Warning Tone sounds from the transceiver. If the battery power of the vehicle battery recovers to the threshold (8.5 V), the flashing of the LED and the Battery Warning Tone stop.

If the power of the vehicle battery is lower than the threshold (8.5 V) when transmitting, transmission cannot occur. In this case, while the **PTT** switch is being pressed, a Warning Tone A (continuous beep) sounds from the transceiver. The threshold (8.5 V) is not determined while transmitting.

8.4 Displaying the Remaining Battery Power by Operating the Transceiver (Battery Status)

Supported Models: Portable (Full Key Model/ Standard Key Model)

By flashing the LED red or emitting a Beep, **Battery Status** notifies a user of the remaining battery power by operating the button of the transceiver.

Battery Status is executed by pressing the **Battery Status** button.

Or, Battery Status is executed by selecting "Battery Status" after placing the transceiver in Menu Mode by pressing the **Menu** button.

(Refer to [Using Menu Mode.](#))

If Battery Status is executed, the LED flashes red depending on the remaining battery power. Also, if **Battery Level Tone** is enabled, a Battery Level Tone (1 beep) sounds from the transceiver depending on the remaining battery power.

Table 8-4 Battery Status

Status	Number of LED Flashes	Number of Battery Level Tones
Full	4 times	4 times
Sufficient	3 times	3 times
Low	2 times	2 times
Very Low	1 time	1 time

Note

- If the following, Battery Status does not operate:
 - While the transceiver is in Emergency Mode
 - While the transceiver is transmitting
 - When the Battery Status becomes Very Low and the LED flashes red if LED is enabled in **Battery Warning**
 - While the transceiver is in Transceiver Password Mode

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Battery Level Tone** ( [See](#) Radio Configuration > Global Options > Basics > Audio/Indicator > Battery Warning)

8.5 Reducing Battery Consumption (Battery Saver)

Analog Conventional/ NXDN Conventional/ DMR Conventional

Battery Saver allows the transceiver to reduce power consumption by receiving intermittently.

The transceiver receives intermittently when there is no carrier and no button is pressed for 5 sec or more, or when the transceiver is in the following states.

However, the case where “Short” is configured in **Battery Saver** is exempt. (Mobile only)

● Analog Conventional channel

When there is a carrier, but the QT tone or DQT code does not match the tone or code preconfigured for the transceiver and no button is pressed for 5 sec or more

● NXDN Conventional channel

When there is a carrier, but the RAN (Radio Access Number) does not match the number preconfigured for the transceiver and no button is pressed for 5 sec or more

● DMR Conventional channel

When there is a carrier, but the Color Code does not match the code preconfigured for the transceiver and no button is pressed for 5 sec or more

Extension of the intervals for intermittent reception may reduce the battery consumption; however, interruptions to introductory parts of received audio may occur. To use **Battery Saver** effectively, there are systemic issues to consider, for instance, the duration from when the transceiver starts transmitting until the transceiver starts sending audio.

Intervals for intermittent reception are as follows.

Table 8-5 Duration of the Battery Saver

Save	No Carrier	Inconsistent Status of QT tone, DQT code, NAC code, RAN code, or Color Code
Off	Off	Off
Short	Portable: 15 ms to 25 ms* ¹ Mobile: 200 ms	400 ms (Mobile)
Medium	400 ms	800 ms
Long	800 ms	1600 ms

*¹ The length of time for turning off a reception circuit changes as follows according to the configuration in **Channel Type** of the selected channel:

Analog: 15 ms

NXDN: 20 ms

DMR: 25 ms

Mixed: 15 ms (not affected by the configuration in **Transmit Mode**)

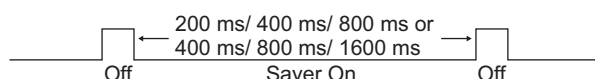


Figure 8-1 Battery Saver

Note

- Battery Saver does not function in an NXDN Trunking system.
- Battery Saver is not activated while the transceiver is scanning.

DMR Tier III Trunking (Power Save)

Battery Saver of the transceiver in a DMR Tier III Trunking system can be used by activating with the transceiver the Power Save function supported by the DMR Tier III Trunking system. The power consumption of the transceiver can be reduced by setting the transceiver receiving intermittently according to the timing managed by the system. The timing of when the transceiver performs the reception behavior again is managed by the system.

If anything other than Off is configured in Battery Saver in KPG-D3, the transceiver requests Power Save to the system when the transceiver begins Registration. If the system supports Power Save, the system notifies the transceiver of the timing for receiving intermittently as a response. At the timing notified by the system, the transceiver will be receiving for 480 ms, and then will be in the paused state.

The following are the duration of the paused state.

Table 8-6 Duration of the Battery Saver (DMR Tier III Trunking)

Power Save	Duration of the Paused State
Short	480 ms
Medium	1440 ms
Long	3360 ms

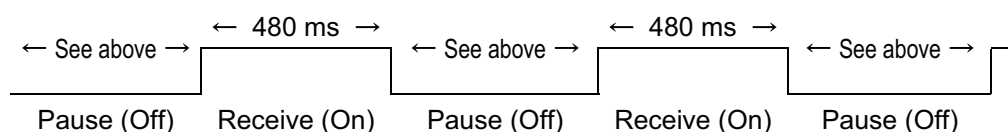


Figure 8-2 Battery Saver (DMR Tier III Trunking)

Note

- The **Power Save** function functions only in a DMR Tier III Trunking system.
- Battery Saver does not function while the transceiver is in Emergency Mode.
- Battery Saver functions even during Scan.
- Battery Saver continues to function even if a button is pressed.
- If the Registration button is pressed, the transceiver requests Power Save to a system even in the same system.
- Battery Saver does not function in a system where the transceiver does not request Registration.
- Battery Saver does not function outside of the communication area where the transceiver cannot receive a signal from a system.
- Whether the Battery Saver function is enabled can be checked in Maintenance Display Mode.
- Matching the configurations of Battery Saver in the transceivers used on the same system is recommended.
- The transceiver does not enter the paused state during communications.
- The battery life becomes longer as the paused time becomes longer. However, if a communication request arises for the transceiver in the paused state, it may take a long time to start communication, because the system waits for communication until the paused time of the transceiver ends.
- To make a Group Call, the Group ID of the transceiver targeted for **Power Save** must be registered in the system and **Group Subscription** must be enabled. (Refer to [Registering the Group ID Used by the Own Transceiver in a System \(Group Subscription\)](#).)

Configuration using KPG-D3/ D3N

- Configuring **Battery Saver** (Analog Conventional) ([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > General > Other Options > RX)
- Configuring **Battery Saver** (NXDN Conventional) ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > General > Other Options > RX)
- Configuring **Battery Saver** (DMR Conventional) ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > General > Other Options > RX)
- Configuring **Battery Saver** (DMR-based Trunking) ([See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > RX Options)

8.6

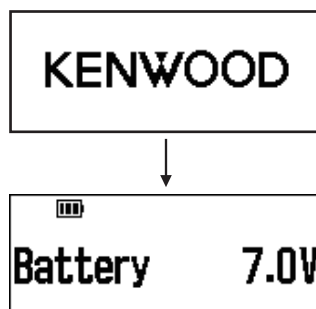
Displaying the Voltage Value of a Battery When the Transceiver Is Turned ON (Battery Voltage)

Supported Models: Portable (Full Key Model/ Standard Key Model)

Battery Voltage is the function to display the voltage value of a battery when the transceiver is turned ON.

The function can be used as an indicator on whether a battery is properly recharged by checking the voltage value of the battery when the transceiver is used.

If **Battery Voltage** is enabled, the voltage value of a battery appears after the animated logo or **Custom-Start-up Screen** appears when the transceiver is turned ON.



 Note

- Each threshold value for switching the Battery Status icon changes depending on the combination of model (VHF, UHF) and battery type (such as Li-ion and Ni-MH). Therefore the Battery Status icon may differ even if the same voltage value is displayed.
- The voltage value of a battery displayed in **Battery Voltage** may vary slightly depending on the lighting status of the backlight.

Configuration using KPG-D3/ D3N

Configuring **Battery Voltage** to be enabled or disabled ( **See** Radio Configuration > Global Options > Basics > General > Power-on)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

GPS Position Display is the function to show the location information on the transceiver display.

For example, a forest ranger or forest firefighter can use this function to monitor the current location and report the location to the base station in order to smoothly perform their tasks smoothly.

GPS Position Display has the following functions:

- Displays the current location (latitude and longitude) on the display of the transceiver
- Displays the altitude of the current location on the display of the transceiver
- Automatically toggles the display of the transceiver between displaying the current location (latitude and longitude) and the altitude display (Mobile only)

9.1

Configuring the GPS Position Display

The functions below related to GPS Position Display can be configured using KPG-D3/ D3N. The functions must be configured in the following order.

1) Communication port

To use the built-in GPS receiver unit, configure **Built-in Device Activation** to be enabled.

To use an external GPS receiver unit, assign “GPS” to the communication port to which the GPS receiver unit is connected. (Refer to [Available Functions for COM Port.](#))

2) PF button

GPS Position Display needs to be assigned to a button on the transceiver.

Pressing the **GPS Position Display** button causes the transceiver to enter GPS Position Display Mode.

The transceiver also enters GPS Position Display Mode if “GPS Position Display” is selected after entering Menu Mode by pressing the **Menu** button. (Refer to [Using Menu Mode.](#))

3) Configuring displays in GPS Position Display Mode

• Latitude and Longitude

This function can be used to configure whether the latitudinal and longitudinal values appear on the transceiver display. If this function is enabled, the latitudinal and longitudinal values appear on the transceiver display in GPS Position Display Mode. For the convenience of the user, the latitude and longitude display format can be selected from “Degrees, Minutes” and “Degrees, Minutes, Seconds”.

If this function is disabled, the latitudinal and longitudinal values do not appear in GPS Position Display Mode.

• Altitude

This function can be used to configure whether the altitudinal value appears on the transceiver display. If this function is enabled, the altitudinal value appears on the transceiver display in GPS Position Display Mode. For convenience of the user, either meters or feet can be configured for the format to display the altitudinal value.

If this function is disabled, the altitudinal value does not appear in GPS Position Display Mode.

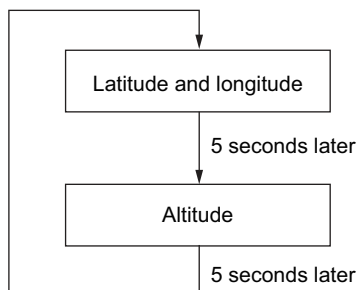
Configuration using KPG-D3/ D3N

- Configuring **COM port** ( [See](#) Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1, Bluetooth)
- Configuring **Built-in Device Activation** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > GPS/Bluetooth)
- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Latitude and Longitude** ( [See](#) Radio Configuration > Global Options > Basics > GPS/Bluetooth > GPS Position Display)
- Configuring **Altitude** ( [See](#) Radio Configuration > Global Options > Basics > GPS/Bluetooth > GPS Position Display)

9.2 Displaying the Location Information

The transceiver enters GPS Position Display Mode if the **GPS Position Display** button is pressed or “GPS Position Display” is selected by pressing the **Menu** button while the transceiver is in standby mode.

The transceiver automatically toggles between displaying the location (latitude and longitude) and the altitude approximately every 5 sec while in GPS Position Display Mode.



Note

- The transceiver cannot enter GPS Position Display Mode if the display that appears in GPS Position Display Mode is not configured.
- Pressing and holding the **Menu** () or **[*]** button pauses the automatic toggling of the display. Pressing and holding the **Menu** () or **[*]** button again resumes the automatic toggling of the display.

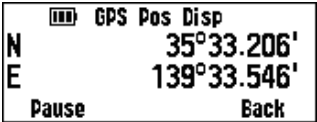
Operating the transceiver

1 Press the **GPS Position Display** button.

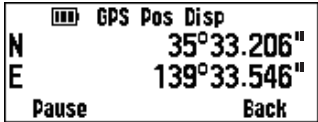
The transceiver enters GPS Position Display Mode.
The following operations are identical even if the transceiver enters GPS Position Display Mode by pressing the **Menu** button.
The following displays appear:

• **Latitude and Longitude Display**

“Degrees, Minutes” display



“Degrees, Minutes, Seconds” display



• **Altitude Display**

Meters display
“Altitude” is displayed in meters.

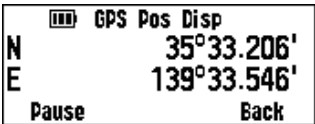


Feet display
“Altitude” is displayed in feet.



• **GPS Non-positioning Status Display**

The GPS positioning is disabled if 5 sec elapse after the transceiver receives non-positioning data from the GPS receiver unit and is not able to receive serial data.



“-” appears for all digits on the display if the transceiver receives no location data from the GPS receiver unit, such as immediately after the transceiver is turned ON.



2 Press the **Home** ([]) button.

The transceiver exits GPS Position Display Mode and then restores the previous display.

 Note

- “-” appears for all digits on the display if the transceiver is not receiving any location data from the GPS receiver unit, such as when the transceiver is turned ON.

Functions such as to record audio in the internal memory of the transceiver (**Auto Recording**), to play recorded audio (**Playback**), and **GPS Data Storage** can be used.

Recorded audio data and acquired GPS data are stored in the internal memory of the transceiver.

 Note

- GPS data can be outputted, but recorded audio data cannot be outputted.

10.1 Recording Transmitted and Received Audio Automatically (Auto Recording)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Auto Recording is the function to record transmitted or received audio automatically to the internal memory. This function is used if the audio needs to be listened again after a part of the conversation is missed, or if the previous conversation needs to be kept as a record.

To use this function, **Auto Recording** needs to be enabled by using KPG-D3/ D3N, and the method to start recording needs to be configured in **Recording Type**.

The transceiver starts recording as follows according to the configuration in **Recording Type**:

Table 10-1 Recording Type

Configuration	Description
All TX/RX Audio	If transmission or reception starts, the audio is recorded to the internal memory. If the recording starts, the timer for Maximum Recording Length is activated. When the amount of time configured in Maximum Recording Length elapses while recording, the recording ends.
Individual Call	If an Individual Call to the own transceiver is received and enters the matching state, the audio is recorded to the internal memory. If the recording starts, the timer for Maximum Recording Length is activated. When the amount of time configured in Maximum Recording Length elapses while recording, the recording ends. After the recording ends, while in the matching state, if an Individual Call from the same transceiver is received or if Talkback is activated, the recording does not start. However, if an Individual Call from a different transceiver to the own transceiver is received, the recording starts. The matching state indicates the following states: MDC-1200/ FleetSync/ NXDN Conventional/ DMR Conventional: The state that Optional Signaling matches NXDN Trunking/ DMR-based Trunking: The state that the ID Name or Unit ID of the transmitting transceiver is displayed 2-tone/ DTMF: The state that the 2-tone or DTMF code is received, and the Optional Signaling matches For 5-tone, the transceiver starts recording to the internal memory if audio sounds from the speaker after the 5-tone sequence matches and Decode Format (MONF, MONO) is executed.

 Note

- Maximum Recording Length is the maximum length of time for Auto Recording to record a single session. (Refer to [Configuring Recording Time \(Maximum Recording Length\)](#).)

Transceiver behavior

Each screen is an example of the display when an Individual Call in an NXDN Conventional system is received and the received audio is recorded.

● Starting Auto Recording

If **Auto Recording** starts recording the received or transmitted audio at the timing configured in **Recording Type**, the “” icon blinks.

The recording start date and time is stored. Also, if “Individual Call” is configured in **Recording Type**, the ID information of the transmitting transceiver is stored.



When the amount of time configured in **Maximum Recording Length** elapses, the “” icon disappears and the recording ends.



● If Auto Recording does not start because the maximum number of recordings has been reached

“Memory Full” appears on the display for 1 sec. After that, “Memory Full” appears on the display for 1 sec at 10-sec intervals.



● If Priority Scan or Priority Monitor Scan is activated

While **Priority Scan** or **Priority Monitor Scan** is activated, the transceiver behaves as follows:

- Regardless of the configuration in **Recording Type**, the muted sound is recorded while **Lookback** is activated.
- If “All TX/RX Audio” is configured in **Recording Type**, and if a signal of a Priority Channel is received while the received audio of a Normal Channel (which is not the Priority Channel) is recorded, the recording continues and the received audio of the Priority Channel is recorded.
- If “Individual Call” is configured in **Recording Type**, and if a signal of a Priority Channel is received while the received audio of a Normal Channel is recorded, the recording of the Normal Channel ends, and then recording of the Priority Channel starts.
- During transmission, the audio is recorded via the Mic Line or MI2 Line.
- The recorded audio can be played back or deleted in Playback Mode. (Refer to [Playing Back the Recorded Audio \(Playback\)](#).)
- When transmitting data, **Auto Recording** does not start.
- Although a Transmit Tone is recorded, a Control Tone and Side Tone are not recorded.
- If “All TX/RX Audio” is configured in **Recording Type**, the ID information is not stored when **Auto Recording** is started.
- After the configuration data is written, the configuration values in **Maximum Recording Length** before and after writing are compared. If the configurations differ, the audio data recorded in the internal memory is deleted when the transceiver is turned ON.
- If configuration data with **Audio/GPS Data Erase** enabled is written, the audio data recorded in the internal memory is deleted when the transceiver is turned ON.
- If **Auto Recording** is used with other functions such as GPS Data Storage, the beginning may be missing from the audio recorded by **Auto Recording**.

 Note

- **Auto Recording** does not start if the maximum number of recordings has already been reached.
- If the transceiver is turned OFF without operating the **Power** switch by the following operations, the audio data recorded with the Auto Recording function is not retained: (Only if **First-in First-out Deletion** is enabled by using KPG-D3/ D3N)
 - Removing the battery pack (Portable only)
 - No remaining battery power (Portable only)
 - Removing the power cable (Mobile only)
- If one of the following occurs during the recording, the timer for **Maximum Recording Length** stops and the recording ends:
 - The Gap timer elapses (the recording continues for 3 sec from when the transmission or reception completes. This duration of time is called the Gap timer.)
 - The channel or site is changed
 - Scanning starts or stops
 - The transceiver enters Emergency Mode
 - The data transmission starts
 - The **PTT** switch is pressed while **Public Address** is enabled (Mobile only)
 - The **Clear** button is pressed and the communication ends
 - The DTMF code and “#” code are received, and the matching state of Optional Signaling is reset
- The maximum number of records varies as follows depending on the configuration of Maximum Recording Length:

Table 10-2 Maximum Number of Records

Maximum Recording Length	Maximum Number of Records
15 sec	40
30 sec	20
60 sec	10

Configuration using KPG-D3/ D3N

- Configuring **Auto Recording** to be enabled or disabled ( **See** Radio Configuration > Global Options > Basics > Stack/Recording > Recording)
- Configuring **Recording Type** ( **See** Radio Configuration > Global Options > Basics > Stack/Recording > Recording)

Configuring Recording Time (Maximum Recording Length)

Maximum Recording Length is the maximum length of time for **Auto Recording** to record a single session.
By using KPG-D3/ D3N, 15 sec, 30 sec, or 60 sec can be configured for the maximum length of recording time for a single session when recording the transmitted or received audio to the internal memory.

Configuration using KPG-D3/ D3N

Configuring **Maximum Recording Length** ( See Radio Configuration > Global Options > Basics > Stack/Recording > Recording)

Configuring the Storage Method of an Audio Data File (First-in First-out Deletion)

First-in First-out Deletion is the function to delete the oldest audio data file in order to store a new audio data file if the full capacity of the internal memory has been used.
The transceiver behaves as follows according to the configuration in **First-in First-out Deletion**:

Table 10-3 First-in First-out Deletion

Configuration	Description
Enabled	The transceiver deletes the oldest audio data file stored in the internal memory and stores a new audio data file. The transceiver backs up the audio data recorded using Auto Recording when the transceiver is turned OFF by pressing the Power switch.
Disabled	The audio data files stored in the internal memory are not deleted. The transceiver cannot record. The transceiver backs up the audio data each time the transceiver records the audio data using Auto Recording .

Configuration using KPG-D3/ D3N

Configuring **First-in First-out Deletion** ( See Radio Configuration > Global Options > Basics > Stack/Recording > Recording)

10.2 Playing Back the Recorded Audio (Playback)

If the transceiver enters in Playback Mode, the audio data recorded by using **Auto Recording** can be played back. Also, unnecessary recorded data can be deleted.

Pressing the **Playback** button places the transceiver in Playback Mode. Or, the transceiver can also be placed in Playback Mode by selecting “Playback” after placing the transceiver in Menu Mode by pressing the **Menu** button. (Refer to [Using Menu Mode](#).)

Operating the transceiver

● Playing back the audio data

1 Press the **Playback** button.

A Button Beep A (1 beep) sounds from the transceiver, and then the transceiver enters Playback Mode.

The audio data stored in the internal memory is displayed in a list.

The following operations are identical even if the transceiver enters Playback Mode by pressing the **Menu** button.

	Playback	1
07/28/'15	11:35	
07/28/'15	14:20	
Play	Delete	

Note

- The oldest audio data is displayed as list number 1.
- Each list of audio data is displayed in the format of either the recording start date and time or the ID of the transmitting transceiver. Pressing the [◀] or [▶] button can switch the display. The recording start date and time is displayed according to the configurations in **Date Format** and **Time Format**.
- If no audio data is stored, “Empty” is displayed for 1 sec.
- In a DMR Tier III Trunking system and S-Trunking system, if **Fleet Dialing Plan** is enabled, an ID is displayed in the Number Prefix (NP) - Fleet Individual Number (FIN) - Individual Number (IN) format. However, if the displayed ID and the ID preconfigured for the transceiver are the same, the display of Number Prefix (NP) - Fleet Individual Number (FIN) is omitted. Also, if the ID cannot be converted to the Number Prefix (NP) - Fleet Individual Number (FIN) - Individual Number (IN) format, the ID is displayed in the format from UID 1 to UID 16776415. In other cases, the saved ID appears as it is.

2 Press the [▲] or [▼] button to select the audio data, and then press the **Menu** ([□]) or [*] button.

A Button Beep A (1 beep) sounds from the transceiver, the playback screen appears, and playback of the audio data starts.

	Playback	1
UID	00:00/00:45	
Pause	65519	

If playback of the audio data having the last list number ends, the list display is restored.

	Playback	1
07/28/'15	11:35A	
07/28/'15	2:20P	
Play	Delete	

● Playing back the latest audio data (Playback (Last Recording))

Pressing the **Playback (Last Recording)** button sounds a Button Beep A (1 beep) from the transceiver and places the transceiver in Playback Mode. The playback screen appears and the playback of the latest audio data starts.



When the playback of audio data ends, the standby display is restored.

If **Playback End Tone** is enabled, a Playback End Tone (3 beeps) sounds from the transceiver.

Note

- If no audio data is stored, “Empty” appears for 1 sec on the standby screen.

The following operations are enabled during playback:

Table 10-4 Operations during Playback

Transmission Operation	Description
Pause	Pressing the Menu ([) or [*] button pauses the playback of audio data. Pressing the Menu ([) or [*] button again resumes the playback of audio data. If the playback screen is displayed by pressing the Playback (Last Recording) button, the same operation can be done even by using the Back ([) or [#] button.
Cue	Pressing the [) button cues to the beginning of the audio file being played back, and then starts the playback. If the [) button is pressed again before the playback of audio data starts, the playback starts after cueing to the beginning of the audio data which has the previous list number. Pressing the [) button cues to the beginning of the audio data which has the next list number, and then starts the playback. Pressing the [) button while the audio data of the last list number is being played back ends the playback, and then the list display is restored. (If the playback screen is displayed by pressing the Playback (Last Recording) button, the standby display is restored.) If the playback is being paused, the audio data is cued while remaining in the paused state.
Rewind	While the [) button is pressed and held, the audio data being played back continues to rewind. Releasing the [) button starts the playback from the point. If the [) button continues to be pressed and held until the rewinding reaches the beginning of the audio data being played back, the rewinding pauses. Furthermore, if the [) button continues to be pressed and held, the rewinding is resumed from the end of the audio data which has the previous list number. If the rewinding reaches the beginning of the audio data with the list number 1, the rewinding ends and the audio data having the list number 1 is played back. If the playback is being paused, the audio data is rewound while remaining in the paused state.
Fast forward	While the [) button is pressed and held, the audio data being played back continues to fast-forward. Releasing the [) button starts the playback at that point. If the [) button continues to be pressed and held until the fast-forwarding reaches the end of the audio data being played back, the fast-forwarding pauses. If the [) button further continues to be pressed and held, the fast-forwarding is resumed from the beginning of the audio data which has the next list number. Fast-forwarding the audio data of the last list number until the end ends fast-forwarding and playback, and then the list display is restored. (If the playback screen is displayed by pressing the Playback (Last Recording) button, the standby display is restored.) If the playback is being paused, the audio data is fast-forwarded while remaining in the paused state.
End of playback	Pressing the Back ([) or [#] button restores the list display and the playback of the recorded data ends.

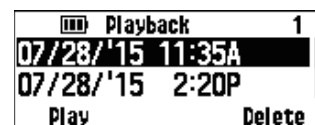
Note

- If the transceiver receives an audio signal while the transceiver is in Playback Mode, the transceiver exits Playback Mode and starts the reception behavior. The transceiver remains in Playback Mode even if the transceiver receives data in Playback Mode. Also, if the transceiver receives data during the playback of the audio data, the transceiver pauses the playback of the audio data.

● Deleting an audio datum

1 Press the **Playback** button to display the audio data.

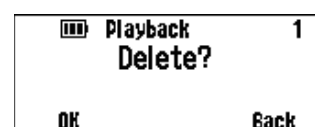
Refer to step 1 of “[Playing back the audio data](#)”.



2 Press the **[▲]** or **[▼]** button to select the audio data to be deleted.

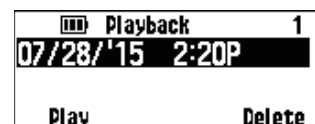
3 Press the **Back** (**[↩]**) or **[#]** button.

The screen to confirm whether to delete the audio data appears.



4 Press the **Menu** (**[□]**) or **[*]** button.

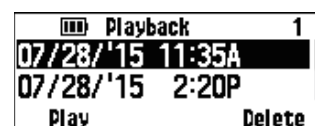
The delete process of the audio data starts. When the delete process completes, the list display is restored.



● Deleting all audio data

1 Press the **Playback** button to display the audio data.

Refer to step 1 of “[Playing back the audio data](#)”.



2 Press and hold the **Back** (**[↩]**) or **[#]** button.

The screen to confirm whether to delete all audio data appears.



3 Press the **Menu** ([) or [*****] button.

The delete process of the audio data starts. When the delete process completes, the standby display is restored, and then “Empty” appears for 1 sec.



Note

- Pressing the **Menu** ([)], **Back** ([)], [*****] or [**#**] button during the deletion of the audio data causes the Button-entry Error Tone (1 beep) to sound from the transceiver and the transceiver does not respond at all.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( **See** Radio Configuration > Global Options > Button Assignment)
- Configuring **Date Format** ( **See** Radio Configuration > Global Options > Basics > Display/Language > Time Stamp)
- Configuring **Time Format** ( **See** Radio Configuration > Global Options > Basics > Display/Language > Time Stamp)
- Configuring **Playback End Tone** to be enabled or disabled ( **See** Radio Configuration > Global Options > Basics > Stack/Recording > Recording)

10.3 Storing the GPS Data (GPS Data Storage)

GPS Data Storage is the function to enable the GPS data to be stored in the internal memory.

At the time intervals configured in **Interval**, the GPS data acquired from the GPS receiver unit is stored in the internal memory.

The acquired data is temporarily stored in the RAM in the transceiver, and if 3 data are stored, the data are collectively stored in the internal memory. If 1 or 2 GPS data are temporarily stored in the RAM in the transceiver, the GPS data are deleted without being stored in the internal memory when the transceiver is turned OFF.

A maximum of 7,000 GPS data can be stored in the internal memory. If the number of the GPS data reaches 7,000, the older 3,500 GPS data are deleted, so the actual number of the GPS data which can be stored in the internal memory is 3,500.

The GPS data stored in the internal memory can be sent from the transceiver using wireless communication and be transferred to a PC.

Sending and transferring the GPS data

● Sending the GPS data using wireless communication

The transceiver sends the GPS stored in the internal memory to the base station according to the specified period and specified number of data upon the receipt of a request message for the GPS data which is sent from the base station using the NXDN/ DMR air protocol.

Note

- While the transceiver is sending the GPS data using wireless communication, new GPS data is not stored even if the transceiver acquires the new GPS data from the GPS receiver unit.
- If the number of the stored GPS data does not reach the number of data specified by the request message for the GPS data which is sent from the base station, the transceiver sends all the stored GPS data to the base station.
- In a DMR-based Trunking system, the transceiver cannot send GPS data by radio communication.

● Transferring the GPS data to a PC

To transfer the GPS data to a PC, the transceiver and the PC must be connected by a serial cable.

The transceiver transfers the GPS data stored in the internal memory to the PC according to the specified period and specified number of data upon the receipt of a request message for the GPS data which is sent from the PC.

Note

- To transfer the GPS data to the PC, the GPS data request message must be controlled using a PC application. Also, **GPS Base Station Settings** must be configured using KPG-D3/ D3N.
- While the transceiver is transferring the GPS data using a PC command, new GPS data is not stored even if the transceiver acquires the new GPS data from the GPS receiver unit.
- If the number of the stored GPS data does not reach the number of data specified by the request message for the GPS data which is sent from the PC, the transceiver sends all the stored GPS data to the PC.
- If configuration data with **Audio/GPS Data Erase** enabled is written, the GPS data stored in the internal memory is deleted when the transceiver is turned ON.

Configuration using KPG-D3/ D3N

- Configuring **GPS Data Storage** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > GPS/Bluetooth > GPS Data)
- Configuring **Interval** ( [See](#) Radio Configuration > Global Options > Basics > GPS/Bluetooth > GPS Data)

Place a beacon transmitter at each location indoors to use the Indoor Location function.

In other words, which beacon transmitter the transceiver is currently located close to is notified for the location server.

As shown in the figure below, there are 2 types of communication methods to send BLE data to the location server:

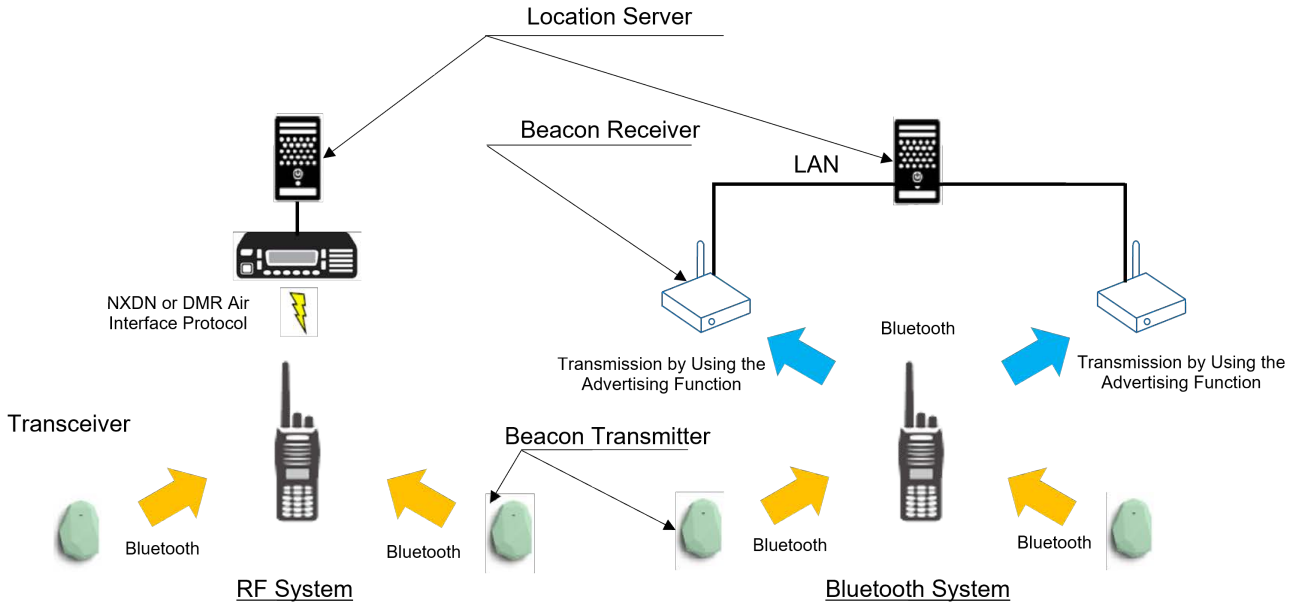


Figure 11-1 2 Communication Methods for Indoor Location Positioning by Using BLE

- RF System method

The BLE data is sent by using the NXDN or DMR Air Interface Protocol.

The repeater or base station transceiver receives the BLE data from the transceiver, and then transfers the BLE data to the location server via IP for the repeater and via serial for the base station transceiver.

 Note

- Because RF is shared with voice calls and other data communications, not occupying the RF with BLE data transmission needs to be considered. In the RF System method, the number of units that can be added is also restricted.

To send BLE data, the behavior is based on the time information (hereafter, referred to as synchronization information) received from KAS-20E. Therefore, if the mobile station transceiver does not receive synchronization information from KAS-20E, the second and subsequent BLE data transmission for a Polling request from KAS-20E and the BLE data transmission by BLE Auto Report do not occur.

For details about the number of units that can be added, refer to the KAS-20E In-depth Manual.

- **Bluetooth System method**

The BLE data is sent by using the Bluetooth advertising function.

The beacon receiver receives the BLE data from the transceiver, and transfers the BLE data to the location server via IP.

Supported protocols

The supported protocols of each communication method of Indoor Location are listed below:

Table 11-1 Support of Protocols and Each Communication Method

Protocol	Bluetooth System Method	RF System Method
Analog Conventional	No	No
Analog Voting	No	No
LTR Trunking	No	No
NXDN Conventional	Yes	Yes
NXDN Site Roaming	Yes	Yes
NXDN Trunking (NEXEDGE 1st Generation/ NEXEDGE 2nd Generation)	Yes	Yes
DMR Conventional	Yes	Yes
DMR Site Roaming	Yes	Yes
DMR-based Trunking (DMR Tier III Trunking)	Yes	No
DMR-based Trunking (Trunking 2.5)	Yes	No

Yes: Supported

No: Not supported

For the RF System method, behavior occurs by using NXDN Air Interface Protocol in an NXDN system, and by using DMR Air Interface Protocol in a DMR system.

BLE advertising mode

BLE advertising mode is the mode to send beacon data, and sends the beacon data at regular intervals.

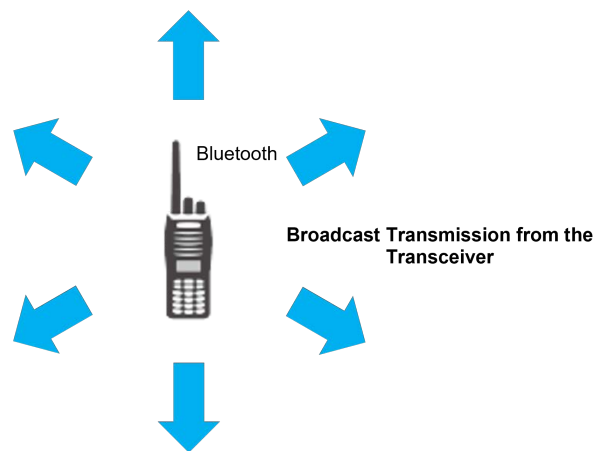


Figure 11-2 Advertising Mode

BLE Scan mode

BLE Scan mode is the mode to receive beacon data. During the behavior in this mode, the receiver is always in the state available to receive beacon data.

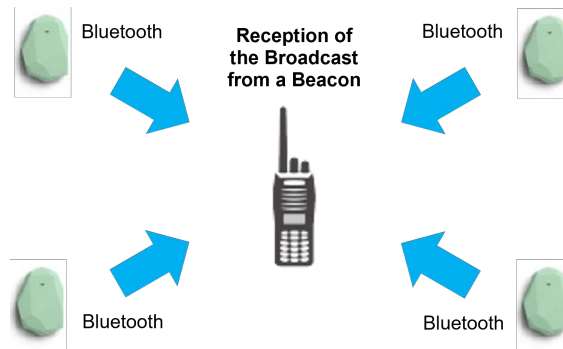


Figure 11-3 BLE Scan Mode

Note

- The software option of INDOOR LOCATION LICENSE (KWD-3020-IL) is required to use Indoor Location.
- For details about the Indoor Location function, refer to the KAS-20E Basic Operations or In-depth Manual.
- Bluetooth Low Energy (Heart Rate Service, Automatic Injury Detection, etc.) cannot be used during BLE Scan. Also, connection to a Bluetooth-compatible device by using HSP Connection or SPP Connection, etc. cannot be made.

To use these functions, “Indoor Location” must be enabled in **Product Information** on the FPU.

Product Information

Product Information

Model Name: Configuration Alias:

Frequency: Configuration Tag:

NXDN

- ☐ NXDN Conventional (KWD-3500CV)
- ☐ NXDN Conventional (KWD-3200CV)
- ☐ NXDN Type-C Trunking (KWD-3501TR)
- ☐ NXDN Type-C Trunking (KWD-3201TR)

DMR

- ☒ DMR Conventional (KWD-3500CV)
- ☐ DMR Conventional (KWD-3301CV)
- ☐ S-Trunking (KWD-3501TR) *1
- ☐ S-Trunking (KWD-3301CV) *1
- ☐ Trunking 2.5 (KWD-3501TR)
- ☐ DMR Tier III Trunking (KWD-3302TR)
- ☐ Fleet Dialing Plan

*1 Support for S-Trunking ended.

Security

- ☐ AES/DES Advanced Encryption (KWD-3503AE)
- ☐ DES Encryption (KWD-3505DE)
- ☐ Enhanced Encryption (KWD-3502EE)

Features

- ☐ 1000 Channel(KWD-3000CH)
- ☒ Bluetooth Data (KWD-3002BT)
- ☐ Remote Control (KWD-3504RC)
- ☐ Front Panel Program (KWD-3001FP)
- ☐ OTAP
- ☒ Indoor Location (KWD-3020-IL)

Selected Model Image



Figure 11-4 Product Information

Note

- To use this function, **Bluetooth Data** needs to be enabled by using KPG-D3/ D3N.
- To use this function, **Built-in Device Activation** needs to be enabled by using KPG-D3/ D3N.
- If the Indoor Location function is enabled, the configuration item that shares the configuration with the GPS function of KPG-D3/ D3N appears in the format that also uses “GPS”, such as “GPS/BLE Time Mark”, for example. In In-depth Manual, the configuration item that shares the configuration with the GPS function of KPG-D3/ D3N is referred to with no “GPS”, such as “BLE Time Mark”.
- In the Indoor Location function, the BLE Beacon/ BLE Gateway-compatible devices in the following URL can be used:
http://manual2.jvckenwood.com/com/help_ref/nx5000_series/compatible_model_list/CNMJSYnnzoitpv.html

Configuration using KPG-D3/ D3N

● Configuration common to NXDN and DMR

- Configuring **Beacon List** ( See Radio Configuration > Global Options > Indoor Location > General)
- Configuring **Beacon UUID** ( See Radio Configuration > Global Options > Indoor Location > General > Beacon List)
- Configuring **Send Location via** ( See Radio Configuration > Global Options > Indoor Location > General > Beacon List)
- Configuring **Minimum Valid Beacon Signal** in an NXDN Conventional system ( See Radio Configuration > System Properties > Systems > NXDN Conventional > Indoor Location > Common)
- Configuring **Minimum Valid Beacon Signal** in an NXDN Site Roaming system ( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Indoor Location > Common)
- Configuring **Minimum Valid Beacon Signal** in an NXDN Trunking system ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Indoor Location > Common)
- Configuring **Minimum Valid Beacon Signal** in a DMR Conventional system ( See Radio Configuration > System Properties > Systems > DMR Conventional > Indoor Location > Common)

- Configuring **Minimum Valid Beacon Signal** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Indoor Location > Common)
- Configuring **Minimum Valid Beacon Signal** in a DMR-based Trunking system ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Indoor Location > Common)
- Assigning the BLE Scan function to a **PF** button on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **BLE Scan Preset** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > GPS/Bluetooth > Bluetooth)
- Configuring **GPS Delay Time** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Indoor Location > Common)
- Configuring **GPS Delay Time** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Indoor Location > Common)
- Configuring **GPS Delay Time** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Indoor Location > Common)
- Configuring **GPS Delay Time** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Indoor Location > Common)
- Configuring **GPS Delay Time** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Indoor Location > Common)
- Configuring **GPS Delay Time** in a DMR-based Trunking system ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Indoor Location > Common)

● Configuration of a Bluetooth System (NXDN and DMR)

- Configuring **BLE Scan Time** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Indoor Location > Bluetooth System)
- Configuring **BLE Scan Time** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Indoor Location > Bluetooth System)
- Configuring **BLE Scan Time** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Indoor Location > Bluetooth System)
- Configuring **BLE Scan Time** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Indoor Location > Bluetooth System)
- Configuring **BLE Scan Time** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Indoor Location > Bluetooth System)
- Configuring **BLE Scan Time** in a DMR-based Trunking system ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Indoor Location > Bluetooth System)
- Configuring **TX Interval** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Indoor Location > Bluetooth System)
- Configuring **TX Interval** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Indoor Location > Bluetooth System)
- Configuring **TX Interval** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Indoor Location > Bluetooth System)
- Configuring **TX Interval** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Indoor Location > Bluetooth System)
- Configuring **TX Interval** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Indoor Location > Bluetooth System)
- Configuring **TX Interval** in a DMR-based Trunking system ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Indoor Location > Bluetooth System)
- Configuring **TX Power** ( [See](#) Radio Configuration > Global Options > Indoor Location > Bluetooth System)

● Configuration of an RF System (NXDN)

- Configuring **GPS/BLE Report on Data System-personality** in an NXDN Conventional system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Data System-personality)

- Assigning the Send the Location Data to a **PF** on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring BLE Base ID (**ID Type, ID**) in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Base Station)
- Configuring BLE Base ID (**ID Type, ID**) in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > Base Station)
- Configuring BLE Base ID (**ID Type, ID**) in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Base Station)
- Configuring **GPS/BLE Combination** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE)
- Configuring **GPS/BLE Combination** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE)
- Configuring **GPS/BLE Combination** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)
- Configuring **GPS/BLE Report Mode** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE)
- Configuring **GPS/BLE Report Mode** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE)
- Configuring **GPS/BLE Report Mode** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)
- Configuring **Number of Times** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Poll)
- Configuring **Number of Times** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > Poll)
- Configuring **Number of Times** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Poll)
- Configuring **GPS/BLE Report Interval Time** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Auto)
- Configuring **GPS/BLE Report Interval Time** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > Auto)
- Configuring **GPS/BLE Report Interval Time** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Auto)
- Configuring **GPS/BLE Time Mark** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Auto)
- Configuring **GPS/BLE Time Mark** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > Auto)
- Configuring **GPS/BLE Time Mark** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Auto)
- Configuring **Respond to Polling ID** in an NXDN Conventional system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Poll)
- Configuring **Respond to Polling ID** in an NXDN Site Roaming system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > Poll)
- Configuring **Respond to Polling ID** in an NXDN Trunking system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Poll)
- Configuring **GPS/BLE ACK Request** in an NXDN Conventional system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE)
- Configuring **GPS/BLE ACK Request** in an NXDN Site Roaming system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE)
- Configuring **GPS/BLE ACK Request** in an NXDN Trunking system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)

- Configuring Map Header (**\$PKPBD (KW)**) to be enabled or disabled ( [See](#) Radio Configuration > Global Options > External Device > General > Serial Interface > BLE Base Station Settings)
- Configuring **GPS/BLE Report Channel Type** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)
- Configuring **GPS/BLE Data System-personality** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)
- Configuring **GPS/BLE Report Priority over Group Call** in an NXDN Trunking system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)

● Configuration of an RF System (DMR)

- Configuring **GPS/BLE Report on Data System-personality** in a DMR Conventional system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Data System-personality)
- Assigning the Send the Location Data to a **PF** on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring BLE Base ID (**ID Type, ID**) in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Base Station)
- Configuring BLE Base ID (**ID Type, ID**) in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Base Station)
- Configuring **GPS/BLE Combination** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE)
- Configuring **GPS/BLE Combination** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE)
- Configuring **GPS/BLE Report Mode** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE)
- Configuring **GPS/BLE Report Mode** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE)
- Configuring **Number of Times** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Poll)
- Configuring **Number of Times** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Poll)
- Configuring **GPS/BLE Report Interval Time** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Auto)
- Configuring **GPS/BLE Report Interval Time** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Auto)
- Configuring **GPS/BLE Time Mark** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Auto)
- Configuring **GPS/BLE Time Mark** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Auto)
- Configuring **Respond to Polling ID** in a DMR Conventional system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Poll)
- Configuring **Respond to Polling ID** in a DMR Site Roaming system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Poll)
- Configuring Map Header (**\$PKPBD (KW)**) to be enabled or disabled ( [See](#) Radio Configuration > Global Options > External Device > General > Serial Interface > BLE Base Station Settings)
- Configuring GPS/BLE Report with Voice (**Report, Interval**) in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > DMR > GPS/BLE Report with Voice)
- Configuring GPS/BLE Report with Voice (**Report, Interval**) in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > GPS/BLE Report with Voice)

11.1 Beacon List

Supported Models: Portable

Of the beacon data received by the transceiver, the transceiver uses only the data with a UUID registered in **Beacon List**.

Beacon List is an item to configure for the mobile station in Indoor Location.

Up to 31 UUIDs can be registered in **Beacon List**.

Whether an RF System or Bluetooth System is used for the communication method of each beacon can be selected by configuring **Send Location via**.

Table 11-2 Send Location via

Configuration	Description
RF System	Sends the BLE data by RF.
Bluetooth System	Sends the BLE data by Bluetooth.

When the beacon data having a registered UUID is received, the transceiver stores the data in the internal memory as a transmission candidate.

If the UUID of the received beacon data is not registered, the transceiver discards the received beacon data.

Configuration using KPG-D3/ D3N

- Configuring **Beacon List** ( See Radio Configuration > Global Options > Indoor Location > General)
- Configuring **Beacon UUID** ( See Radio Configuration > Global Options > Indoor Location > General > Beacon List)
- Configuring **Send Location via** ( See Radio Configuration > Global Options > Indoor Location > General > Beacon List)

11.2 Minimum Valid Beacon Signal

Supported Models: Portable

Minimum Valid Beacon Signal is the threshold value used to evaluate from the receive strength level (RSSI) whether to store the beacon data to the internal memory as the next transmission candidate or discard it when a beacon signal is received by the transceiver.

Minimum Valid Beacon Signal is an item to configure for the mobile station in Indoor Location.

The function is enabled in both an RF System and a Bluetooth System.

If the RSSI of when a beacon signal is received exceeds the threshold value configured in **Minimum Valid Beacon Signal**, the data is stored in the internal memory as the next transmission candidate.

In **Minimum Valid Beacon Signal**, a desired value from -110 dBm to -20 dBm can be configured.

Configuration using KPG-D3/ D3N

- Configuring **Minimum Valid Beacon Signal** in an NXDN Conventional system ( See Radio Configuration > System Properties > Systems > NXDN Conventional > Indoor Location > Common)
- Configuring **Minimum Valid Beacon Signal** in an NXDN Site Roaming system ( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Indoor Location > Common)
- Configuring **Minimum Valid Beacon Signal** in an NXDN Trunking system ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Indoor Location > Common)
- Configuring **Minimum Valid Beacon Signal** in a DMR Conventional system ( See Radio Configuration > System Properties > Systems > DMR Conventional > Indoor Location > Common)
- Configuring **Minimum Valid Beacon Signal** in a DMR Site Roaming system ( See Radio Configuration > System Properties > Systems > DMR Site Roaming > Indoor Location > Common)
- Configuring **Minimum Valid Beacon Signal** in a DMR-based Trunking system ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Indoor Location > Common)

11.3 BLE Scan

Supported Models: Portable

BLE Scan is the function for the transceiver to scan signals from beacon transmitters.

BLE Scan is the function to configure for the mobile station in Indoor Location.

BLE Scan is enabled in both an RF System and a Bluetooth System.

BLE Scan is enabled by using one of the following button operations on the transceiver:

- **BLE Scan** button

BLE Scan can be toggled between enabled and disabled by pressing the **BLE Scan** button.

- **Menu** button

Pressing the **Menu** button causes the transceiver to enter Menu Mode, and then BLE Scan can be toggled between enabled and disabled by selecting “On” or “Off” after “BLE Scan” is executed.

The operation to enable or disable BLE Scan mode can be executed even on a channel of a system which does not support Indoor Location.

Even if BLE Scan mode is enabled, BLE Scan does not function on a channel of a system which does not support Indoor Location. However, the Bluetooth connection icon appears.

With BLE Scan enabled, BLE Scan Time is activated.

With BLE Scan disabled, BLE Scan Time is stopped.

During the BLE Scan, if the beacon signal of a UUID registered in the Beacon List and with a receive strength level stronger than the **Minimum Valid Beacon Signal** configuration is received, the beacon data is stored in the internal memory of the transceiver. After the length of time configured in **BLE Scan Time** elapses, the transceiver searches from the beacon data stored in the internal memory for the beacon data received within the last 20 seconds with the strongest receive strength level.

If the **Send Location via** configuration of the beacon data that is the search target is “Bluetooth System”, the switch to the advertising behavior is made to send BLE data in a Bluetooth System. BLE Scan automatically stops when the switch to the advertising behavior is done. The advertising behavior is maintained for 1 second, and then the BLE Scan behavior resumes. The data to be advertised is the incorporation of the Major/ Minor value of the received beacon data and the RSSI value of when reception occurs.

If the **Send Location via** configuration of the beacon data that is the search target is “RF System”, the advertising behavior does not occur, and BLE Scan resumes.

If a beacon signal with the receive strength level stronger than the **Minimum Valid Beacon Signal** configuration cannot be received, BLE Scan resumes without the advertising behavior occurring.

The default for BLE Scan can be configured by using the **BLE Scan Preset** configuration of the FPU. However, because the enabled or disabled status of BLE Scan is backed up in the transceiver, the enabled or disabled status of BLE Scan for the next time that the power is turned on and later is retained in the transceiver.

- If **BLE Scan Preset** is enabled

The transceiver is turned ON with BLE Scan enabled.

- If **BLE Scan Preset** is disabled

The transceiver is turned ON with BLE Scan disabled.

Operating the transceiver

1 Press the **BLE Scan** button.

The BLE Scan function is enabled after a Button Beep A (1 beep) sounds from the transceiver and the “” icon appears.

The transceiver activates BLE Scan Time.

If BLE Scan is enabled with Bluetooth disabled, the BLE Scan function will be enabled after Bluetooth is enabled. The transceiver activates BLE Scan Time.

If a beacon signal with the Bluetooth System configured in the **Send Location via** configuration becomes a transmission target after the beacon signal is received during the BLE Scan, the advertising behavior occurs for 1 second when the BLE Scan Time elapses. The advertising stops when 1 second elapses, and the transceiver resumes BLE Scan.

The “” icon appears during the BLE Scan, and the “” icon appears during the BLE advertising.



Note

- The “” icon remains if the transceiver cannot be turned on normally.

2 Press the **BLE Scan** button.

The BLE Scan function is disabled after a Button Beep B (2 beeps) sounds from the transceiver, the “” icon disappears, and the “” icon appears.

If the BLE Scan function is disabled, BLE Scan Time and TX Interval are stopped.

The enabled or disabled Bluetooth returns to the state before BLE Scan is enabled.

If Bluetooth returns to the enabled state, reconnection to the BLE device is executed.



Note

- If the following operations are attempted during the BLE Scan behavior, a Button-entry Error Tone (1 beep) sounds from the transceiver, and the operations cannot be performed. Stop the BLE Scan when the following operations are executed:
 - When Bluetooth is executed from Menu Mode
 - When Bluetooth Find Device is executed from Menu Mode
 - When Bluetooth Discoverable is executed from Menu Mode
 - When Bluetooth My Device is executed from Menu Mode
 - When the **Bluetooth** button is pressed
 - When the **Bluetooth Connect/ Disconnect** button is pressed
- If the operation to enable BLE Scan is performed while the transceiver is connected to a Bluetooth device, the transceiver disconnects from the Bluetooth device and BLE Scan is enabled.
- If BLE Scan is enabled while in the following modes, a Button-entry Error Tone (1 beep) sounds from the transceiver, and BLE Scan cannot be performed:
 - Bluetooth Speaker Mode
 - Bluetooth Find Device Mode
 - Bluetooth Discoverable Mode
 - Bluetooth Information Mode
- Pressing the **BLE Scan** button maintains Function Mode, and the BLE Scan function functions.
- During BLE Scan, the transceiver cannot connect to a Bluetooth device (including a device in the Bluetooth Low Energy state).

Configuration using KPG-D3/ D3N

- Assigning the BLE Scan function to a **PF** button on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **BLE Scan Preset** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > GPS/Bluetooth > Bluetooth)

11.4 BLE Scan Time

Supported Models: Portable

BLE Scan Time is the function to configure the BLE Scan behavior time of while a Bluetooth System behaves.

BLE Scan Time is an item to configure for the mobile station in Indoor Location, and is the function of the Bluetooth System method. The length of time that BLE Scan functions is configured by using the FPU. The configuration range of **BLE Scan Time** is 100 ms to 10000 ms.

The transceiver performs the BLE scan for the length of time configured in **BLE Scan Time**. The beacon data stored in the internal memory is checked when the BLE Scan ends, and if the beacon data that satisfies the advertising transmission conditions exists, the transceiver migrates to the advertising behavior. If the advertising transmission conditions are not satisfied, the current BLE Scan is maintained.

The configuration of the FPU is not applied in Emergency Mode. In Emergency Mode, the BLE Scan behavior time is fixed at 1 sec. Also, the last beacon data sent is advertised even if the advertising transmission conditions are not satisfied.

Configuration using KPG-D3/ D3N

- Configuring **BLE Scan Time** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Indoor Location > Bluetooth System)
- Configuring **BLE Scan Time** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Indoor Location > Bluetooth System)
- Configuring **BLE Scan Time** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Indoor Location > Bluetooth System)
- Configuring **BLE Scan Time** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Indoor Location > Bluetooth System)
- Configuring **BLE Scan Time** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Indoor Location > Bluetooth System)
- Configuring **BLE Scan Time** in a DMR-based Trunking system ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Indoor Location > Bluetooth System)

11.5 TX Interval

Supported Models: Portable

During the Bluetooth System behavior, if the same beacon data as the last beacon data sent is continuously received and this same beacon data becomes a transmission candidate, the same beacon data is sent again after the TX Interval time elapses. By periodically sending beacon data, the location of the transceiver can be clarified. Also, by spacing the transmission times, the battery consumption from multiple data transmissions is saved, and an increase in the processing of the target Gateway can be reduced.

TX Interval is an item to configure for the mobile station in Indoor Location, and is the function of the Bluetooth System method.

The length of time that TX Interval functions is configured by using the FPU. The configuration range of **TX Interval** is 1 sec to 255 sec.

If the state occurs where the same beacon data continuously becomes a transmission candidate, the same beacon data is not sent until the elapse of the length of time configured in **TX Interval**.

If the time specified in **TX Interval** elapses at the timing of BLE Scan Time expiry, the same beacon data is sent again.

TX Interval is activated after an advertising (Adv) behavior and stops before the next advertising behavior.

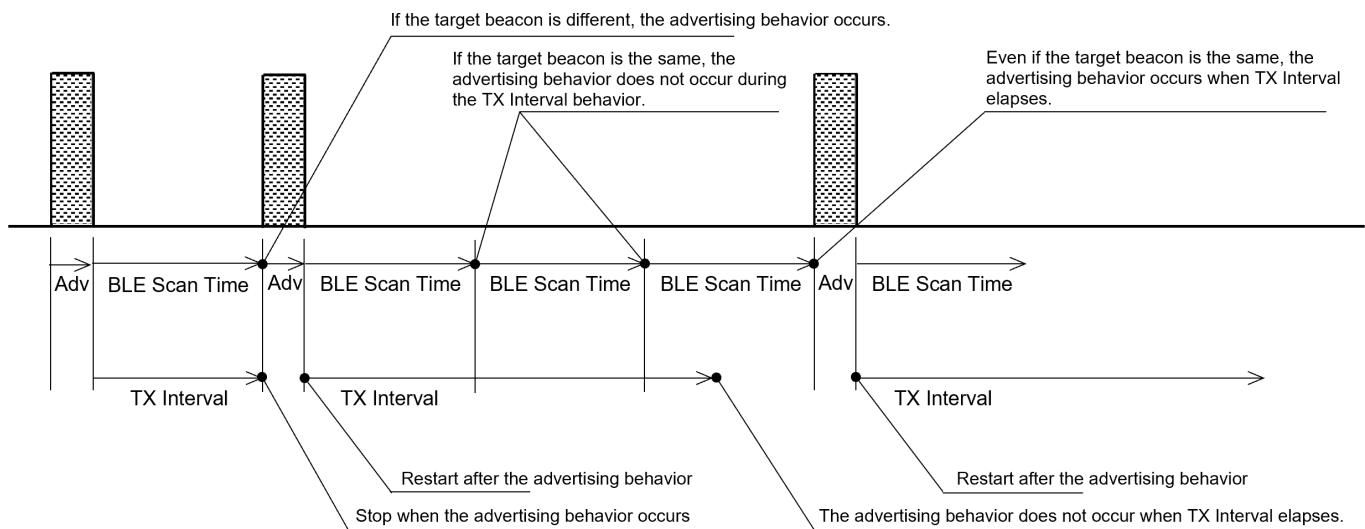


Figure 11-5 Relationship of TX Interval and BLE Scan Time (If the TX Interval Configuration Is Longer Than the BLE Scan Time Configuration)

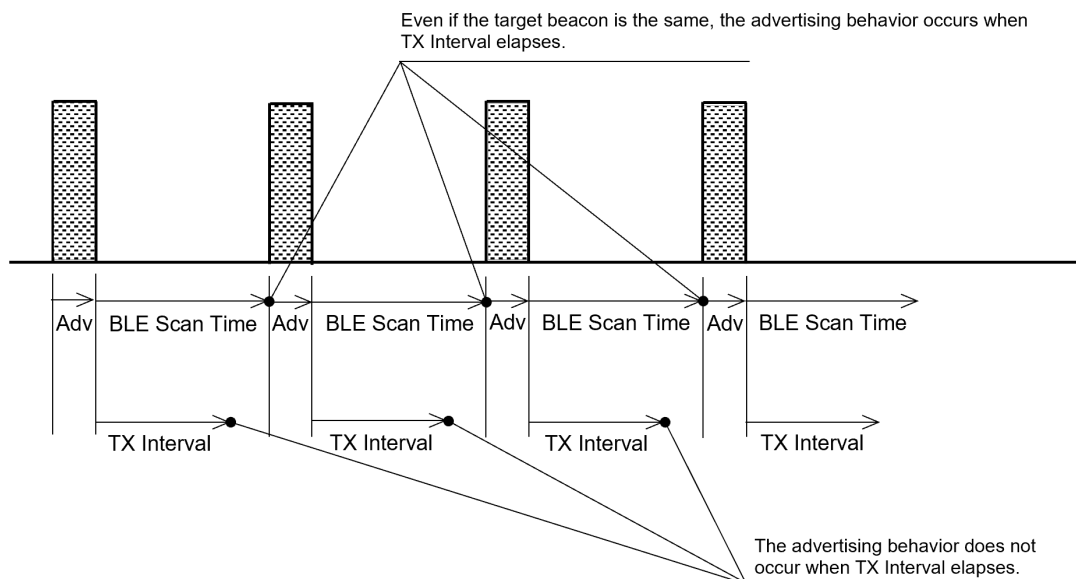


Figure 11-6 Relationship of TX Interval and BLE Scan Time (If the BLE Scan Time Configuration Is Longer Than the TX Interval Configuration)

Configuration using KPG-D3/ D3N

- Configuring **TX Interval** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Indoor Location > Bluetooth System)
- Configuring **TX Interval** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Indoor Location > Bluetooth System)
- Configuring **TX Interval** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Indoor Location > Bluetooth System)
- Configuring **TX Interval** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Indoor Location > Bluetooth System)
- Configuring **TX Interval** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Indoor Location > Bluetooth System)
- Configuring **TX Interval** in a DMR-based Trunking system ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Indoor Location > Bluetooth System)

11.6 TX Power

Supported Models: Portable

TX Power is the function to configure by using the FPU the Bluetooth transmission power of when beacon data is sent during the Bluetooth System behavior. **TX Power** is an item to configure for the mobile station in Indoor Location, and is the function of the Bluetooth System method.

TX Power configuration values: 1 dBm, 0 dBm, -1 dBm, -10 dBm, -16 dBm, -20 dBm, -24 dBm

Configuration using KPG-D3/ D3N

Configuring **TX Power** ( [See](#) Radio Configuration > Global Options > Indoor Location > Bluetooth System)

11.7 GPS Delay Time

Supported Models: Portable

GPS Delay Time is the function to configure the length of time from when the mobile station stops receiving beacon data until GPS data transmission is permitted.

If the Indoor Location function is used, the transceiver receives the signal from the beacon transmitter placed at each location indoors to perform indoor positioning. However, a GPS signal may be received depending on the location to which the transceiver is moved. In this case, the location server determines that the transceiver is outside when the transceiver sends GPS data to the base station. Also, before and after the transceiver is moved, if the transceiver receives the signal from the beacon transmitter and sends the beacon data to the base station, the location display of the transceiver frequently changes.

By using this function, the location display of the transceiver frequently changing because the transceiver sends GPS data while a beacon cannot be received can be avoided.

GPS Delay Time is an item to configure for the mobile station in Indoor Location, and is the function enabled in both the RF System method and the Bluetooth System method.

GPS Delay Time prevents the mobile station from sending GPS data until a configured length of time elapses. The range of GPS Delay Time configured by using the FPU is 20 sec to 255 sec. After receipt of the last beacon signal, GPS data transmission is permitted when the configured length of time elapses.

Configuration using KPG-D3/ D3N

- Configuring **GPS Delay Time** in an NXDN Conventional system ( See Radio Configuration > System Properties > Systems > NXDN Conventional > Indoor Location > Common)
- Configuring **GPS Delay Time** in an NXDN Site Roaming system ( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Indoor Location > Common)
- Configuring **GPS Delay Time** in an NXDN Trunking system ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Indoor Location > Common)
- Configuring **GPS Delay Time** in a DMR Conventional system ( See Radio Configuration > System Properties > Systems > DMR Conventional > Indoor Location > Common)
- Configuring **GPS Delay Time** in a DMR Site Roaming system ( See Radio Configuration > System Properties > Systems > DMR Site Roaming > Indoor Location > Common)
- Configuring **GPS Delay Time** in a DMR-based Trunking system ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Indoor Location > Common)

11.8 BLE Beacon Display

Supported Models: Portable (Full Key Model/ Standard Key Model)

BLE Beacon Display is the function to display on the LCD of the transceiver the beacon information received while the Indoor Location function functions. **BLE Beacon Display** is the function to configure for the mobile station in Indoor Location, and applies to the beacon data in the RF System method and the Bluetooth System method.

To use BLE Beacon Display, one of the button operations is performed on the transceiver.

- **BLE Beacon Display** button

Pressing the **BLE Beacon Display** button causes the transceiver to migrate to BLE Beacon Display Mode.

- **Menu** button

Pressing the **Menu** button places the transceiver in Menu Mode, and then the transceiver enters BLE Beacon Display Mode by executing "BLE Beacon Display".

Of the beacon data accumulated in the transceiver, the information of the beacon data that satisfies the following conditions is displayed:

- Data received within the last 20 seconds at the timing of the BLE Beacon Display update
- Data with the highest RSSI value

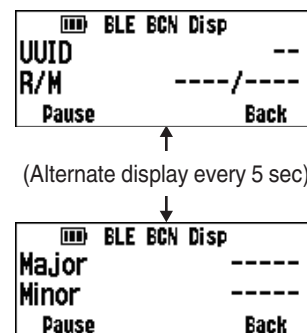
Even if BLE Scan is disabled, or even on a channel of a system which does not support Indoor Location, the transceiver can migrate to BLE Beacon Display Mode. However, the value of each item is not displayed because beacon data is not received.

Operating the transceiver

1 Press the **BLE Beacon Display** button.

The transceiver enters BLE Beacon Display Mode.

The following operations are the same even if BLE Beacon Display Mode is executed by pressing the **Menu** button.



2 Press the **Home** ([]) button.

The transceiver exits BLE Beacon Display Mode and restores the previous channel display.

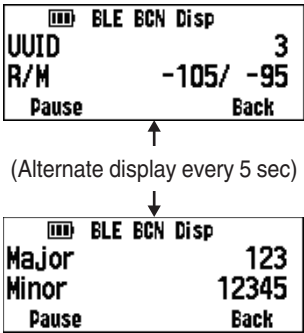
Transceiver behavior

Beacon information is displayed on the LCD display of the transceiver.

Table 11-3 Displayed Beacon Information

Display	Description
UUID	The list number of a UUID configured in Beacon List
R	The signal strength level (RSSI) value (dBm) of when the transceiver receives beacon data
M	The Measured Power value (dBm) in the beacon data
Major	The Major value in the beacon data
Minor	The Minor value in the beacon data

The following is an example of when the beacon information is displayed on the LCD of the transceiver:



Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Supported Models: Portable/ Mobile (NX-3720G/ NX-3720HG/ NX-3820G/ NX-3820HG/ NX-3920G/ NX-3921G)

Bluetooth can be used to wirelessly connect a Bluetooth-compatible device and the transceiver.

As the main method of use, wirelessly connecting by Bluetooth a Bluetooth-compatible headset and the transceiver can execute a voice call using the mic and speaker of the headset.

Also, if a Bluetooth-compatible Automatic Injury Detection Sensor is connected to the transceiver, Emergency can be activated when the transceiver receives a damage report.

Note

- The transceiver complies with Bluetooth standard Version 3.0 and Version 4.0.

The following are the supporting transceivers and functions for each Bluetooth version:

Table 12-1 Supporting Transceivers and Functions for Bluetooth Versions

Bluetooth Version	Supporting Transceiver	Function
Version 4.0	Portable (Standard Key Model/ Full Key Model)	Headset Profile, Serial Port Profile, Heart Rate Service, Automatic Injury Detection Service, Battery Service, Device Information Service
Version 3.0	Portable (Basic Model)	Headset Profile, Serial Port Profile
	Mobile	Headset Profile, Serial Port Profile

- To wirelessly connect by Bluetooth a Bluetooth-compatible headset and the transceiver, the Bluetooth-compatible headset needs to support HSP (Headset Profile). JVCKENWOOD Corporation has confirmed the behavior with some headsets, heart rate meters, and Automatic Injury Detection devices. Refer to the following URL for the specific devices: http://manual2.jvckenwood.com/com/help_ref/nx5000_series/compatible_model_list/CNMJSYnnzoitpv.html

Configuration using KPG-D3/ D3N

Configuring **Built-in Device Activation** to be enabled or disabled ( See Radio Configuration > Global Options > Basics > GPS/Bluetooth)

12.1 Toggling Bluetooth On/ Off

To use various Bluetooth functions, **Built-in Device Activation** needs to be enabled (On) by using KPG-D3/ D3N.

Also, Bluetooth can be toggled On and Off by operating the transceiver.

Pressing the **Bluetooth** button can toggle Bluetooth On and Off.

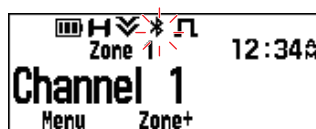
Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then Bluetooth can be toggled On and Off by selecting “On” or “Off”. (Refer to [Using Menu Mode.](#))

Operating the transceiver

● Enabling Bluetooth

Press the **Bluetooth** button when Bluetooth is disabled.

A Button Beep A (1 beep) sounds from the transceiver and the “” icon blinks.



The “” icon lights when Bluetooth is enabled.



● Disabling Bluetooth

Press the **Bluetooth** button when Bluetooth is enabled.

A Button Beep B (2 beeps) sounds from the transceiver and Bluetooth is disabled. The “” icon disappears.



Note

- If Bluetooth in **Preset Activation** is enabled, Bluetooth is enabled when the transceiver is turned ON. However, the Bluetooth enabled or disabled state is retained; therefore, the transceiver starts up in the same Bluetooth status as retained when the transceiver is turned ON next time.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Bluetooth** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > GPS/ Bluetooth > Preset Activation)

12.2

Finding a Bluetooth-compatible Device (Bluetooth Find Device)

Bluetooth Find Device is the function to find a Bluetooth-compatible device.

For wirelessly connecting by Bluetooth a Bluetooth-compatible device and the transceiver, the Bluetooth-compatible device is found by using this function.

The transceiver can find a Bluetooth-compatible device by entering Bluetooth Find Device Mode.

Pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the transceiver enters Bluetooth Find Device Mode by executing “Find Device” after executing “Bluetooth Device”. (Refer to [Using Menu Mode.](#))

Configuring the FPU

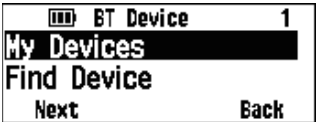
To search for a Bluetooth-compatible device which supports **Heart Rate Service** or **Automatic Injury Detection Service**, configure KPG-D3/ D3N as follows:

- **To search for a Bluetooth-compatible device which supports Heart Rate Service**
 - Enable Bluetooth Data (KWD-3002BT) in Radio Configuration > Radio Definition > Product Information > Product Information > Product Information > Features.
- **To search for a Bluetooth-compatible device which supports Automatic Injury Detection Service**
 - Enable Bluetooth Data (KWD-3002BT) in Radio Configuration > Radio Definition > Product Information > Product Information > Product Information > Features.
 - Enable Injury Detection in Radio Configuration > Global Options > Emergency > General > Bluetooth.

Operating the transceiver

- 1
- Press the **Menu** button to enter Menu Mode and then execute “Bluetooth Device”.

Pressing the [▲] or [▼] button to select “Bluetooth Device” and then pressing the **Menu** ([□]) or [*] button causes the transceiver to enter Bluetooth Device Mode. (Refer to [Using Menu Mode.](#))



2 Press the [▲] or [▼] button to select “Find Device”, and then press the Menu ([☐]) or [*] button.

A Button Beep A (1 beep) sounds from the transceiver, and then the transceiver enters Bluetooth Find Device Mode. The transceiver automatically initiates the search for a Bluetooth-compatible device. A Bluetooth Find Device Mode Tone (2 beeps) continuously sounds from the transceiver during the search.



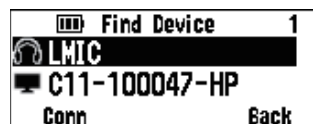
Note

- If Bluetooth is disabled when “Bluetooth Device” is executed, Bluetooth is automatically enabled.
- The Bluetooth-compatible device first needs to be in pairing mode.

3 Find a Bluetooth-compatible Device.

A found Bluetooth-compatible device appears on the display.

With the Bluetooth-compatible device found earliest listed as list number 1, a maximum of 16 devices are displayed. When about 30 sec or about 40 sec elapse after the search is started, or when 16 devices are found, the search ends. Even if the search ends, the transceiver continues in Bluetooth Find Device Mode.



Note

- The Bluetooth Find Device Mode Tone stops and the search ends if about 30 sec or about 40 sec elapse without the transceiver finding a Bluetooth-compatible device. In this case, “BT Not Found” appears on the display.
- When “Finding” or a detected Bluetooth-compatible device appears on the display, pressing the **Back** ([↵]) button stops the Bluetooth Find Device Mode Tone and ends the search. A Button Beep A (1 beep) sounds from the transceiver and the transceiver returns to Bluetooth Device Mode.
- A found Bluetooth-compatible device is registered in the transceiver and the transceiver can connect wirelessly. (Refer to [Finding, Registering and Connecting a Bluetooth-compatible Device \(Bluetooth Find Device\)](#).)
- A detected Bluetooth-compatible device is displayed in the format of the Bluetooth device name, Bluetooth device address, or device class. Pressing the [▲] or [▼] button can switch the display. (Refer to [About the Displayed Contents of a Bluetooth-compatible Device](#).)
- If the Bluetooth device name of a found Bluetooth-compatible device cannot be acquired, the Bluetooth device name is displayed as “- - -”.
- **Mode Reset Timer** is extended during a search. **Mode Reset Timer** is initiated when the search ends.
- If the transceiver receives an individual call while in Bluetooth Find Device Mode, Bluetooth Find Device Mode ends.
- If the Bluetooth-compatible device to be connected wirelessly is not found, move the Bluetooth-compatible device closer to the transceiver and search again.

About the Displayed Contents of a Bluetooth-compatible Device

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile (NX-3720G/ NX-3720HG/ NX-3820G/ NX-3820HG/ NX-3920G/ NX-3921G)

A detected Bluetooth-compatible device is displayed in the format of the Bluetooth device name, Bluetooth device address, or device class. Pressing the [▲] or [▼] button can switch the display.

Bluetooth device name:

The name of the Bluetooth-compatible device. The name of the Bluetooth-compatible device appears as a maximum 14-character ASCII code on the display of the transceiver. Therefore, if the name of a found Bluetooth-compatible device is 15 characters or more, the first 14 characters are displayed. If non-ASCII code characters are used, these characters are blank.

Bluetooth device address:

The unique address of the Bluetooth-compatible device. The Bluetooth device address appears as 12 hexadecimal digits on the display of the transceiver.

Device class:

The type of the Bluetooth-compatible device. The device class is displayed by the following icons: If the device cannot be classified even in the following table, the device class is “Other Device”. The device class of the transceiver is “Phone”.

Table 12-2 Device Class

Device Class	Icons	
	Disconnected	Connected
Computer		
Phone		
Audio/Video		
LAN/Network		
Peripheral		
Imaging		
Wearable		
Toy		
Health		

Note

- The device class of the transceiver is “Phone”.
- If the device class is “Other Device”, the icon is “” or “”.
- The device class icon of the Bluetooth-compatible device registered by using the **Bluetooth Connect / Disconnect** button becomes “” or “”.

Configuring the Bluetooth Device Name of the Transceiver (Bluetooth Device Name)

Bluetooth Device Name is the Bluetooth device name of the transceiver to be notified to a Bluetooth-compatible device. A maximum of 14 characters of Bluetooth device name can be configured. By configuring the Bluetooth device name of the transceiver, the configured Bluetooth device name can be notified to the Bluetooth-compatible device. The Bluetooth-compatible device can display the notified Bluetooth device name.

The type of Bluetooth device name can be configured in **Type**.

Table 12-3 Type

Configuration	Description
Text	An arbitrary text string can be configured as a Bluetooth device name. If the text is left blank, the combination of Model Name and Market Code of the Kenwood ESN is configured as the Bluetooth device name.
Unit ID	Using “%” in the text string can configure the Unit ID of the system configured in Preset System as a Bluetooth device name. If the text is left blank, the combination of Model Name and Market Code of the Kenwood ESN is configured as the Bluetooth device name.  Note • If the number of configured “%” is less than the number of digits for the Unit ID (Own), the Unit ID is displayed from the lowest digits. • If the number of configured “%” is more than the number of digits configured for the Unit ID (Own), the extra “%” is replaced with a space. This method is also applied if Unit ID is not configured. • The following is the case if Fleet Dialing Plan is enabled in a DMR Tier III Trunking system or S-Trunking system for the system configured in Preset System Number: • A Unit ID replaced from “%” is displayed in the format of a total of 8 digits (3-digit of Number Prefix (NP) + a 2-digit of Fleet Individual Number (FIN) + a 3-digit of Individual Number (IN)).
Unit ID Name	The Unit ID Name (Own) string of the system configured in Preset System can be configured as a Bluetooth device name. If the Unit ID Name (Own) of the system configured in Preset System is not configured, a combination of Model Name and Market Code of the Kenwood ESN is configured as the Bluetooth device name.
ESN	Serial Number of Kenwood ESN can be configured as a Bluetooth device name.
FleetSync ID	Using “%” in a text string can configure the Fleet (Own) and ID (Own) of the system configured in Preset System as the Bluetooth device name.  Note • If the number of configured “%” is less than 7, the IDs are displayed from the lowest digits. • If both Fleet (Own) and ID (Own) are not configured, “%” is replaced with a space.

 Note

- While the transceiver is in Unprogramming Mode, the Bluetooth device name becomes the combination of Model Name and Market Code of the Kenwood ESN. If the combination of characters for Model Name and Market Code is 15 or more, the number of characters of Model Name are removed from the end to display the name within 14 characters. For example, if the configuration is such as the following, the Bluetooth device name becomes “1234567890ABCD”.

Model Name: “123456789012”

Market Code: “ABCD”

Configuration using KPG-D3/ D3N

Configuring **Bluetooth Device Name** ( **See** Radio Configuration > Global Options > Basics > GPS/Bluetooth > Bluetooth > Bluetooth Device Name)

Checking the Bluetooth Device Name (Bluetooth Information)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile (NX-3720G/ NX-3720HG/ NX-3820G/ NX-3820HG/ NX-3920G/ NX-3921G)

In **Bluetooth Information**, the own Bluetooth device name configured for the transceiver can be confirmed on the display. Pressing the **Menu** button to enter Menu Mode and executing “Bluetooth Information” sounds a Button Beep A (1 beep) from the transceiver and places the transceiver in Bluetooth Information Mode. If **Bluetooth** is disabled, **Bluetooth** becomes enabled automatically.



In Bluetooth Information Mode, the Bluetooth device name, the Bluetooth device address, and the device class configured in the transceiver are displayed.

Pressing the [▲] button can change the display in the following order:

Bluetooth device name → device class → Bluetooth device address → Bluetooth device name → ...

Pressing the [▼] button can change the display in the following order:

Bluetooth device name → Bluetooth device address → device class → Bluetooth device name → ...

Responding to the Search of a Bluetooth-compatible Device (Bluetooth Discoverable)

Bluetooth Discoverable is the function to respond to the search of a Bluetooth-compatible device.

A Bluetooth-compatible device searches to understand a Bluetooth device name and a Bluetooth device address of the transceiver before requesting a pairing to the transceiver. Whether or not the transceiver responds to the search of a Bluetooth-compatible device can be configured using KPG-D3/ D3N beforehand.

If **Bluetooth Discoverable** is enabled, the transceiver responds to the search of a Bluetooth-compatible device.

If **Bluetooth Discoverable** is disabled, the transceiver responds to the search of a Bluetooth-compatible device temporarily in Menu Mode.

Pressing the **Menu** button to enter Menu Mode and executing “Bluetooth Discoverable” sounds a Button Beep A (1 beep) from the transceiver and places the transceiver in Bluetooth Discoverable Mode.



The available time to respond is displayed and counting down of the time is started while the transceiver is in Bluetooth Discoverable Mode.

After responding to the search of a Bluetooth-compatible device, the transceiver notifies the Bluetooth-compatible device of the Bluetooth device name and the Bluetooth device address.

When a Bluetooth-compatible device requests a pairing to the transceiver, the transceiver will be in the state of confirming whether or not to pair with the Bluetooth-compatible device. Refer to “[Registering and Connecting a Bluetooth-compatible Device to the Transceiver \(Pairing/ HSP Connection\)](#)” for the pairing operation.

Note

- Bluetooth Discoverable Mode ends upon lapse of 60 sec after the transceiver enters the mode. Or, pressing the **Home** button sounds a Button Beep A (1 beep) from the transceiver and ends the mode.
- If the transceiver enters Bluetooth Discoverable Mode when Bluetooth is disabled, Bluetooth becomes enabled automatically.
- **Mode Reset Timer** is extended while the transceiver is in Bluetooth Discoverable Mode.

Configuration using KPG-D3/ D3N

Configuring **Bluetooth Discoverable** to be enabled or disabled ( Radio Configuration > Global Options > Basics > GPS/Bluetooth > Bluetooth)

12.3 Registering and Connecting a Bluetooth-compatible Device to the Transceiver (Pairing/ HSP Connection)

Pairing is the function to register the device configuration of a Bluetooth-compatible device to the transceiver. For registering a device configuration of a Bluetooth-compatible device which supports the Headset Profile and Serial Port Profile, authentication is required, such as entering a PIN Code. If a Bluetooth-compatible device is registered in the transceiver, HSP Connection starts, and the transceiver and Bluetooth-compatible device are connected wirelessly. (Refer to [About Headset Profile \(HSP Connection/ HSP Disconnection\)](#).)

Once pairing succeeded, additional pairing is not required.

Pairing can be started for a Bluetooth-compatible device from the transceiver by one of the following methods:

● Bluetooth Find Device Mode

In Bluetooth Find Device Mode, the transceiver can select a Bluetooth-compatible device and start pairing. (Refer to [Finding, Registering and Connecting a Bluetooth-compatible Device \(Bluetooth Find Device\)](#).)

● Bluetooth Connect / Disconnect Button

Pressing the **Bluetooth Connect / Disconnect** button causes the transceiver to behave as follows. (Refer to [Registering and Connecting Using PF Buttons \(Define Bluetooth Device\)](#).)

Table 12-4 Bluetooth Connect / Disconnect

Connection Status	Define Bluetooth Device Registration Status	Operation
Disconnected	Unregistered	Pairing is started for a Bluetooth-compatible device having an address configured in Define Bluetooth Device .
Disconnected	Already Registered	By HSP Connection, connection starts for a Bluetooth-compatible device having an address configured in Define Bluetooth Device .
Connected	Not Depend on the Registration Status	The connection to the connected Bluetooth-compatible device is reset.

Also, the transceiver can start pairing by receiving a pairing request from a Bluetooth-compatible device. (Refer to [Receive a pairing request from a Bluetooth-compatible device](#).)

Note

- If pairing for a Bluetooth-compatible device is started from the transceiver, the transceiver confirms whether the Bluetooth-compatible device supports Headset Profile, Heart Rate Service, or Automatic Injury Detection Service. If the Bluetooth-compatible device does not support Headset Profile, Heart Rate Service, or Automatic Injury Detection Service, pairing ends.
- A maximum of 10 Bluetooth-compatible devices can be registered in the transceiver. If pairing is executed while 10 devices are already registered, the registration of the Bluetooth-compatible device registered earliest is reset, and the new Bluetooth-compatible device is registered.
- Pairing continues even if a Voice Call or Data Call is received during pairing.
- **Mode Reset Timer** is extended during pairing.

About Authentication

If pairing a Bluetooth-compatible device which supports Headset Profile or Serial Port Profile to the transceiver, the transceiver executes authentication. The authentication of pairing differs as follows depending on whether the Bluetooth-compatible device supports Secure Simple Pairing:

● If Secure Simple Pairing is not supported

If authenticating a Bluetooth-compatible device found in Bluetooth Find Device Mode, the same PIN Code needs to be entered on both the transceiver and the Bluetooth-compatible device. A PIN Code is a number of 1 digit to 6 digits (from 0 to 999999).

If authenticating a Bluetooth-compatible device having an address configured in **Define Bluetooth Device** by pressing the **Bluetooth Connect / Disconnect** button, the Fixed PIN preconfigured by using KPG-D3/ D3N is used.

● If Secure Simple Pairing is supported

The behavior when authenticating differs as follows depending on whether an input function and display function are available for the Bluetooth-compatible device:

Table 12-5 Behavior when Secure Simple Pairing is Supported

Input Functions	Display Functions	Operation
Disabled	Disabled	Authenticating a Bluetooth-compatible device is not required.
Enabled	Disabled	Pairing cannot occur because the transceiver cannot authenticate this Bluetooth-compatible device. In this case, pairing ends.
Enabled	Enabled	Whether the Passkey displayed on the transceiver and the Passkey displayed on the Bluetooth-compatible device are the same needs to be confirmed. A Passkey is a 6-digit number.

Note

- For Portable (Basic Model), when a pairing request is received from a Bluetooth-compatible device (mainly a PC), pairing is rejected if the Bluetooth standard of the Bluetooth-compatible device is 2.0 or lower (Secure Simple Pairing not supported).

Finding, Registering and Connecting a Bluetooth-compatible Device (Bluetooth Find Device)

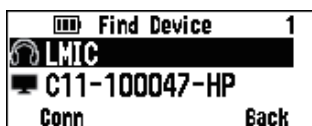
In Bluetooth Find Device Mode, the transceiver searches for a Bluetooth-compatible device, and the transceiver can start pairing for the found Bluetooth-compatible device.

Operating the transceiver

1 Search for a Bluetooth-compatible device in Bluetooth Find Device Mode.

Refer to “[Finding a Bluetooth-compatible Device \(Bluetooth Find Device\)](#)” for operation methods.

- 2** Press the [**▲**] or [**▼**] button to select the Bluetooth-compatible device, and then press the **Menu** ([**□**]) or [*****] button.



A Button Beep A (1 beep) sounds from the transceiver and pairing starts. An LED flashes blue during pairing.



If the Bluetooth-compatible device supports Heart Rate Service or Automatic Injury Detection Service, the connection process starts by Bluetooth Low Energy. Proceed to step 5.

If the selected Bluetooth-compatible device is already registered in the transceiver, the connection process starts by HSP Connection without pairing occurring. Proceed to step 5.

If the selected Bluetooth-compatible device is not registered in the transceiver, the transceiver checks whether the Bluetooth-compatible device supports Secure Simple Pairing. The operation procedure differs as follows according to the check results. (Refer to [About Authentication](#).)

- **If Secure Simple Pairing is not supported**

The following screen appears. Proceed to step 3.



- **If Secure Simple Pairing is supported**

The behavior differs as follows depending on whether an input function and display function are available for the Bluetooth-compatible device:

- **No input function/ no display function**

Pairing continues. The display does not change. Proceed to step 5.

- **Input function available/ no display function**

Pairing cannot occur because the transceiver cannot authenticate this Bluetooth-compatible device. In this case, pairing ends.

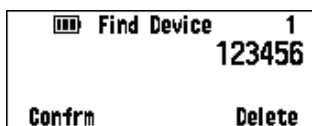
- **Input function available/ display function available**

The following screen appears. Proceed to step 4.



3 Enter the PIN Code.

Refer to “[Entering or Deleting a Code](#)” for entry methods.



Press the **Menu** ([) or [*****] button.

A Button Beep A (1 beep) sounds from the transceiver and the transceiver checks whether the PIN Codes match. Proceed to step 5.



4

Check whether the Passkey displayed on the transceiver and the Passkey displayed on the Bluetooth-compatible device are the same.



If the Passkeys match

Press the **Menu** ([) or [*****] button.

A Button Beep A (1 beep) sounds from the transceiver and pairing continues. Proceed to step 5.



If the Passkeys do not match

Pairing cannot occur with this Bluetooth-compatible device. Pressing the **Home** ([) button ends pairing.



- If the Passkeys do not match, pairing ends even if the **Menu** ([) or [*****] button is pressed.

5

Complete pairing.

When pairing completes, the Bluetooth-compatible device is registered in the transceiver, and the connection process starts by HSP Connection or Bluetooth Low Energy.

● If Heart Rate Service or Automatic Injury Detection Service is not supported

The connection process by HSP Connection starts.

If a connected Bluetooth-compatible device exists, the connection process starts after the connection is reset.

A Ring Tone sounds from the Bluetooth-compatible device during the connection process. In this case, start-up operations need to be done on the Bluetooth-compatible device. Refer to the instruction manual supplied with the Bluetooth-compatible device for details on the start-up operations.



The mic and speaker of the Bluetooth-compatible device can be used when the connection process completes. At this time, the "" icon appears and "Connected" appears for 1 sec. Also, the LED turns Off.



Note

- The connection process continues even if a Voice Call or Data Call is received during the connection process.
- **Mode Reset Timer** is extended during the connection process.
- If the transceiver emits audio according to the configuration in **Bluetooth Speaker** and **Off-hook Speaker Revert**, a Bluetooth Connect Tone (2 beeps) is emitted. The Bluetooth Connect Tone (2 beeps) is not emitted if audio is emitted from the Bluetooth-compatible device or from both the transceiver and Bluetooth-compatible device.

● **If Heart Rate Service or Automatic Injury Detection Service is supported**

The connection process by Bluetooth Low Energy starts.

If the transceiver is already connected to a Bluetooth-compatible device which supports Heart Rate Service (1 device), the connection is automatically disconnected, and the connection of the selected Bluetooth-compatible device and Heart Rate Service starts.

If the transceiver is already connected to Bluetooth-compatible devices which support Automatic Injury Detection Service (2 devices), the connection to the Bluetooth-compatible device connected first is automatically disconnected, and the connection of the selected Bluetooth-compatible device and Automatic Injury Detection Service starts.



When the connection process completes, a Bluetooth Connect Tone (2 beeps) sounds, the "📶" icon blinks, and "Connected" appears for 1 sec. Also, the LED turns Off.

**Note**

- To terminate the connection process, press the **Home** ([🏠]) button. A Button Beep A (1 beep) sounds, and "Canceling" appears on the display. When the process to end a connection completes, "Canceled" appears for 1 sec, and the blue LED turns off.
- While a connection process is being canceled, nothing appears in the button guide of the **Menu** ([📁]) button. When a connection process is canceled, "Conn" appears in the button guide of the **Menu** ([📁]) button.

Registering and Connecting Using PF Buttons (Define Bluetooth Device)

Pairing can be started for a Bluetooth-compatible device having an address configured in **Define Bluetooth Device**.

Operating the transceiver

- 1** Press the **Bluetooth Connect / Disconnect** button when a connected Bluetooth-compatible device does not exist.

A Button Beep A (1 beep) sounds from the transceiver and pairing starts. An LED flashes blue during pairing.



If the Bluetooth-compatible device having an address configured in **Define Bluetooth Device** is already registered in the transceiver, the connection process starts by HSP Connection without pairing occurring. Proceed to step 3.

If the Bluetooth-compatible device having an address configured in **Define Bluetooth Device** is not registered in the transceiver, the transceiver checks whether the Bluetooth-compatible device supports Secure Simple Pairing. The operation procedure differs as follows according to the check results. (Refer to [About Authentication](#).)

- **If Secure Simple Pairing is not supported**

The transceiver checks whether the Fixed PIN matches. If the **Fixed PIN** matches, pairing continues. Proceed to step 3.

If the **Fixed PIN** does not match, pairing cannot occur because the transceiver cannot authenticate this Bluetooth-compatible device. In this case, pairing ends.

- **If Secure Simple Pairing is supported**

The behavior differs as follows depending on whether an input function and display function are available for the Bluetooth-compatible device having an address configured in **Define Bluetooth Device**:

- **No input function/ no display function**

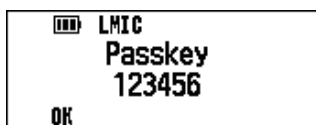
Pairing continues. The display does not change. Proceed to step 3.

- **Input function available/ no display function**

Pairing cannot occur because the transceiver cannot authenticate this Bluetooth-compatible device. In this case, pairing ends.

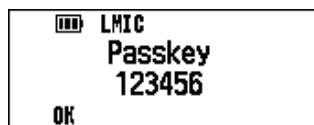
- **Input function available/ display function available**

The following screen appears. Proceed to step 2.



- Pressing the **Bluetooth Connect / Disconnect** button while Bluetooth is turned Off causes Bluetooth to automatically turn On, and then pairing starts.
- If the Bluetooth device address of the transceiver is configured in **Define Bluetooth Device**, pressing the **Bluetooth Connect / Disconnect** button sounds a Button-entry Error Tone (1 beep) and the transceiver does not respond at all.

2 Check whether the Passkey displayed on the transceiver and the Passkey displayed on the Bluetooth-compatible device are the same.



If the Passkeys match

Press the **Menu** ([) or [*****] button.

A Button Beep A (1 beep) sounds from the transceiver and pairing continues. Proceed to step 3.



If the Passkeys do not match

Pairing cannot occur with this Bluetooth-compatible device. Pressing the **Home** ([) button ends pairing.

Note

- If the Passkeys do not match, pairing ends even if the **Menu** ([) or [*****] button is pressed.

3 Complete pairing.

When pairing completes, the Bluetooth-compatible device is registered in the transceiver, and the connection process starts by HSP Connection.

A Ring Tone sounds from the Bluetooth-compatible device during the connection process. In this case, start-up operations need to be done on the Bluetooth-compatible device. Refer to the instruction manual supplied with the Bluetooth-compatible device for details on the start-up operations.



The mic and speaker of the Bluetooth-compatible device can be used when the connection process completes. In this case, a Bluetooth Connect Tone (2 beeps) sounds from the transceiver, the "" icon blinks, and "Connected" appears for 1 sec. Also, the LED turns Off.



Note

- The connection process continues even if a Voice Call or Data Call is received during the connection process.
- **Mode Reset Timer** is extended during the connection process.

Configuration using KPG-D3/ D3N

- Configuring **Define Bluetooth Device** ( See Radio Configuration > Global Options > Basics > GPS/Bluetooth > Bluetooth > Define Bluetooth Device)
- Configuring **Fixed PIN** ( See Radio Configuration > Global Options > Basics > GPS/Bluetooth > Bluetooth > Define Bluetooth Device)

Receive a pairing request from a Bluetooth-compatible device

When the transceiver receives a pairing request from a Bluetooth-compatible device, the Bluetooth device name or Bluetooth device address appears on the transceiver and whether to connect can be selected.

If a pairing request from a Bluetooth-compatible device is received, the connection can be made by using either Headset Profile or Serial Port Profile.

Operating the transceiver

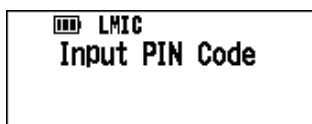
- If a pairing request from a Bluetooth-compatible device not supporting Secure Simple Pairing is received

1 Receive a pairing request from a Bluetooth-compatible device.

If the Bluetooth-compatible device is already registered in the transceiver, the connection process starts by HSP Connection or SPP Connection without pairing occurring. Proceed to step 3.

If the Bluetooth-compatible device is not registered in the transceiver, the PIN Code entry screen appears and the LED flashes blue.

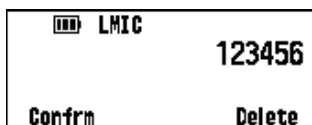
If permitting pairing, enter the PIN Code. Proceed to step 2.



If rejecting pairing, press the **Home** ([🏠]) button to end pairing. Also, pairing ends if 30 sec elapse without confirming the entered PIN Code.

2 Enter the PIN Code.

Refer to “[Entering or Deleting a Code](#)” for entry methods.



Press the **Menu** ([☰]) or [*****] button.

A Button Beep A (1 beep) sounds from the transceiver and the transceiver checks whether the PIN Codes match.

If the PIN Code matches, the following is displayed:



3 Complete pairing.

When pairing completes, the Bluetooth-compatible device is registered in the transceiver, and the connection process starts by HSP Connection or SPP Connection. However, if a connected Bluetooth-compatible device exists, the connection process by HSP Connection or SPP Connection does not start.



If a Bluetooth-compatible device is registered in the transceiver, "Connecting" does not appear.

For the Headset Profile connection, the microphone and speaker of the Bluetooth-compatible device can be used when the connection process completes. For the Serial Port Profile connection, the communication to KPG-D3/ D3N and using the PC Interface Protocol become available. In this case, a Bluetooth Connect Tone (2 beeps) sounds from the transceiver, the "📶" icon blinks, and "Connected" appears for 1 sec. Also, the LED turns Off.



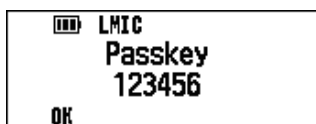
- If a pairing request from a Bluetooth-compatible device supporting Secure Simple Pairing and having an input function and display function is received

1 Receive a pairing request from a Bluetooth-compatible device.

If the Bluetooth-compatible device is already registered in the transceiver, the connection process starts by HSP Connection or SPP Connection without pairing occurring. Proceed to step 3.

If the Bluetooth-compatible device is not registered in the transceiver, the Passkey confirmation screen appears and the LED flashes blue.

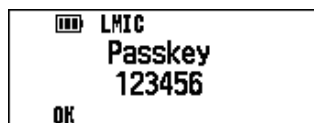
If permitting pairing, whether the Passkey displayed on the transceiver and the Passkey displayed on the Bluetooth-compatible device are the same needs to be confirmed. Proceed to step 2.



If rejecting pairing, press the **Home** ([🏠]) button to end pairing. Also, pairing ends if 30 sec elapse with the Passkey displayed.

2

Check whether the Passkey displayed on the transceiver and the Passkey displayed on the Bluetooth-compatible device are the same.



If the Passkeys match

Press the **Menu** ([) or [*****] button.

A Button Beep A (1 beep) sounds from the transceiver and pairing continues. Proceed to step 3.



If the Passkeys do not match

Pairing cannot occur with this Bluetooth-compatible device. Pressing the **Home** ([) button ends pairing.



- If the Passkeys do not match, pairing ends even if the **Menu** ([) or [*****] button is pressed.

3

Complete pairing.

When pairing completes, the Bluetooth-compatible device is registered in the transceiver, and the connection process starts by HSP Connection or SPP Connection. However, if a connected Bluetooth-compatible device exists, the connection process by HSP Connection or SPP Connection does not start.



If a Bluetooth-compatible device is registered in the transceiver, "Connecting" does not appear.

For the Headset Profile connection, the microphone and speaker of the Bluetooth-compatible device can be used when the connection process completes. For the Serial Port Profile connection, the communication to KPG-D3/ D3N and using the PC Interface Protocol become available. In this case, a Bluetooth Connect Tone (2 beeps) sounds from the transceiver, the "" icon blinks, and "Connected" appears for 1 sec. Also, the LED turns Off.



Note

- The connection process continues even if a Voice Call or Data Call is received during the connection process.
- **Mode Reset Timer** is extended during the connection process.
- If a pairing request is received from a Bluetooth-compatible device when **Button Lock** is enabled, **Button Lock** is temporarily disabled with the “” icon displayed. **Button Lock** is restored to the enabled state by one of the following operations:
 - Confirming the PIN Code
 - Completing Passkey confirmation
 - Aborting the current mode

Behavior of the Transceiver When Pairing Cannot Occur

If pairing cannot occur, the transceiver behaves as follows:

Table 12-6 Behavior of the Transceiver When Pairing Cannot Occur

Status	Transceiver Behavior
When nothing can be received from the Bluetooth-compatible device	Pairing ends in one of the following conditions. In this case, a Bluetooth No Response Tone (1 beep) sounds from the transceiver, the LED turns Off, and “No Response” appears on the display for 1 sec. • The transceiver starts pairing for the Bluetooth-compatible device, and the Bluetooth-compatible device does not respond even if about 10 sec elapse. • The transceiver moves outside the Bluetooth operation range while pairing.
When the Bluetooth-compatible device rejects pairing	If the transceiver starts pairing for the Bluetooth-compatible device and pairing is rejected, pairing ends. In this case, a Bluetooth Connect Denied Tone (2 beeps) sounds from the transceiver, the blue LED turns Off, and “Connect Denied” appears on the display for 1 sec.
When the Bluetooth-compatible device does not support Headset Profile	If pairing for a Bluetooth-compatible device is started from the transceiver, the transceiver checks whether the Bluetooth-compatible device supports the Headset Profile. If the Bluetooth-compatible device does not support the Headset Profile, pairing ends. In this case, a Bluetooth No Service Tone (3 beeps) sounds from the transceiver, the LED turns Off, and “BT No Service” appears on the display for 1 sec.
When the PIN Code is incorrect	If the PIN Code entered on the transceiver differs, or if the Fixed PIN and the PIN Code entered on the Bluetooth-compatible device differ, pairing ends. In this case, a Bluetooth Connect Invalid Tone (3 beeps) sounds from the transceiver, the LED turns Off, and “BT PIN Invalid” appears on the display for 1 sec.
When nothing operates	Pairing ends in one of the following conditions when the transceiver starts pairing for the Bluetooth-compatible device. In this case, a Bluetooth Connect Denied Tone (2 beeps) sounds from the transceiver, the LED turns Off, and “Connect Denied” appears on the display for 1 sec. • 30 sec elapse without pressing the Menu () or [*] button after “Passkey” appears on the display. • 30 sec elapse without confirming the PIN Code after the PIN Code entry screen appears. • 30 sec elapse without the Bluetooth-compatible device completing confirmation of the Passkey. • 30 sec elapse without the Bluetooth-compatible device confirming of the PIN Code.
If Passkey Entry	If pairing occurs with a Bluetooth-compatible device which supports Secure Simple Pairing, which does not have a display function, and which has an input function, pairing ends. In this case, a Bluetooth No Service Tone (3 beeps) sounds from the transceiver, the LED turns Off, and “BT No Service” appears on the display for 1 sec.

12.4

Displaying a Bluetooth-compatible Device (Bluetooth My Devices)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile (NX-3720G/ NX-3720HG/ NX-3820G/ NX-3820HG/ NX-3920G/ NX-3921G)

Bluetooth My Devices is the function to display a Bluetooth-compatible device registered in the transceiver. If the transceiver enters Bluetooth My Devices Mode, a Bluetooth-compatible device registered in the transceiver appears on the display.

The following operations are enabled in Bluetooth My Devices Mode:

- The connection to the selected Bluetooth-compatible device can be made by using Headset Profile, Heart Rate Service, or Automatic Injury Detection Service.
- The connection to the Bluetooth-compatible device connected by Headset Profile, Heart Rate Service, or Automatic Injury Detection Service is reset.
- The registration of a Bluetooth-compatible device can be reset if the connection has not been made by using Headset Profile, Serial Port Profile, Heart Rate Service, or Automatic Injury Detection Service.

For Bluetooth version 4.0 or later, the following items of a registered Bluetooth-compatible device can be confirmed in Bluetooth My Devices Mode:

- If a device supports Heart Rate Service, the heart rate [bpm] notified from the Bluetooth-compatible device can be confirmed.
- If a device supports Automatic Injury Detection Service, whether the Bluetooth-compatible device has been damaged can be confirmed.
- The remaining battery power can be confirmed.
- The manufacturer name, Model Number, hardware version, and firmware version, etc. can be confirmed.

Pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the transceiver enters Bluetooth My Devices Mode by executing “Bluetooth My Devices” after executing “Bluetooth Device”. (Refer to [Using Menu Mode.](#))

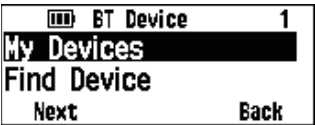
Operating the transceiver

● Placing the transceiver in Bluetooth My Devices Mode

1

Press the **Menu** button to enter Menu Mode and then execute “Bluetooth Device”.

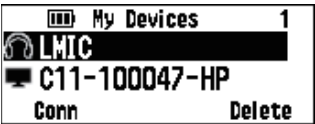
Pressing the **[▲]** or **[▼]** button to select “Bluetooth Device” and then pressing the **Menu** (**[□]**) or **[*]** button causes the transceiver to enter Bluetooth Device Mode. (Refer to [Using Menu Mode.](#))



2

Press the **[▲]** or **[▼]** button to select “My Devices”, and then press the **Menu** (**[□]**) or **[*]** button.

A Button Beep A (1 beep) sounds from the transceiver, and then the transceiver enters Bluetooth My Devices Mode.



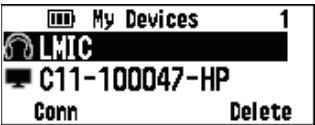
If a Bluetooth-compatible device registered in the transceiver does not exist, a Button-entry Error Tone (1 beep) sounds from the transceiver and “BT No Device” appears on the display.



Note

- A Bluetooth-compatible device registered in the transceiver is displayed in the format of the Bluetooth device name, Bluetooth device address, or device class. Pressing the [▲] or [▼] button can switch the display. (Refer to [About the Displayed Contents of a Bluetooth-compatible Device](#).)
 - If the Bluetooth device name of a Bluetooth-compatible device registered in the transceiver cannot be acquired, the Bluetooth device name is displayed as “- - -”.
 - If the transceiver receives an individual call while in Bluetooth My Devices Mode, Bluetooth My Devices Mode ends.
- **Connecting to a Bluetooth-compatible device, or resetting the connection**

1 In Bluetooth My Devices Mode, press [▲] or [▼] button to select a Bluetooth-compatible device.



2 Press the Menu ([□]) or [*] button.

If a disconnected Bluetooth-compatible device is selected

A Button Beep A (1 beep) sounds from the transceiver, and then the screen to confirm whether to connect appears.



If a connected Bluetooth-compatible device is selected

A Button Beep A (1 beep) sounds from the transceiver, and then the screen to confirm whether to reset the connection appears.



3 Press the Menu ([□]) or [*] button.

If a disconnected Bluetooth-compatible device is selected

The connection process by HSP Connection starts. The LED flashes blue and “Connecting” appears on the display.



If a connected Bluetooth-compatible device is selected

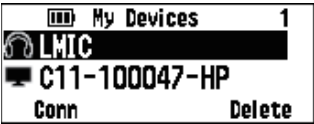
The connection to the Bluetooth-compatible device is reset. In this case, a Bluetooth Disconnect Tone (2 beeps) sounds from the transceiver, the “⌘” icon blinks, and “Disconnected” appears on the display for 1 sec.



● Deregistration of 1 Bluetooth-compatible device

1

In Bluetooth My Devices Mode, press [▲] or [▼] button to select a disconnected Bluetooth-compatible device.



2

Press the Back ([↩]) or [#] button.

A Button Beep A (1 beep) sounds from the transceiver, and then the screen to confirm whether to deregister a Bluetooth-compatible device appears.



3

Press the Menu ([□]) or [*] button.

A Button Beep B (2 beeps) sounds from the transceiver and the selected Bluetooth-compatible device is deregistered, and then the list display is restored.



● Deregistering all Bluetooth-compatible devices

1

In Bluetooth My Devices Mode, press and hold the Back ([↩]) or [#] button.

A Button Beep A (1 beep) sounds from the transceiver, and then the screen to confirm whether to deregister a Bluetooth-compatible device appears.



Pressing and holding the button causes the screen to confirm whether to deregister all Bluetooth-compatible devices to appear.



- If all Bluetooth-compatible devices cannot be deregistered, the list display is restored.

2

Press the Menu ([□]) or [*] button.

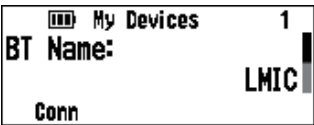
A Button Beep B (2 beeps) sounds from the transceiver and all Bluetooth-compatible devices are deregistered, and then “BT No Device” appears on the display.



● Migrating to the Device Information screen of the transceiver

1 Select a Bluetooth-compatible device in Bluetooth My Devices Mode and press the [▶] button.

A Button Beep A (1 beep) sounds from the transceiver, and then the Device Information screen for the selected Bluetooth-compatible device appears.



2 Press the [▲] or [▼] button.

A Button Beep A (1 beep) or Rollover Tone sounds from the transceiver, and the display switches in the following order:

When the [▲] button is pressed:

Bluetooth device name → software version^{*3} → firmware version^{*3} → hardware version^{*3} → Serial Number^{*3} → Model Number^{*3} → manufacturer name^{*3} → remaining Battery power^{*3} → Injury Detection Status^{*2} → Heart Rate^{*1} → device class → Bluetooth device address → Bluetooth device name → ...

When the [▼] button is pressed:

Bluetooth device name → Bluetooth device address → device class → Heart Rate^{*1} → Injury Detection Status^{*2} → remaining Battery power^{*3} → manufacturer name^{*3} → Model Number^{*3} → Serial Number^{*3} → hardware version^{*3} → firmware version^{*3} → software version^{*3} → Bluetooth device name → ...

^{*1} Appears if the selected Bluetooth-compatible device supports Heart Rate Service.
^{*2} Appears if the selected Bluetooth-compatible device supports Automatic Injury Detection Service.
^{*3} Appears if the selected Bluetooth-compatible device supports Heart Rate Service or Automatic Injury Detection Service.



- The display of the Device Information screen is available with Bluetooth version 4.0 or later.

12.5 About Headset Profile (HSP Connection/ HSP Disconnection)

HSP Connection is the function to connect a registered Bluetooth-compatible device to the transceiver by Headset Profile. If connected by Headset Profile, a voice call can be made using the mic and speaker of the Bluetooth-compatible device. For connecting by Headset Profile, a Bluetooth-compatible device needs to support Headset Profile.

Also, **HSP Disconnection** is the function to reset a connection by Headset Profile.

Connecting by Headset Profile

A Bluetooth-compatible device that supports Headset Profile can be selected and the connection process can be initiated by one of the following methods:

● Bluetooth Find Device Mode

Entering Bluetooth Find Device Mode, the transceiver selects a Bluetooth-compatible device and starts pairing. If pairing is successful, the connection process is automatically initiated.

In this case, if a connected Bluetooth-compatible device exists, connection to the found Bluetooth-compatible device is initiated after connection to the connected Bluetooth-compatible device is automatically reset. (Refer to [Finding, Registering and Connecting a Bluetooth-compatible Device \(Bluetooth Find Device\)](#).)

● Bluetooth My Devices Mode

Entering Bluetooth My Devices Mode, the transceiver selects a Bluetooth-compatible device registered in the transceiver and initiates the connection process. In this case, if a connected Bluetooth-compatible device exists, connection to the selected Bluetooth-compatible device is initiated after connection to the connected Bluetooth-compatible device is automatically reset. (Refer to [Displaying a Bluetooth-compatible Device \(Bluetooth My Devices\)](#).)

● Bluetooth Connect / Disconnect Button

When **Define Bluetooth Device** is registered in the transceiver with no connected Bluetooth-compatible devices, pressing the **Bluetooth Connect / Disconnect** button starts connection to **Define Bluetooth Device**.

(Refer to [Registering and Connecting Using PF Buttons \(Define Bluetooth Device\)](#).)

The following is the behavior of the transceiver when the connection process of the transceiver and Bluetooth-compatible device completes:

- If the **PTT** switch of the transceiver (including the microphone of Mobile) is pressed, or if the External PTT (Voice) port or one of the External PTT (Direct Channel 1 Voice) port to External PTT (Direct Channel 5 Voice) port (Mobile only) is configured low level, the Mic Line of the Bluetooth-compatible device is enabled.
- The PTT command using the Serial Port Profile functions regardless of whether Bluetooth Data is enabled or disabled.
- If the **PTT** switch of the Bluetooth-compatible device is pressed, the behavior is the same as the behavior of when With QT/DQT and With STE are allowed.
- The configuration in **External Microphone Sense** applies to the microphone sensitivity of the Bluetooth-compatible device.
- The speaker to emit audio is switched according to the configuration in **Bluetooth Speaker**. (Refer to [Switching the Speaker to Emit Audio \(Bluetooth Speaker\)](#).)
- Based on the volume level 31 of the transceiver, the volume level of the received audio of a Bluetooth-compatible device is adjusted by the volume operation of the Bluetooth-compatible device. Even if the volume level is operated by the transceiver, the volume level of the received audio of the Bluetooth-compatible device does not change.

- The configuration in **Level Customization** applies to the volume level of a tone emitted from a Bluetooth-compatible device as follows. (Refer to [Configuring the Volume Level of Various Tones \(Level Customization\)](#).)

Table 12-7 Level Customization

Level Customization	Description
Linked	The tone volume is linked to the reception volume level adjusted in a Bluetooth-compatible device.
1 to 31	The tone sounds from a Bluetooth-compatible device with a fixed tone volume. Higher values result in greater volume.
Off	The tone does not sound from a Bluetooth-compatible device.
Selectable	The tone volume switches in conjunction with the Fixed Volume button. (Refer to Changing the Tone Volume Level with a Single Touch .)

The sound quality function behaves as follows. (Refer to [Configuring Audio Profile \(Audio Profile\)](#).)

Table 12-8 Sound Quality Function

Type	Function	Configuration
RX Digital Audio Response	Audio Gain Control	Yes
	Audio Equalizer (High)	Yes
	Audio Equalizer (High Midrange)	Yes
	Audio Equalizer (Midrange)	Yes
	Audio Equalizer (Low Midrange)	Yes
	Audio Equalizer (Low)	Yes
	Speaker Type	Yes ^{*1}
TX Digital Audio Response	Audio Gain Control	Yes
	Audio Equalizer (High)	Yes
	Audio Equalizer (High Midrange)	Yes
	Audio Equalizer (Midrange)	Yes
	Audio Equalizer (Low Midrange)	Yes
	Audio Equalizer (Low)	Yes
	Microphone Type	Yes ^{*1}
Active Noise Reduction	ANR Preset Mode	Yes
	Vocoder	Yes
	DSP	Yes
	Noise Attenuation Level	Yes
	Low Noise Level Adjustment	Yes
	Optimization based on Microphone Position	No ^{*2}
	Siren	Yes
	Vibration (Alert Device)	Yes
	Battery Save for Noise Reduction	Yes ^{*3}

^{*1} Behaves as the configuration of "None".

^{*2} Behaves as the configuration of "Off".

^{*3} For Portable, behaves as the configuration of "On", and for Mobile, behaves as the configuration of "Off".

Yes: Indicates that the configuration is enabled when connected to a Bluetooth-compatible device and that the sound quality function behaves as configured.

No: Indicates that the configuration is disabled when connected to a Bluetooth-compatible device.

When a Pairing Cannot Occur with the Bluetooth-compatible Device or the Bluetooth-compatible Device Does Not Behave (Bluetooth Headset Connection Type)

An appropriate Headset Profile connection sequence exists for each of the Bluetooth-compatible devices (headsets) to be connected with the transceiver by using Headset Profile. For the transceiver, an appropriate Headset Profile connection sequence needs to be configured in **Bluetooth Headset Connection Type** according to the Bluetooth-compatible device to be used.

By using KPG-D3/ D3N, **Bluetooth Headset Connection Type** can be configured.

Operation confirmed Bluetooth-compatible devices are as follows:

Table 12-9 Bluetooth Headset Connection Type

Configuration	Description
Headset 1	The Bluetooth-compatible devices of the following URL can be used normally: http://manual2.jvckenwood.com/com/help_ref/nx5000_series/compatible_model_list/CNMJSYnnzoitpv.html
Headset 2	

Also, the Headset Profile connection sequence can be changed by selecting “Headset 1” or “Headset 2” after placing the transceiver in Menu Mode by pressing the **Menu** button and executing “Bluetooth Headset Connection Type”.
(Refer to [Using Menu Mode.](#))

Note

- Bluetooth-compatible devices with different connection sequences may not be connected even if either “Headset 1” or “Headset 2” is configured in **Bluetooth Headset Connection Type**.

Configuration using KPG-D3/ D3N

Configuring **Bluetooth Headset Connection Type** ( **See** Radio Configuration > Global Options > Basics > GPS/Bluetooth > Bluetooth)

Resetting the Connection by Headset Profile

Connection by Headset Profile can be reset by one of the following methods:

- Pressing the **Bluetooth Connect / Disconnect** button when a connected Bluetooth-compatible device exists
- Place the transceiver in Bluetooth My Devices Mode, select the connected Bluetooth-compatible device, and then press the **Menu** (□) or **[*]** button (Refer to [Displaying a Bluetooth-compatible Device \(Bluetooth My Devices\)](#).)
- Disabling Bluetooth (Refer to [Toggling Bluetooth On/ Off.](#))
- Moving outside the Bluetooth operation range
- Receiving a disconnection request from a connected Bluetooth-compatible device
- Turning the transceiver OFF

If connection by Headset Profile is reset by any of these methods, a Bluetooth Disconnect Tone (2 beeps) sounds from the transceiver, the “” icon blinks, and “Disconnected” appears on the display for 1 sec.



Behavior of the Transceiver When Connecting to a Bluetooth-compatible Device Fails (Headset Profile)

If connection to a Bluetooth-compatible device fails by Headset Profile, the transceiver behaves as follows:

Table 12-10 Behavior of the Transceiver When Connecting to a Bluetooth-compatible Device Fails

Status	Transceiver Behavior
When the Bluetooth-compatible device does not support Headset Profile	If connection to a Bluetooth-compatible device is started using Bluetooth My Devices Mode or the Bluetooth Connect / Disconnect button, the transceiver checks whether the Bluetooth-compatible device supports Headset Profile. If the Bluetooth-compatible device does not support Headset Profile, the connection process ends. In this case, a Bluetooth No Service Tone (3 beeps) sounds from the transceiver, the LED turns Off, and “BT No Service” appears on the display for 1 sec.
When nothing can be received from the Bluetooth-compatible device	The connection process ends in one of the following conditions. In this case, a Bluetooth No Response Tone (1 beep) sounds from the transceiver, the LED turns Off, and “No Response” appears on the display for 1 sec. • The transceiver starts connection to the Bluetooth-compatible device, and the Bluetooth-compatible device does not respond even if about 10 sec elapse. • The transceiver moves outside the Bluetooth operation range during the connection process.
When the Bluetooth-compatible device rejects the connection request.	The connection process ends in one of the following conditions. In this case, a Bluetooth Connect Denied Tone (2 beeps) sounds from the transceiver, the LED turns Off, and “Connect Denied” appears on the display for 1 sec. • The connection request is rejected by the Bluetooth-compatible device. • 120 sec elapse without the Bluetooth-compatible device operating to start connection after a Ring Tone sounds from the Bluetooth-compatible device.

12.6 About Serial Port Profile (SPP Connection/ SPP Disconnection)

SPP Connection is the function to connect a registered Bluetooth-compatible device with the transceiver by Serial Port Profile.

Connecting by Serial Port Profile enables the communication to KPG-D3/ D3N without using a programming cable and the use of the PC Interface Protocol. Serial Port Profile is an effective function when operating a small-scale system. Also, **SPP Disconnection** is the function to reset a connection by Serial Port Profile.

Note

- When the transceiver is configured as a Bluetooth-compatible device on the PC in which KPG-D3/ D3N is used, the Serial Port Profile function (Bluetooth SPP) of KPG-D3/ D3N cannot be used. Use the Serial Port Profile function after removing the corresponding transceiver from the configuration of Bluetooth-compatible device on the PC.
- To use Serial Port Profile in KPG-D3/ D3N, a Bluetooth-compatible device using Windows standard drivers is required.
- For Bluetooth version 4.0, the device supporting Bluetooth Low Energy and the device supporting Serial Port Profile cannot be connected to the transceiver at the same time. Only the one connected to the transceiver first can be used.

Connecting by Serial Port Profile

After the pairing completes, the connection process by Serial Port Profile starts when the transceiver receives a connection request from a Bluetooth-compatible device. (Refer to [Receive a pairing request from a Bluetooth-compatible device.](#))



After the connection process between the transceiver and the Bluetooth-compatible Device completes, the communication to KPG-D3/ D3N and the use of the PC Interface Protocol are available.



The transceiver migrates to each mode when the communication to KPG-D3/ D3N starts. If the PC Interface Protocol is used, the behavior of each PC command is executed.

Note

- Whether or not to use Serial Port Profile can be configured using KPG-D3/ D3N. (Refer to [Connecting the Transceiver to a PC by Bluetooth.](#))
- The connection by Serial Port Profile cannot be requested from the transceiver to the Bluetooth-compatible device.
- If the Bluetooth-compatible device connected by Serial Port Profile exists, the transceiver does not respond even if the transceiver receives a connection request by Serial Port Profile.
- Serial Port Profile functions also in Unprogramming Mode. The following are behaviors of Bluetooth in Unprogramming Mode:
 - If the writing of FPU data by using SPP Connection fails, the transceiver enters Unprogramming Mode when the transceiver is turned ON next time. In this case, Bluetooth is enabled.
 - If a connection request by Headset Profile is received, the connection is established once; however, the connection is immediately disconnected. The transceiver also rejects a pairing request automatically even if the request is received.
 - **Bluetooth Device Name** becomes the combination of Model Name and Market Code of the Kenwood ESN.

Configuration using KPG-D3/ D3N

- Configuring **Bluetooth Data (KWD-3002BT)** to be enabled or disabled ( [See](#) Radio Configuration > Radio Definition > Product Information > Product Information > Features)
- Configuring **Bluetooth SPP** ( [See](#) Preferences > COM port > Bluetooth SPP)
- Configuring **Communication Method Preset** ( [See](#) Preferences > COM port)

Resetting the Connection by Serial Port Profile

Connection by Serial Port Profile can be reset by one of the following methods:

- Terminating the communication with KPG-D3/ D3N (A disconnection request is sent from KPG-D3/ D3N to the connected Bluetooth-compatible device when writing or reading of configuration data ends.)
- Disabling Bluetooth (Refer to [Toggling Bluetooth On/ Off.](#))
- Moving outside the Bluetooth operation range
- Receiving a disconnection request from a connected Bluetooth-compatible device

Note

- When the transceiver is turned OFF during the connection, a disconnection request is not sent from the transceiver to the Bluetooth-compatible device. Therefore, the Bluetooth-compatible device behaves the same as when the transceiver moves out of range of Bluetooth.

Behavior of the Transceiver When Connecting to a Bluetooth-compatible Device Fails (Serial Port Profile)

The connection process ends in one of the following conditions.

- The transceiver starts connection to the Bluetooth-compatible device, and the Bluetooth-compatible device does not respond even if about 10 sec elapse.
- The transceiver moves outside the Bluetooth operation range during the connection process.

In this case, if “Connecting” appears on the display, a Bluetooth No Response Tone (1 beep) sounds from the transceiver, the LED turns Off, and “No Response” appears on the display for 1 sec. If “Connecting” does not appear on the display, the display does not change, and no tone sounds.

12.7 Switching the Speaker to Emit Audio (Bluetooth Speaker)

Bluetooth Speaker is the function to switch the speaker to emit audio between the speaker of the Bluetooth-compatible device connected to the transceiver by Headset Profile and the internal speaker of the transceiver.

Pressing the **Bluetooth Speaker** button can switch among Off, Only, Both (Bluetooth+Radio) (Mobile only) of **Bluetooth Speaker**.

Or, pressing the **Menu** button to enter Menu Mode, and selecting “Off”, “Only” or “Both (Bluetooth+Radio)” (Mobile only) after executing “Bluetooth Speaker” can switch the speaker to emit audio.

(Refer to [Using Menu Mode](#).)

Table 12-11 Bluetooth Speaker

Configuration	Description
Off	Audio is emitted from the internal speaker of the transceiver.
Only	Audio is emitted from the speaker of a Bluetooth-compatible device.
Both (Bluetooth+Radio) (Mobile only)	Audio is emitted from both the speaker of a Bluetooth-compatible device and the internal speaker of the transceiver.

Note

- **Bluetooth Speaker** behaves as the configuration “Only” by default. If “Bluetooth Speaker” is not assigned to a **PF** button, and if “Bluetooth Speaker” is not configured in Menu Mode, the configuration of **Bluetooth Speaker** cannot be changed.
- The configuration status of **Bluetooth Speaker** is retained even if the transceiver is turned OFF.
- When a Bluetooth-compatible device connected by Headset Profile does not exist, pressing the **Bluetooth Speaker** button sounds a Button-entry Error Tone (1 beep) from the transceiver and the transceiver does not respond at all.
- The relationship between the **External Speaker** function and **Bluetooth Speaker** is as follows:

Table 12-12 Relationship Between the External Speaker Function and Bluetooth Speaker

Connection Status		Configuration Status		Audio Output Pattern		
External Speaker	Bluetooth-compatible Device	External Speaker	Bluetooth Speaker	Internal Speaker	External Speaker	Bluetooth-compatible Device
Disconnected	Disconnected	-	-	Output	-	-
Connected	Disconnected	Off	-	Output	No output	-
		On	-	No output	Output	-
		Internal + External (Mobile only)	-	Output	Output	-
Disconnected	Connected	-	Off	Output	-	No output
		-	Only	No output	-	Output
		-	Both (Bluetooth+Radio) (Mobile only)	Output	-	Output
Connected	Connected	Off	Off	Output	No output	No output
		On	Off	No output	Output	No output
		Internal + External (Mobile only)	Off	Output	Output	No output
		On	Only	No output	No output	Output
		Off	Only	No output	No output	Output

Connection Status		Configuration Status		Audio Output Pattern		
External Speaker	Bluetooth-compatible Device	External Speaker	Bluetooth Speaker	Internal Speaker	External Speaker	Bluetooth-compatible Device
Connected	Connected	Internal + External (Mobile only)	Only	No output	No output	Output
		Off	Both (Bluetooth+Radio) (Mobile only)	Output	No output	Output
		On	Both (Bluetooth+Radio) (Mobile only)	No output	Output	Output
		Internal + External (Mobile only)	Both (Bluetooth+Radio) (Mobile only)	Output	Output	Output

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Determining the Speaker to Emit by Linking with the Microphone Hook (Off-hook Speaker Revert)

Supported Models: Mobile

Off-hook Speaker Revert is the function to determine whether to use the speaker of the transceiver or the speaker of the Bluetooth-compatible device connected by Headset Profile, by linking with a microphone on- or off-hook state.

If **Off-hook Speaker Revert** is enabled, the speaker to emit is determined by the configuration of **Bluetooth Speaker** regardless of the microphone on-hook or off-hook state.

If **Off-hook Speaker Revert** is disabled, the speaker to emit is determined as follows by the microphone hook state and the configuration of Bluetooth Speaker.

Table 12-13 Off-hook Speaker Revert

The Microphone Hook Status	Bluetooth Speaker	Speaker to Emit Audio
Off	Off	Transceiver
	Only	Transceiver
	Both (Bluetooth+Radio)	Transceiver + Bluetooth-compatible device
On	Off	Transceiver
	Only	Bluetooth-compatible device
	Both (Bluetooth+Radio)	Transceiver + Bluetooth-compatible device

Note

- This function can be used only when a Bluetooth-compatible device connected by Headset Profile exists.
- If **Off-hook Speaker Revert** is disabled, changing the microphone on- or off-hook state while the audio data is being played back in Playback Mode pauses the playing.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Speaker Revert** to be enabled or disabled ( See Radio Configuration > Global Options > Basics > GPS/Bluetooth > Bluetooth)

12.8 Resetting the GPS/ Bluetooth Device (GPS/Bluetooth Reset)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile (NX-3720G/ NX-3720HG/ NX-3820G/ NX-3820HG/ NX-3920G/ NX-3921G)

GPS/Bluetooth Reset is the function to execute the hardware reset of the GPS/Bluetooth device.

By using this function, the GPS/Bluetooth device can be restored to the normal state without turning OFF the transceiver.

If the device does not function normally when the Bluetooth function is used, "BT Failure" appears on the display for 1 sec and the transceiver enters the state where the Bluetooth function cannot be used.



If GPS/Bluetooth Reset is executed in such case, the normal status of the GPS/Bluetooth device is restored and the Bluetooth function can be used.

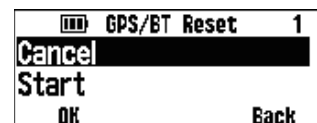
Pressing the **Menu** button to enter Menu Mode, and then executing "GPS/Bluetooth Reset" places the transceiver in GPS/Bluetooth Reset Mode. (Refer to [Using Menu Mode.](#))

Operating the transceiver

● Placing the transceiver in GPS/Bluetooth Reset Mode

1 Press the **Menu** button to enter Menu Mode and then execute "GPS/Bluetooth Reset".

A Button Beep A (1 beep) sounds from the transceiver, and then the transceiver enters GPS/Bluetooth Reset Mode. (Refer to [Using Menu Mode.](#))



2 Press the **[▲]** or **[▼]** button to select "Start", and then press the **Menu** (**[□]**) or **[*]** button.

A Button Beep A (1 beep) sounds from the transceiver and the hardware reset of the GPS/Bluetooth device is executed. When the hardware reset completes, the standby display is restored.

The screen above is an example of the display when executing the hardware reset of the GPS/Bluetooth device during connection of a Bluetooth-compatible device by Headset Profile or while GPS positioning.



Note

- If the hardware reset of the GPS/Bluetooth device is executed while GPS positioning, the GPS positioning is disabled.
- If the hardware reset of the GPS/Bluetooth device is executed while connecting to a Bluetooth-compatible device by Headset Profile, the connection is reset.

12.9 About Bluetooth Low Energy (Heart Rate Service/ Automatic Injury Detection Service/ Battery Service/ Device Information Service)

Heart Rate Service, Automatic Injury Detection Service, Battery Service, and Device Information Service in **Bluetooth Low Energy** can be used when the transceiver is connected to a Bluetooth-compatible device.

Bluetooth Low Energy is supported by the compatible device with Bluetooth version 4.0 or later in all systems.

Note

- **Bluetooth Low Energy** includes the Heart Rate Notice function, Heart Rate Status function, and Injury Detection function.
- For Bluetooth version 4.0, the device supporting **Bluetooth Low Energy** and the headset supporting Headset Profile cannot be connected to the transceiver together. Only the one connected to the transceiver first can be used.

● Heart Rate Service

The function notifies the transceiver of the heart rate [bpm] from a Bluetooth-compatible device (heart rate meter, etc.) which supports Heart Rate Service. The transceiver can send the heart rate as a Status and activate Emergency according to the notified heart rate [bpm]. Also, when the transceiver receives the Status request message from the Base ID, the transceiver can send back the heart rate or send the heart rate together with GPS data. (Refer to [Notifying the Heart Rate from a Bluetooth-compatible Device to the Transceiver \(Heart Rate Service\)](#).)

● Automatic Injury Detection Service

The function notifies the transceiver of the damage from the Bluetooth-compatible device if a Bluetooth-compatible device which supports Automatic Injury Detection Service has been damaged. Up to 2 Bluetooth-compatible devices can simultaneously be connected to the transceiver for Automatic Injury Detection Service. (Refer to [Notifying of Damage on a Bluetooth-compatible Device to the Transceiver \(Automatic Injury Detection Service\)](#).)

● Battery Service

If the transceiver is connected to a Bluetooth-compatible device which supports Heart Rate Service or Automatic Injury Detection Service, the transceiver can display the remaining battery power [%] of the Bluetooth-compatible device on the display. (Refer to [Confirming the Remaining Battery Power of a Bluetooth-compatible Device \(Battery Service\)](#).)

● Device Information Service

If the transceiver is connected to a Bluetooth-compatible device which supports Heart Rate Service or Automatic Injury Detection Service, the transceiver can display the manufacturer name, Model Number, etc. of the Bluetooth-compatible device on the display. (Refer to [Confirming the Manufacturer Name, Model Number, Etc. of a Bluetooth-compatible Device \(Device Information Service\)](#).)

Configuring the FPU

To use **Heart Rate Service** or **Automatic Injury Detection Service**, configure as follows in KPG-D3/ D3N:

- 1 Enable **Built-in Device Activation** in **GPS/Bluetooth of Radio Configuration > Global Options > Basics**.

Figure 12-1 Heart Rate Notice Configuration 1

- 2 Enable **Bluetooth Discoverable** in **GPS/Bluetooth > Bluetooth**, and then configure **Heart Rate Notice**.

Figure 12-2 Heart Rate Notice Configuration 2

- **Upper Threshold [bpm]**

Configures the heart rate value which activates **Delay Time**. If the transceiver receives a heart rate which is larger than the value configured in **Upper Threshold**, the transceiver activates **Delay Time**.

Range: Off, 25 bpm to 200 bpm (in steps of 1)

Default: Off

- **Lower Threshold [bpm]**

Configures the heart rate value which activates **Delay Time**. If the transceiver receives a heart rate which is smaller than the value configured in **Lower Threshold**, the transceiver activates **Delay Time**.

Range: Off, 25 bpm to 200 bpm (in steps of 1)

Default: Off

- **Method**

Configures the behavior for the transceiver to transmit to the Base ID after **Delay Time** elapses.

Range: Status, Emergency

Default: Status

- **Delay Time [s]**

Configures the duration until the transceiver transmits to the Base ID when the heart rate goes higher than **Upper Threshold** or goes lower than **Lower Threshold**.

Range: 0 sec to 70 sec (in steps of 1)

Default: 10 sec

 Note

- A number and "O" can be entered in **Upper Threshold** and **Lower Threshold**. If the entry is "0", "O" or blank, the configuration is disabled.
- If "Off" is configured in **Upper Threshold** and **Lower Threshold**, the **Delay Time** configuration is disabled.
- The **Heart Rate Notice** configuration is disabled in the following cases:
 - If **Bluetooth Data** in **Product Information** is disabled
 - If **Built-in Device Activation** is disabled
- The **Heart Rate Notice** configuration is disabled if all of the following conditions are satisfied:
 - If NXDN is disabled, or NXDN Conventional and NXDN Trunking are disabled
 - If DMR is disabled, or DMR Conventional and DMR-based Trunking are disabled
- If the Bluetooth version of the transceiver is 3.0, the **Heart Rate Notice** configuration is not displayed.

3 Configure **Bluetooth** in NXDN and DMR.

If connecting to a Bluetooth-compatible device on an NXDN Channel:

Configure **Bluetooth** in Status of Radio Configuration > Protocol Options > NXDN.

If connecting to a Bluetooth-compatible device on a DMR Channel:

Configure **Bluetooth** in Status of Radio Configuration > Protocol Options > DMR.

Figure 12-3 Bluetooth Configuration

- **Heart Rate Status**

Whether the heart rate received by a Bluetooth-compatible device is sent to a Base ID as a Status (status number) is configured.

Range: Check, Uncheck

Default: Uncheck

- **Reserved Statuses**

The Status range specified as the heart rate is configured.

Range: 25 to 200 (in steps of 1) [Start ≤ End]

Default: Start = 25, End = 200

- **Status Hold**

Whether only a Status selected in Status Mode is retained or the sent Status is also retained can be configured.

Range: Selected, Selected + Transmit

Default: Selected

Note

- If the Bluetooth version of the transceiver is 3.0, the **Bluetooth** configuration is not displayed.
- The **Bluetooth** configuration is disabled in the following cases:
 - If **Bluetooth Data** in **Product Information** is disabled
 - If **Built-in Device Activation** of step 1 is disabled
- A value on the right must be larger than a value on the left in **Reserved Statuses**.
- If **Heart Rate Status** is enabled, the **Status Hold** configuration is disabled.

Connecting by Bluetooth Low Energy

A Bluetooth-compatible device which supports Bluetooth Low Energy can be selected from the transceiver and the connection process can be initiated by one of the following methods:

● Bluetooth Find Device Mode

Entering Bluetooth Find Device Mode, the transceiver selects a Bluetooth-compatible device and starts the connection process.

In this case, if a connected Bluetooth-compatible device exists, connection to the found Bluetooth-compatible device is initiated after connection to the connected Bluetooth-compatible device is automatically reset. (Refer to [Finding, Registering and Connecting a Bluetooth-compatible Device \(Bluetooth Find Device\)](#).)

● Bluetooth My Devices Mode

Entering Bluetooth My Devices Mode, the transceiver selects a Bluetooth-compatible device registered in the transceiver and initiates the connection process.

In this case, if a connected Bluetooth-compatible device exists, connection to the selected Bluetooth-compatible device is initiated after connection to the connected Bluetooth-compatible device is automatically reset. (Refer to [Displaying a Bluetooth-compatible Device \(Bluetooth My Devices\)](#).)

Note

- If the Bluetooth Low Energy connection process is done with the transceiver and a Bluetooth-compatible device not connected, GPS positioning is temporarily interrupted because the IC for Built-in GPS Receiver/Bluetooth is restarted.
- Refer to “[Notifying the Heart Rate from a Bluetooth-compatible Device to the Transceiver \(Heart Rate Service\)](#)”, “[Notifying of Damage on a Bluetooth-compatible Device to the Transceiver \(Automatic Injury Detection Service\)](#)” for the connection process as needed.

Reconnecting by Bluetooth Low Energy

If Bluetooth is turned on, or if the connection is reset when the transceiver moves outside the **Bluetooth Low Energy** operation range, the transceiver tries to reconnect to a Bluetooth-compatible device for **Heart Rate Service** (one unit) or Bluetooth-compatible devices for **Automatic Injury Detection** (two units) around the transceiver.

When connecting to a Bluetooth-compatible device for **Heart Rate Service** (one unit) or Bluetooth-compatible devices for **Automatic Injury Detection** (two units), the transceiver first tries the device having the smallest list number in **Bluetooth My Devices Mode**.

Note

- If the connection to a Bluetooth-compatible device is reset when the transceiver moves outside the **Bluetooth Low Energy** operation range, a Bluetooth Find Device Mode Tone (2 beeps) continuously sounds until one of the following operations is done while the transceiver is searching the vicinity:
 - Reconnecting to the Bluetooth-compatible device for which the connection was reset
 - Deleting from **Bluetooth My Devices Mode** the registration information of the Bluetooth-compatible device for which the connection was reset

Resetting the Connection by Bluetooth Low Energy

Connection to a Bluetooth-compatible device can be reset by one of the following methods:

- Placing the transceiver in Bluetooth My Devices Mode, selecting the connected Bluetooth-compatible device, and then pressing the **Menu** ([) or [*****] button (Refer to [Displaying a Bluetooth-compatible Device \(Bluetooth My Devices\)](#).)
- Disabling Bluetooth (Refer to [Toggling Bluetooth On/ Off](#).)
- Moving outside the Bluetooth operation range
- Enabling BLE Scan

Note

- When the transceiver is turned OFF during the connection, a disconnection request is not sent from the transceiver to the Bluetooth-compatible device. Therefore, the Bluetooth-compatible device behaves the same as when the transceiver moves out of range of Bluetooth.

Behavior of the Transceiver When Connecting to a Bluetooth-compatible Device Fails (Bluetooth Low Energy)

If connection to a Bluetooth-compatible device fails by Bluetooth Low Energy, the transceiver behaves as follows:

Table 12-14 Behavior of the Transceiver When Connecting to a Bluetooth-compatible Device Fails

Status	Transceiver Behavior
When nothing can be received from the Bluetooth-compatible device	If the Bluetooth-compatible device does not respond even if about 10 sec elapse after the transceiver starts the connection process to the Bluetooth-compatible device, the connection process ends. In this case, a Bluetooth No Response Tone sounds from the transceiver, the LED turns Off, and "No Response" appears on the display for 1 sec.
When the Bluetooth-compatible device rejects the connection request	The connection process to the Bluetooth-compatible device ends. In this case, a Bluetooth Connect Denied Tone sounds from the transceiver, the LED turns Off, and "Connect Denied" appears on the display for 1 sec.

12.10 Notifying the Heart Rate from a Bluetooth-compatible Device to the Transceiver (Heart Rate Service)

Heart Rate Service is the function to notify the transceiver of the heart rate [bpm] from a Bluetooth-compatible device (heart rate meter, etc.) which supports Heart Rate Service. The transceiver can send the heart rate as a Status and activate Emergency according to the notified heart rate [bpm]. Also, when the transceiver receives the Status request message from the Base ID, the transceiver can send back the heart rate or send the heart rate together with GPS data.

Heart Rate Service is available with Bluetooth version 4.0 or later.

Note

- **Heart Rate Service** is the function for the police or firefighting services. Use this function as support for determining whether an emergency or failure has occurred.

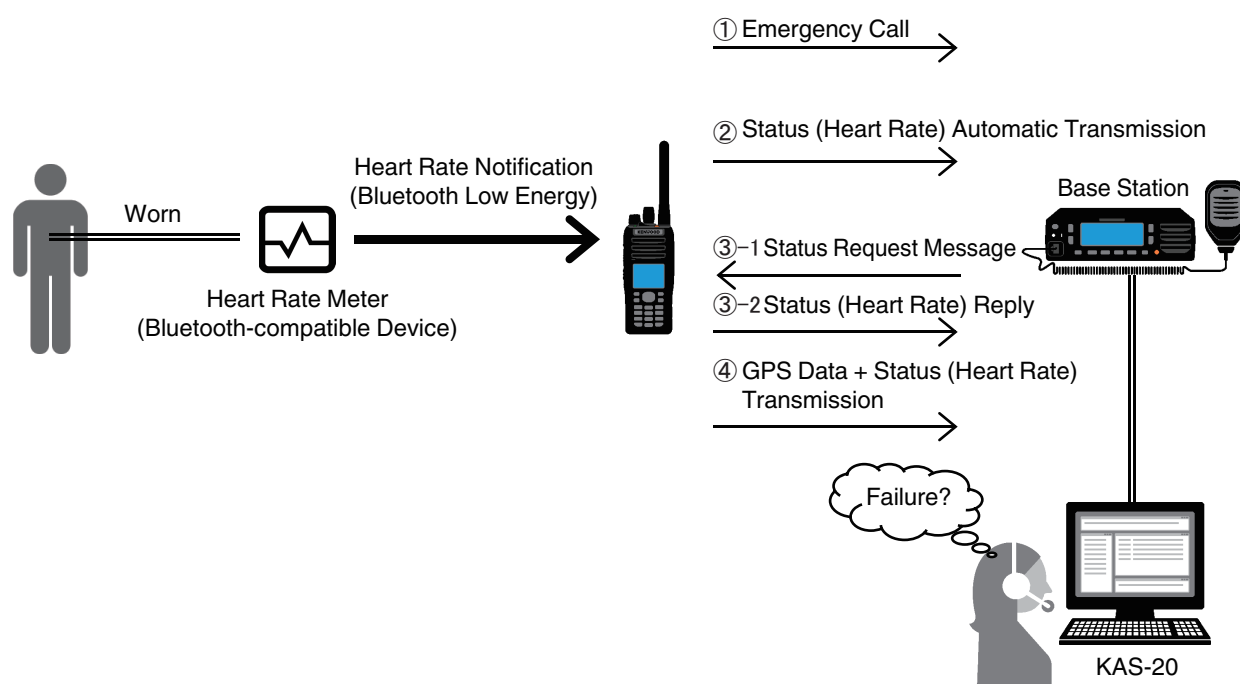


Figure 12-4 Heart Rate Service

Automatic Status Transmission

The automatic transmission of Status functions on an NXDN Channel or DMR Channel if “Status” is configured in **Method**.

The transceiver activates **Delay Time** if the heart rate notified from a Bluetooth-compatible device goes higher than Upper Threshold, or goes lower than Lower Threshold. The transceiver sends a Status to the Base ID if the status where the heart rate goes higher than Upper Threshold or goes lower than Lower Threshold continues while **Delay Time** is activated.

Also, the Status to be sent back depends on the configuration in **Reserved Statuses**.

● For NXDN Conventional, NXDN Trunking, DMR Conventional

If the heart rate is within the range of **Reserved Statuses** when **Delay Time** expires, the status number which is the same as the heart rate is sent. If the heart rate is larger than **Reserved Statuses**, the largest number in **Reserved Statuses** is sent. If the heart rate is smaller than **Reserved Statuses**, the smallest number in **Reserved Statuses** is sent.

● For DMR-based Trunking

If a value calculated 1/2 of the heart rate (cut off after the decimal point) is within the range of **Reserved Statuses** when **Delay Time** expires, the status number which is the same as the heart rate is sent. If a value calculated 1/2 of the heart rate (cut off after the decimal point) is larger than **Reserved Statuses**, the largest number in **Reserved Statuses** is sent. If the heart rate is smaller than **Reserved Statuses**, the smallest number in **Reserved Statuses** is sent.

Note

- The transceiver does not activate **Delay Time** even if the heart rate goes higher than Upper Threshold or goes lower than Lower Threshold in the following cases. Also, if the following cases occur while **Delay Time** is activated, the transceiver does not send a Status even when **Delay Time** expires:
 - When the heart rate is notified from a Bluetooth-compatible device, if the heart rate has already been higher than Upper Threshold (A Button-entry Error Tone sounds from the transceiver.)
 - When the heart rate is notified from a Bluetooth-compatible device, if the heart rate has already been lower than Lower Threshold
 - When the Channel to send a Status is an Analog Channel or Error Channel
 - When the Channel to send a Status is configured as Receive only (Transmit Frequency = None)
 - When “None” is configured in Base ID
 - When Heart Rate Status is disabled
 - When Lone Worker is enabled and “Transmit / Receive Inhibit” is configured in Lone Worker Type
 - While the transceiver is in Emergency Mode
 - While the transceiver is in Transceiver Password Mode
 - While the transceiver is in the Radio Inhibit (Kill) or Stun state
 - While data transmission is suspended
- If the transceiver is in the following statuses upon expiry of Delay Time, a Status transmission is suspended. Also, when the following statuses are reset on the transceiver, the suspended Status is sent.
 - During voice communications or data transmission
 - While the speaker is muted
 - While the transceiver is executing the Trunking control channel Hunt
 - While executing Zeroize

● **For NXDN Conventional, NXDN Trunking, DMR Conventional**

Example 1: For the following configuration:

Upper Threshold = 150 bpm

Lower Threshold = 50 bpm

Delay Time = 10 sec

Reserved Statuses = 25 to 200

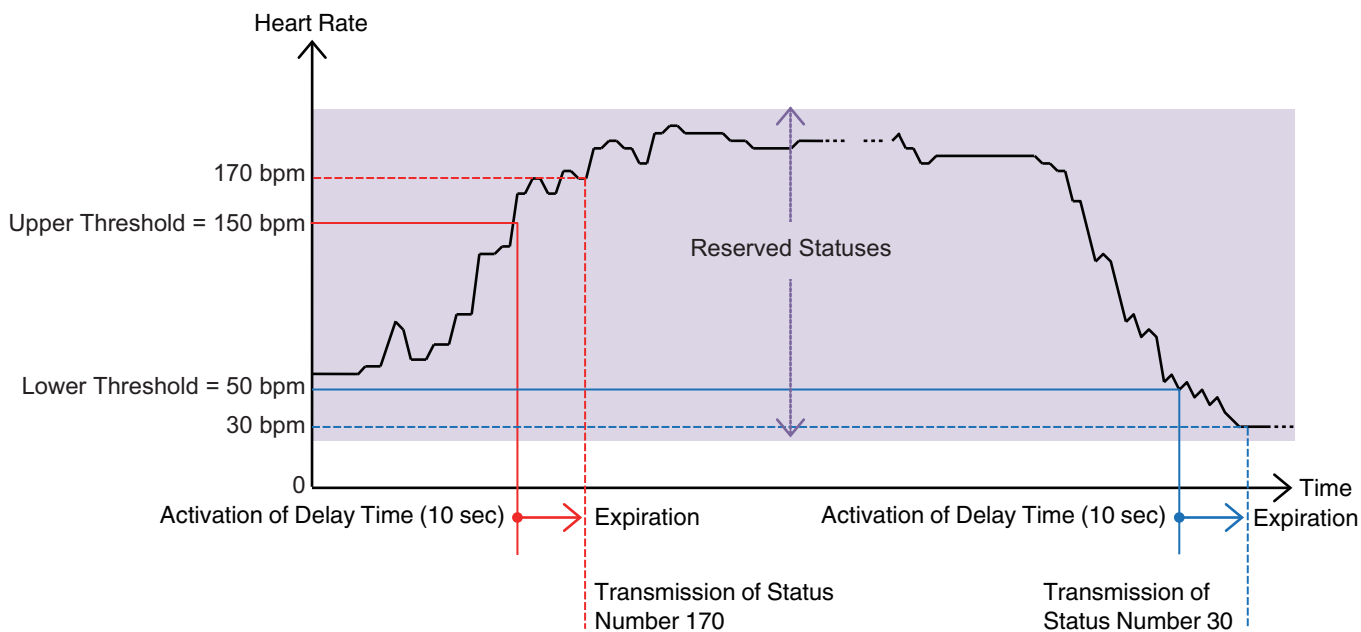


Figure 12-5 Automatic Status Transmission 1

Example 2: For the following configuration:

Upper Threshold = 70 bpm

Lower Threshold = 120 bpm

Delay Time = 10 sec

Reserved Statuses = 60 to 120

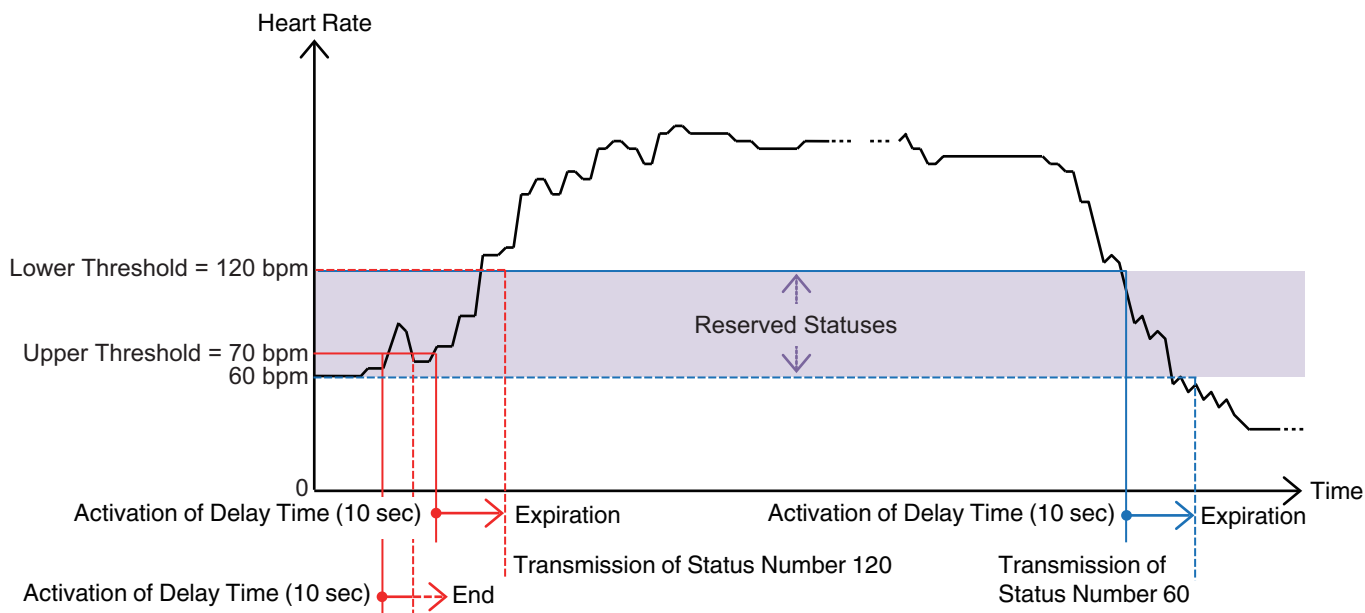


Figure 12-6 Automatic Status Transmission 2

● For DMR-based Trunking

Example 1: For the following configuration:

Upper Threshold = 150 bpm

Lower Threshold = 50 bpm

Delay Time = 10 sec

Reserved Statuses = 15 to 99

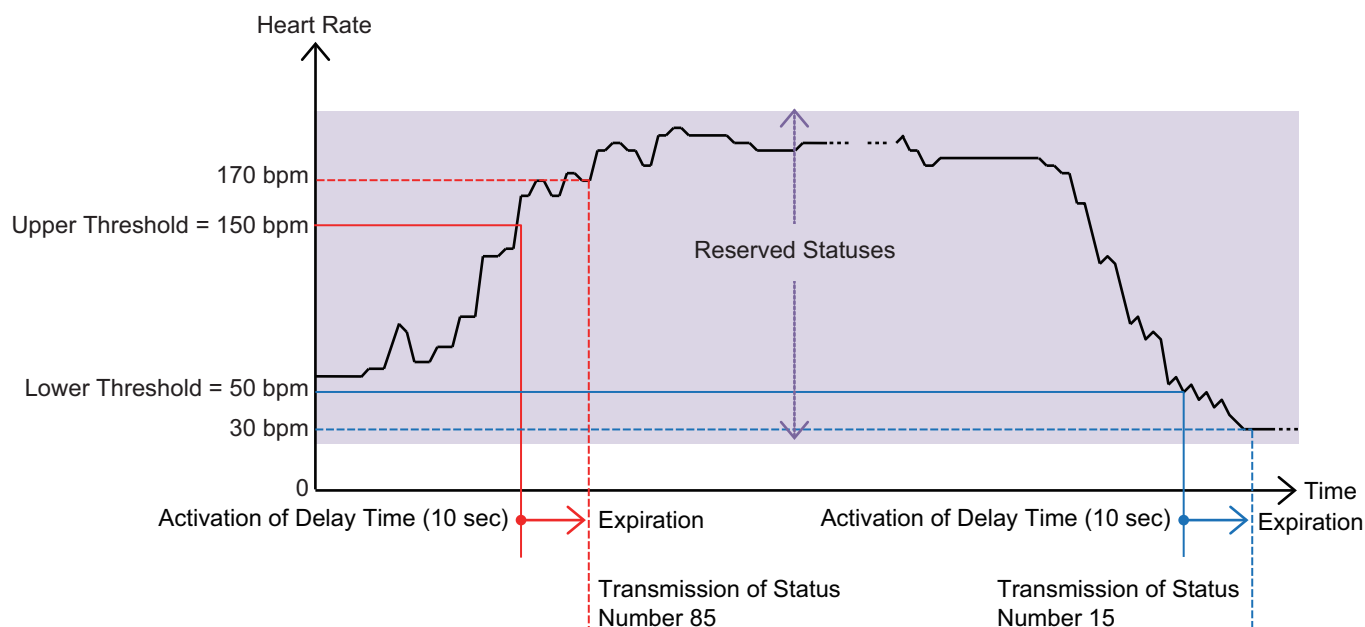


Figure 12-7 Automatic Status Transmission 3

Example 2: For the following configuration:

Upper Threshold = 70 bpm

Lower Threshold = 120 bpm

Delay Time = 10 sec

Reserved Statuses = 30 to 60

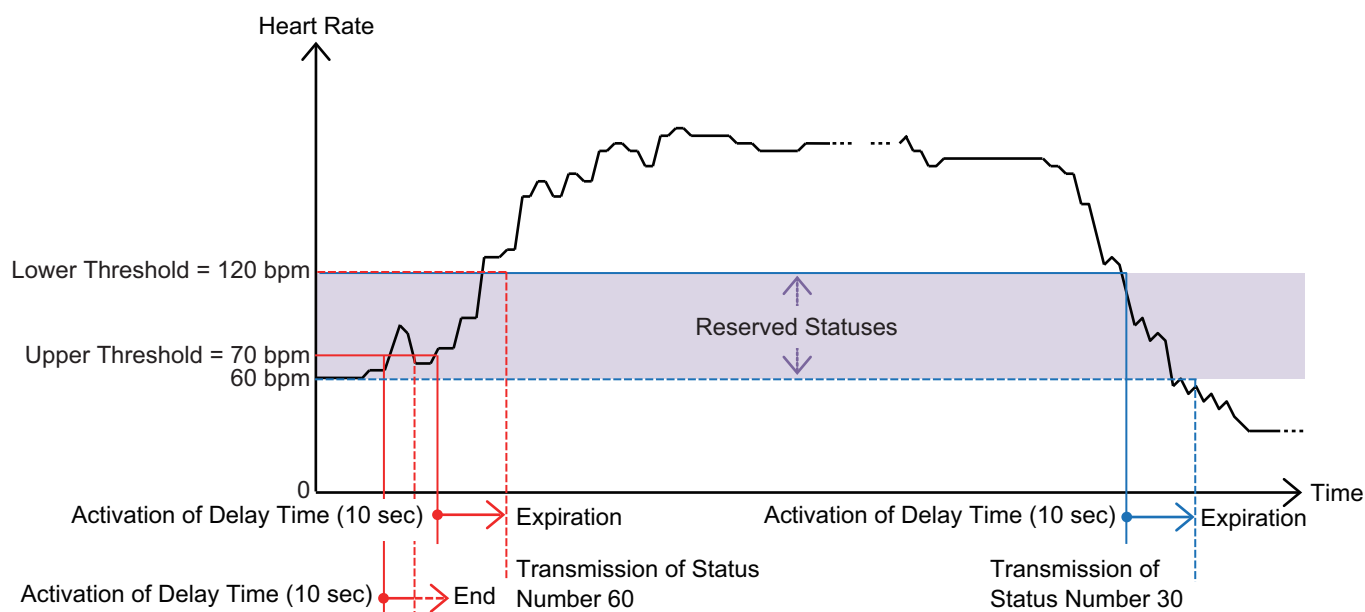


Figure 12-8 Automatic Status Transmission 4

Activation of Emergency

The activation of Emergency occurs in all types of protocols if “Emergency” is configured in **Method**.

The transceiver activates **Delay Time** if the heart rate notified from a Bluetooth-compatible device goes higher than Upper Threshold, or goes lower than Lower Threshold. The transceiver activates Emergency if the status where the heart rate goes higher than Upper Threshold or goes lower than Lower Threshold continues while **Delay Time** is activated.

Note

- The transceiver does not activate **Delay Time** even if the heart rate goes higher than Upper Threshold or goes lower than Lower Threshold in the following cases. Also, if the following cases occur while **Delay Time** is activated, the transceiver does not send Emergency even when **Delay Time** expires:
 - When the heart rate is notified from a Bluetooth-compatible device, if the heart rate has already been higher than Upper Threshold
 - When the heart rate is notified from a Bluetooth-compatible device, if the heart rate has already been lower than Lower Threshold
 - While the transceiver is in Emergency Mode due to a cause other than the button operation
 - While the transceiver is in Transceiver Password Mode
 - While the transceiver is in the Radio Inhibit (Kill) or Stun state

Example: For the following configuration:

Upper Threshold = 150 bpm

Lower Threshold = 50 bpm

Delay Time = 10 sec

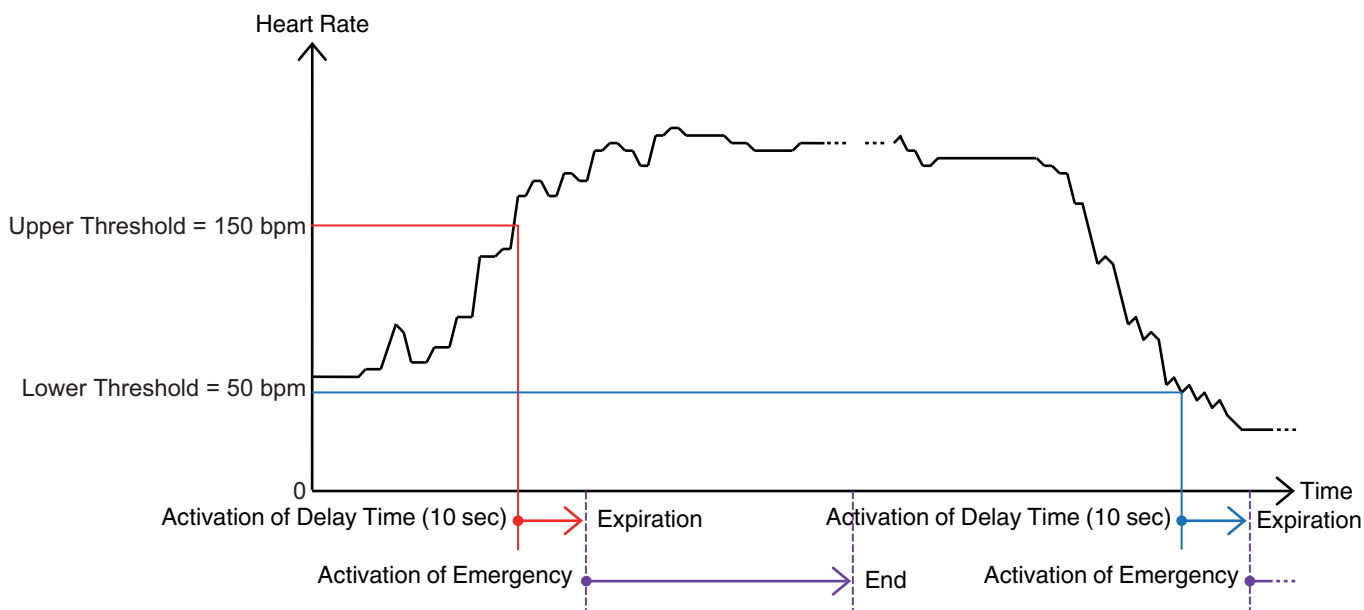


Figure 12-9 Activation of Emergency

Status Request Message Response

The response of the Status request message occurs on an NXDN Channel or DMR Channel.

If **Heart Rate Status** is enabled, the transceiver sends back the heart rate (status number) received from a Bluetooth-compatible device upon receipt of a Status request message.

Also, the Status to be sent back depends on the configuration in **Reserved Statuses**.

● For NXDN Conventional, NXDN Trunking, DMR Conventional

If the heart rate is within the range of **Reserved Statuses** upon receipt of a Status request message, the status number which is the same as the heart rate is sent. If the heart rate is larger than **Reserved Statuses**, the largest number in **Reserved Statuses** is sent. If the heart rate is smaller than **Reserved Statuses**, the smallest number in **Reserved Statuses** is sent.

If no heart rate has been notified from a Bluetooth-compatible device, the default value of Status is sent.

Example: If Reserved Statuses are from 50 to 120:

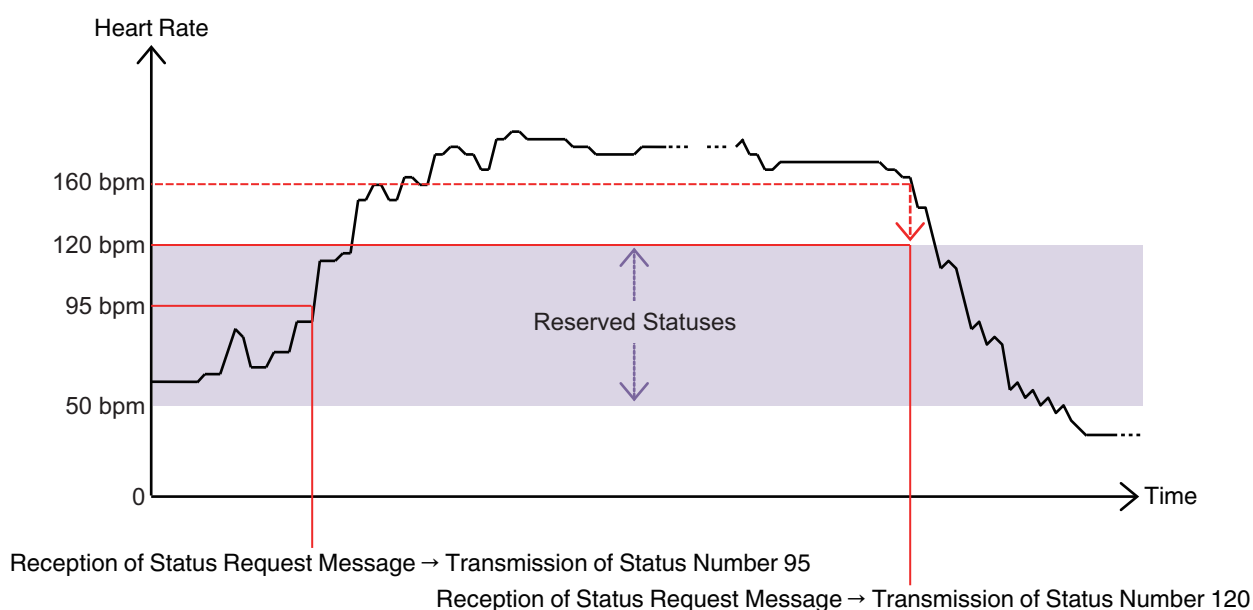


Figure 12-10 Status Request Message Response 1

● For DMR-based Trunking

If a value calculated 1/2 of the heart rate (cut off after the decimal point) is within the range of **Reserved Statuses** upon receipt of a Status request message, the status number for the value which is the same as the heart rate is sent. If a value calculated 1/2 of the heart rate (cut off after the decimal point) is larger than **Reserved Statuses**, the largest number in **Reserved Statuses** is sent. If a value calculated 1/2 of the heart rate (cut off after the decimal point) is smaller than **Reserved Statuses**, the smallest number in **Reserved Statuses** is sent.

If no heart rate has been notified from a Bluetooth-compatible device, the default value of Status is sent.

Example: If Reserved Statuses are from 25 to 60:

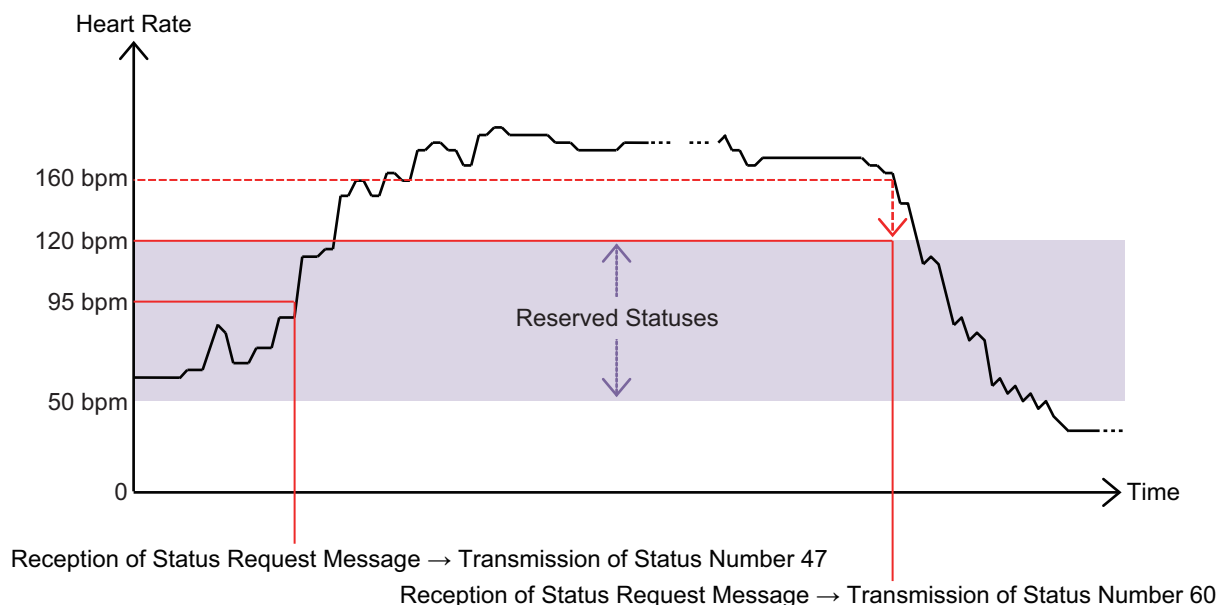


Figure 12-11 Status Request Message Response 2

Note

- The heart rate notified from a Bluetooth-compatible device is cleared when Heart Rate Service is disconnected.
- While the transceiver is in Emergency Mode or the Stun state, a Status corresponding to the heart rate is not sent even if the transceiver receives a Status request message. A Status indicating Emergency or Stun is sent.

GPS Data Transmission

The transmission of GPS data functions on an NXDN Channel.

If **Heart Rate Status** is enabled, the GPS data sent from the transceiver includes the heart rate (status number) notified from a Bluetooth-compatible device.

Also, the Status to be included in the GPS data depends on the configuration in **Reserved Statuses**. If the heart rate is within the range of **Reserved Statuses** when sending the GPS data, the status number which is the same as the heart rate is sent. If the heart rate is larger than **Reserved Statuses**, the largest number in **Reserved Statuses** is sent. If the heart rate is smaller than **Reserved Statuses**, the smallest number in **Reserved Statuses** is sent. If no heart rate has been notified from a Bluetooth-compatible device, the default value of Status is included in the GPS data.

Example: If Reserved Statuses are from 50 to 120:

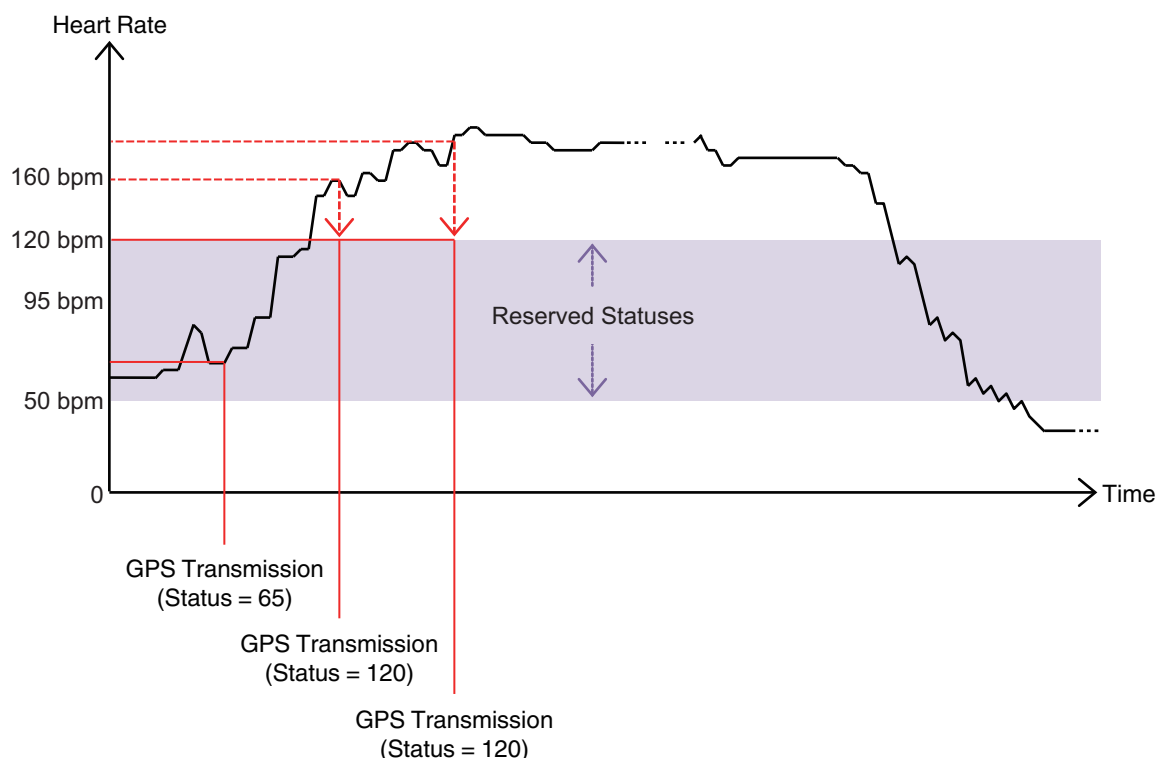


Figure 12-12 GPS Data Transmission

Note

- The heart rate notified from a Bluetooth-compatible device is cleared when Heart Rate Service is disconnected.
- While the transceiver is in Emergency Mode, a Status corresponding to the heart rate is not included in the GPS data. A Status indicating Emergency is included.

Confirming the Heart Rate by Using the Transceiver (Bluetooth My Devices Mode)

The heart rate notified from a Bluetooth-compatible device can be confirmed in the Device Information screen of **Bluetooth My Devices Mode**.

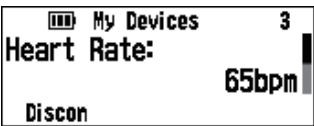
Operating the transceiver

1 Select a Bluetooth-compatible device in Bluetooth My Devices Mode and press the [▶] button.

The Device Information screen for the selected Bluetooth-compatible Device appears.
Refer to “[Displaying a Bluetooth-compatible Device \(Bluetooth My Devices\)](#)” for operation methods.

2 Press the [▲] button or [▼] button and select “Heart Rate”.

If a Bluetooth-compatible device is connected
The heart rate notified from a Bluetooth-compatible device appears.



If a Bluetooth-compatible device is not connected
“ - - -bpm ” appears for the heart rate.



Configuration using KPG-D3/ D3N

- Configuring **Heart Rate Status** (See Radio Configuration > Protocol Options > NXDN > Status > Bluetooth)
- Configuring **Heart Rate Status** (See Radio Configuration > Protocol Options > DMR > Status > Bluetooth)

12.11 Notifying of Damage on a Bluetooth-compatible Device to the Transceiver (Automatic Injury Detection Service)

Automatic Injury Detection Service is the function to notify from a Bluetooth-compatible device to the transceiver of the damage if the Bluetooth-compatible device which supports Automatic Injury Detection Service has been damaged. Up to 2 Bluetooth-compatible devices can simultaneously be connected to the transceiver for **Automatic Injury Detection Service**.

If **Injury Detection** is enabled, the transceiver activates Emergency when the transceiver receives a damage report from a Bluetooth-compatible device.

Automatic Injury Detection Service is available with Bluetooth version 4.0 or later.

Note

- **Automatic Injury Detection Service** is the function for the police. If a police officer is shot while wearing a bulletproof vest, Emergency is automatically activated and an emergency situation is reported to a console.

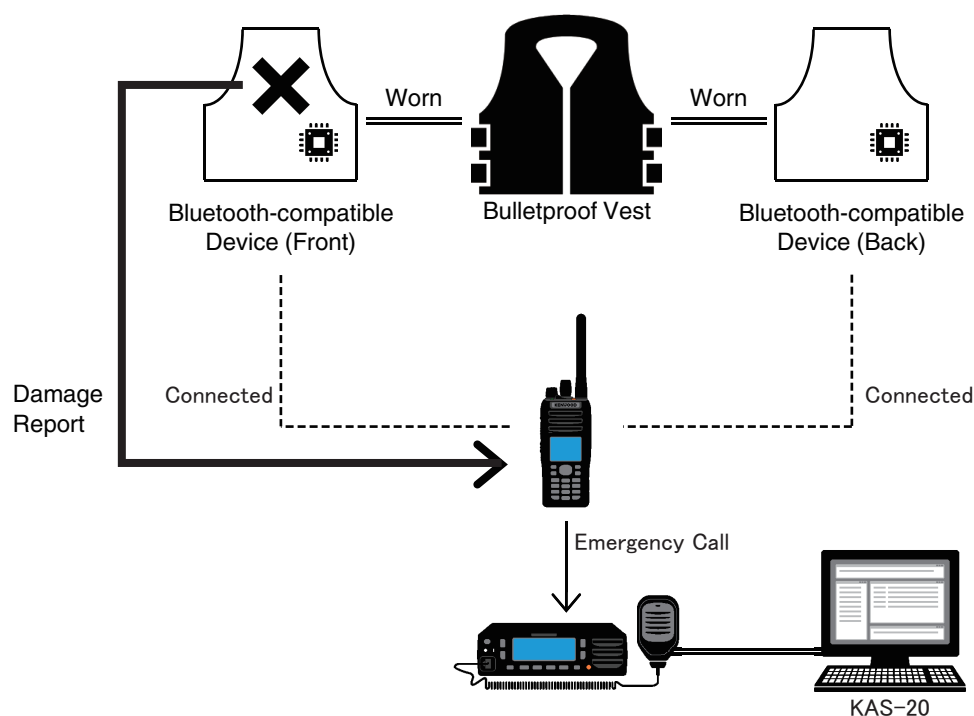


Figure 12-13 Automatic Injury Detection Service

Confirming Damage to a Bluetooth-compatible Device by Using the Transceiver (Bluetooth My Devices Mode)

Whether a Bluetooth-compatible device has been damaged can be confirmed in the Device Information screen of **Bluetooth My Devices Mode**.

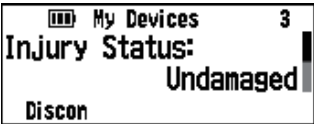
Operating the transceiver

- 1
- Select a Bluetooth-compatible device in Bluetooth My Devices Mode and press the [▶] button.

The Device Information screen for the selected Bluetooth-compatible device appears.
Refer to “[Displaying a Bluetooth-compatible Device \(Bluetooth My Devices\)](#)” for operation methods.

- 2
- Press the [▲] button or [▼] button and select “Injury Detection Status”.

If a Bluetooth-compatible device is connected
Whether a Bluetooth-compatible device has been damaged can be confirmed.
If not damaged = Undamaged
If damaged = Damaged



- Note
- The display example is for the case when a Bluetooth-compatible device is not damaged.

If a Bluetooth-compatible device is not connected
“ - - - ” appears for the result of Injury Detection Status.



Configuration using KPG-D3/ D3N

Configuring **Injury Detection** to be enabled or disabled (See Radio Configuration > Global Options > Emergency > General > Bluetooth)

12.12

Confirming the Remaining Battery Power of a Bluetooth-compatible Device (Battery Service)

Battery Service is the function to notify the transceiver of the remaining battery power [%] of a Bluetooth-compatible device which supports Heart Rate Service or Automatic Injury Detection Service. The transceiver displays the notified remaining battery power [%] on the display.

The remaining battery power can be confirmed when the transceiver is in the following statuses:

- When connection to a Bluetooth-compatible device completes (displays for 1 sec) (Refer to [Connecting to a Bluetooth-compatible device, or resetting the connection.](#))
- When connection to a Bluetooth-compatible device completes and the Device Information screen of Bluetooth My Devices Mode appears

Operating the transceiver

The following is the confirmation procedure in the Device Information screen:

1

Select a Bluetooth-compatible device in Bluetooth My Devices Mode and press the **[▶]** button.

The Device Information screen for the selected Bluetooth-compatible Device appears.
Refer to “[Displaying a Bluetooth-compatible Device \(Bluetooth My Devices\)](#)” for operation methods.

2

Press the **[▲]** button or **[▼]** button and select “Charge”.

If a Bluetooth-compatible device is connected
The remaining battery power is indicated in the range of 0 % to 100 %.



If a Bluetooth-compatible device is not connected
The remaining battery power is indicated as “- - - %”.



12.13

Confirming the Manufacturer Name, Model Number, Etc. of a Bluetooth-compatible Device (Device Information Service)

Device Information Service is the function to notify the transceiver of the manufacturer name or Model Number of a Bluetooth-compatible device which supports Heart Rate Service or Automatic Injury Detection Service. The transceiver displays the notified manufacturer name or Model Number on the display.

The following of a Bluetooth-compatible device can be confirmed with **Device Information Service**.

- Manufacturer Name = Manufacturer
- Model Number = Model
- Serial Number = Serial
- Hardware Version = Hardware Ver.
- Firmware Version = Firmware Ver.
- Software Version = Software Ver.

Operating the transceiver

1

Select a Bluetooth-compatible device in Bluetooth My Devices Mode and press the [▶] button.

The Device Information screen for the selected Bluetooth-compatible Device appears.
Refer to “[Displaying a Bluetooth-compatible Device \(Bluetooth My Devices\)](#)” for operation methods.

2

Press the [▲] button or [▼] button and select the item to confirm.

If a Bluetooth-compatible device is connected

The content of the selected item appears with the maximum of 14 characters.



If a Bluetooth-compatible device is not connected

“ - - - ” appears for the content of the selected item.



- The display example is for the case when a manufacturer name is selected.

The transceiver is equipped with function ports that can be programmed using KPG-D3/ D3N.

13.1 Universal Connector

Supported Models: Portable (NX-3200/ NX-3300/ NX-3400)

For NX-3200/ NX-3300/ NX-3400, the transceiver is equipped with a function port that can be programmed for use with the 14-pin universal connector located on the side of the transceiver. The Vibrator unit and GPS receiver unit can be connected to the transceiver via the universal connector.

Assigning Functions to the Universal Connector

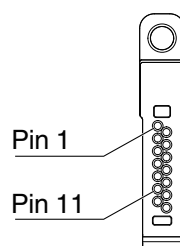


Figure 13-1 Universal Connector

Pin 11 of the universal connector can be used with the following functions according to the user's purpose of use.

Table 13-1 Available Functions to be Assigned to Pin 11

Function	Description
AUX (Active High)	When the AUX function is enabled by pressing the AUX button, or by pressing the Menu button to enter Menu Mode and then selecting "AUX", the 5 V power source is supplied to pin 11 of the universal connector. The transceiver stops supplying 5 V when the AUX function is disabled. A maximum of 200 mA current can be supplied to pin 11.
Vibrator	If activation conditions of the vibrator are satisfied while the Vibrator function is enabled, the 5 V power source is supplied to pin 11 at 500 ms intervals for 10 sec. The vibrator unit (KCT-48VU) connected to the universal connector notifies a user by vibrating.
Always 5V (high)	This configuration is applied when an external device that always requires a power source such as the speaker microphone and the headset is used. The transceiver behavior varies as below depending on the configuration in Output Control by SSW . If the Output Control by SSW is configured to be enabled: The 5 V power source is supplied to pin 11 if pin 1 (SSW) of the universal connector is low level. If the Output Control by SSW is configured to be disabled: The 5 V power source is always supplied to pin 11 regardless of the status of pin 1 (SSW) of the universal connector.
HRS Adapter	The 5 V power source is always supplied to pin 11 of the universal connector. This configuration is applied when the KCT-51 is used. Audio accessories, etc. can be used by easily connecting to the KCT-51. This configuration is also applied when an external device that always requires a power source is used.

Note

- If the **Vibrator** button is not configured while "Vibrator" is configured in **PIN Number 11**, the **Vibrator** function is automatically enabled when the transceiver is turned ON.
- If the **PTT** switch of an external microphone or the transceiver is pressed while the external microphone is connected to the universal connector, the audio inputted from the external microphone is sent.

Configuration using KPG-D3/ D3N

- Configuring **PIN Number 11** ( See Radio Configuration > Global Options > External Device > Universal Connector)
- Configuring **Output Control by SSW** to be enabled or disabled ( See Radio Configuration > Global Options > External Device > Universal Connector > Always 5V (high))

Using the Vibrator

Vibrator is the function to vibrate the transceiver when the transceiver receives an individual call with Optional Signaling, an NXDN Status Message or Short Message. With this function, a user can recognize that the transceiver is receiving a call even in noisy environments or an environment requiring silence.

The vibrator functions under the following conditions:

Table 13-2 Conditions for the Vibrator to Function

System	Conditions
NXDN Conventional	• If the Optional Signaling matches • If the transceiver receives a Status Message (except the status number 226) • If the transceiver receives a Short Message • If the transceiver receives a Paging Call
NXDN Trunking	• If the transceiver receives an Individual Call or Group Call • If the transceiver receives a Status Message (except the status number 226) • If the transceiver receives a Short Message • If the transceiver receives a Paging Call • If the transceiver receives a Telephone Call • If the Optional Signaling matches
DMR Conventional	• If the transceiver receives an Individual Call or Group Call (except an Unaddressed Call) • If the transceiver receives a Status Message (except an Emergency Termination Status) • If the transceiver receives a Short Message • If the transceiver receives a Paging Call • If the transceiver receives a Telephone Call (a Telephone Call using an Individual Call or Group Call in the KAIROS system (SIP Call))
DMR-based Trunking	• If the transceiver receives an Individual Call or Group Call • If the transceiver receives a Status Message (except an Emergency Termination Status) • If the transceiver receives a Short Message • If the transceiver receives a Telephone Call • If the Optional Signaling matches
Analog Conventional/ LTR Trunking	• If the Optional Signaling matches • If the transceiver receives a Status Message (except the status numbers 88, 90, 91, and 92) • If the transceiver receives a Short Message • If the transceiver receives a Paging Call • If the transceiver receives a Call Alert

The vibrator vibrates for 500 ms and stops for 500 ms, and repeats this cycle 10 times.

However, in the following cases, even if the conditions for the vibrator to function are satisfied, the vibrator does not function. During this state, the  icon blinks.

- When the transceiver receives another signal to match the Optional Signaling while the vibrator is activated after the Optional Signaling matches
- During the amount of time configured in **Auto Reset Timer** after pressing the **PTT** switch, if the transceiver is on a channel where anything other than “None” is configured for Optional Signaling
- When the transceiver receives the same call while the amount of time configured in **Auto Reset Timer** is counting down Pressing the **Vibrator** button toggles the **Vibrator** between enabled and disabled.
Vibrator can also be enabled or disabled by selecting “Vibrator” after entering Menu Mode by pressing the **Menu** button. (Refer to [Using Menu Mode](#).)

Operating the transceiver

1 Press the **Vibrator** button.

The “**⚡**” icon appears and then the **Vibrator** function will be enabled. A Button Beep A (1 beep) sounds from the transceiver, and the vibrator vibrates for 1 sec.



2 Press the **Vibrator** button again.

The “**⚡**” icon disappears and then the **Vibrator** function will be disabled. A Button Beep B (2 beeps) sounds from the transceiver.

Note

- If the **Vibrator** button is not configured while “Vibrator” is configured in **PIN Number 11**, the **Vibrator** function is automatically enabled when the transceiver is turned ON. (Refer to [Assigning Functions to the Universal Connector.](#))
- The status of the **Vibrator** function (enabled or disabled) is retained even if the transceiver is turned OFF.
- If one of the **PF** buttons is pressed while the vibrator is vibrating, the vibrator stops. At this time, the function assigned to the **PF** button that is pressed does not function. However, the following **PF** buttons function:
 - **Emergency** button
 - **Backlight** button
 - **Button Lock** button
 - **Function** button
 - **Zeroize** button
- While the “**⚡**” icon blinks, the vibrator does not function even if the functioning conditions for the vibrator are satisfied.

Without Alert Tone

Without Alert Tone is the function to configure the transceiver not to emit an Alert Tone when the conditions for the vibrator to function are satisfied and the vibrator functions. (Refer to [Conditions for the Vibrator to Function.](#))

If an Alert Tone sounds from the transceiver in quiet environments, it may bother other people. In this case, the transceiver can be configured to mute Alert Tones and a user can recognize the reception of a call or message only from the vibration of the vibrator.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Without Alert Tone** to be enabled or disabled ([See](#) Radio Configuration > Global Options > External Device > Universal Connector > Vibrator)

13.2 D-sub 15-pin Connector

Supported Models: Mobile

For Mobile, the transceiver is equipped with function ports (AUX Input/ AUX Output) that can be programmed for use with the D-sub 15-pin connector located on the rear panel of the transceiver.

Also, if the Control Head and RF Deck (the transceiver) are separated by using KRK-19B and KRK-18H, the programmable function ports (AUX Input/ AUX Output) equipped on KRK-18H are available.

Note

- To use a KRK-18H function port, KCT-72 (Connection Cable) needs to be connected. (Refer to [Separating the Control Head and RF Deck.](#))

Available Functions for AUX Input Ports

This section describes each function that can be assigned to AUX Input ports.

Depending on a function assigned to an AUX Input port, the function immediately functions if the AUX Input port is active when the transceiver is turned ON. In addition, depending on the function assigned to an AUX Input port, the function does not function when the transceiver is in the Radio Inhibit state. Refer to the following table for how the function functions depending on the transceiver status.

Table 13-3 Behavior of Each Function Depending on the Transceiver Status

Function	Transceiver Status		
	When the transceiver is turned ON	While the transceiver is in the Stun state	While the transceiver is in the Radio Inhibit state
External PTT (Voice)	No	No	No
External PTT (Data)	No	No	No
Data PTT	No	No	No
External PTT (PA)	No	No	No
External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice)	No	No	No
Channel Select A to Channel Select D	Yes	*1	*1
DTC	Yes	*1	*1
Speaker Mute	Yes	Yes	*1
Mic Mute	Yes	Yes	*1
External Monitor	Yes	Yes	*1
External Hook	Yes	Yes	*1
External Speaker	Yes	Yes	*1
Emergency	Yes	No	No
AUX Input Status Message 1 to AUX Input Status Message 3	No	No	No
Scan	Yes	*1	*1
Call 1 to Call 6	No	No	No
Light Sense	Yes	Yes	*1
Zeroize	Yes	No	No
Scrambler/ Encryption	Yes	*1	*1

*1 The function functions when the Stun or Radio Inhibit state is reset.

Yes: functions, No: does not function

Configuration using KPG-D3/ D3N

Assigning functions to the AUX Input port ( See Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)

External PTT (Voice)

External PTT (Voice) is the transmission request port for voice channels. This port can be used for a transmission request from a headset or external microphone.

The transceiver starts transmitting if the External PTT (Voice) port goes low level. The transceiver ends transmitting if the External PTT (Voice) port goes high level. If the transceiver is on a data channel, the transceiver migrates to the lowest numbered voice channel in the current zone and transmits.

Also, functions that are used for transmitting by using the External PTT (Voice) port can be configured using KPG-D3/ D3N. (Refer to [Functions When Sending by Using the External PTT and Data PTT.](#))

Note

- The External PTT (Voice) port and the External PTT (Direct Channel 1 Voice) port to External PTT (Direct Channel 5 Voice) port can be used at the same time. However, the Data PTT, External PTT (Voice) and External PTT (Data) ports cannot be used at the same time.

External PTT (Data)

External PTT (Data) is the transmission request port for data communications.

The following are the 2 methods of use of **External PTT (Data)**:

● Using with the DTC port

In an LTR Trunking system, the port becomes the transmission request port in ARQ Mode.

The transceiver transmits by activating the External PTT (Data) port after activating the DTC port.

● Using with Channel Select A to Channel Select D

This port functions as the transmit request port for external devices used for data communications. However, the transceiver transmits on the currently selected channel without migrating to the Data Zone-channel in the same manner as the Data PTT port.

The transceiver behaves as follows depending on the channel which has the External PTT (Data) port active:

Table 13-4 External PTT (Data)

Current Channel	Transceiver Behavior
Conventional Zone-channel (Analog)	The transceiver transmits.
Conventional Zone-Channel (NXDN/ DMR)	A Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not transmit.
LTR Trunking Zone-Channel	The transceiver transmits.
NXDN Trunking Zone-Channel	A Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not transmit.
DMR-based Trunking Zone-Channel	A Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not transmit.

Also, functions that are used for transmitting by using the External PTT (Data) port can be configured using KPG-D3/ D3N. (Refer to [Functions When Sending by Using the External PTT and Data PTT.](#))

Note

- The Data PTT, External PTT (Voice) and External PTT (Data) ports cannot be used at the same time.

Data PTT

Data PTT is the transmission request port for data communications.

The transceiver migrates to a Data System-personality to start the transmission when the Data PTT port goes low level. The transceiver ends transmitting if the Data PTT port goes high level. The transceiver remains on the data channel for the amount of time configured in **Dwell Time** after the Data PTT port goes high level. The transceiver returns to the voice channel after the amount of time configured in **Dwell Time** elapses.

The relationship between the channel when the Data PTT port is activated and the Data System-personality is as follows:

Table 13-5 Data PTT

Current Channel	Transceiver Behavior
Conventional Zone-channel (Analog)	The transceiver migrates to an analog channel configured for the Data System-personality (Analog) in the Conventional Zone to start transmitting. If no Data System-personality (Analog) is configured, the transceiver migrates to the data channel (Channel Type = Analog only) configured for the highest channel number in the zone to start transmitting.
Conventional Zone-Channel (NXDN/ DMR)	The transceiver migrates to an analog channel configured for the Data System-personality (Analog) in the Conventional Zone to start transmitting. If no Data System-personality (Analog) is configured, a Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not start transmitting.
LTR Trunking Zone-Channel	The transceiver migrates to an analog channel configured for Data System-personality in the LTR Trunking Zone to start transmitting. If no Data System-personality is configured, the transceiver migrates to the data channel with the highest channel number in the zone to start transmitting.
NXDN Trunking Zone-Channel	The transceiver migrates to an analog channel configured for Data System-personality (Analog) in the NXDN Trunking Zone to start transmitting. If no Data System-personality (Analog) is configured, a Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not start transmitting.
DMR-based Trunking Zone-Channel	A Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not transmit.

Also, functions that are used for transmitting by using the Data PTT port can be configured using KPG-D3/ D3N.

(Refer to [Functions When Sending by Using the External PTT and Data PTT.](#))

Note

- The Data PTT, External PTT (Voice) and External PTT (Data) ports cannot be used at the same time.

External PTT (PA)

External PTT (PA) is the port for the audio output of Public Address. If the External PTT (PA) port goes low level, the transceiver enters Public Address Mode and the audio inputted from the microphone line (MI/ MI2) configured for Modulation Line is outputted from the external speaker. If the External PTT (PA) port goes high level, the transceiver terminates the audio output and exits Public Address Mode.

External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice)

External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) are the ports used for requesting voice transmission of Direct Channel. If External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) goes low level, the transceiver displays “Remote Control” and starts transmitting after the channel is changed to the Direct Channel.

If the Direct Channel is the 5-tone Channel, the transceiver behaves according to the configuration in Encode Format or Decode Format after the channel is changed to the Direct Channel.

If the digital Encode Format or Decode Format is enabled for the Direct Channel, the transceiver behaves according to the configuration in the digital Decode Format when Talkback is received after the transceiver transmits on the Direct Channel.

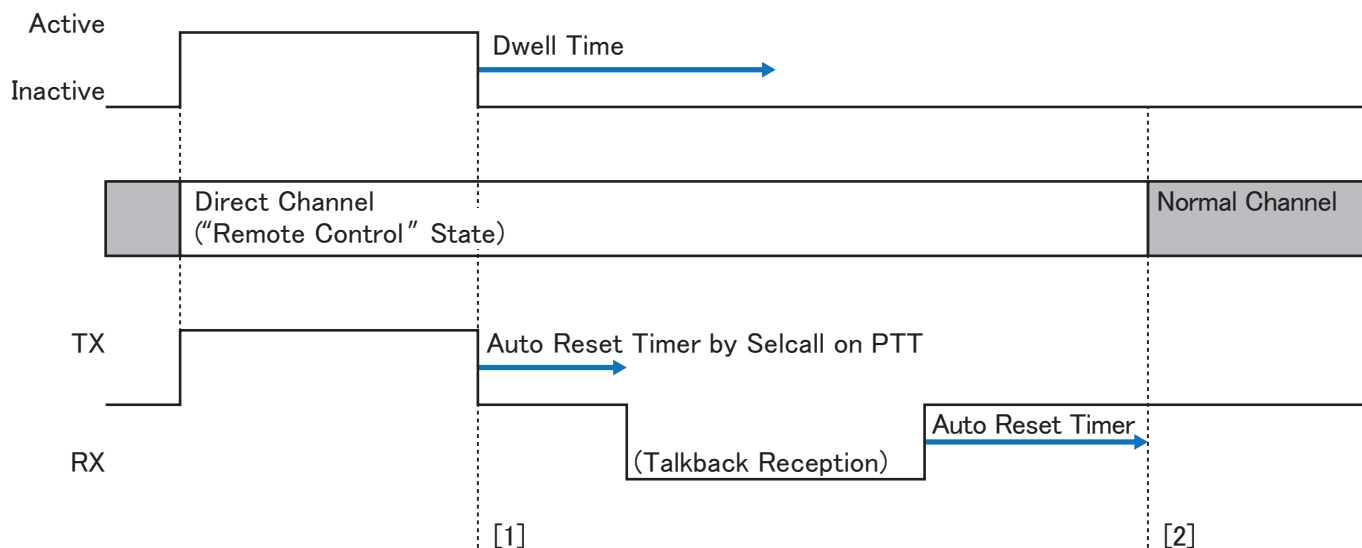


Figure 13-2 External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) Behavior

If External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) goes high level, the transceiver ends the transmission, and the **Dwell Time** is activated. The **Optional Signaling** matches by the transmission and reception of the transceiver. ...[1]

If the matching state of the **Optional Signaling** is reset and the **Dwell Time** expires, the “Remote Control” display is reset. ...[2]

Also, the transceiver behavior varies as follows depending on the configuration in Return on the FPU:

- **If Return is enabled**

The transceiver returns to the previous channel of before the change to the Direct Channel.

- **If Return is disabled**

The transceiver continues to retain the Direct Channel.

If the **Clear** button is pressed while “Remote Control” is displayed by External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice), the matching of the **Optional Signaling** can be reset.

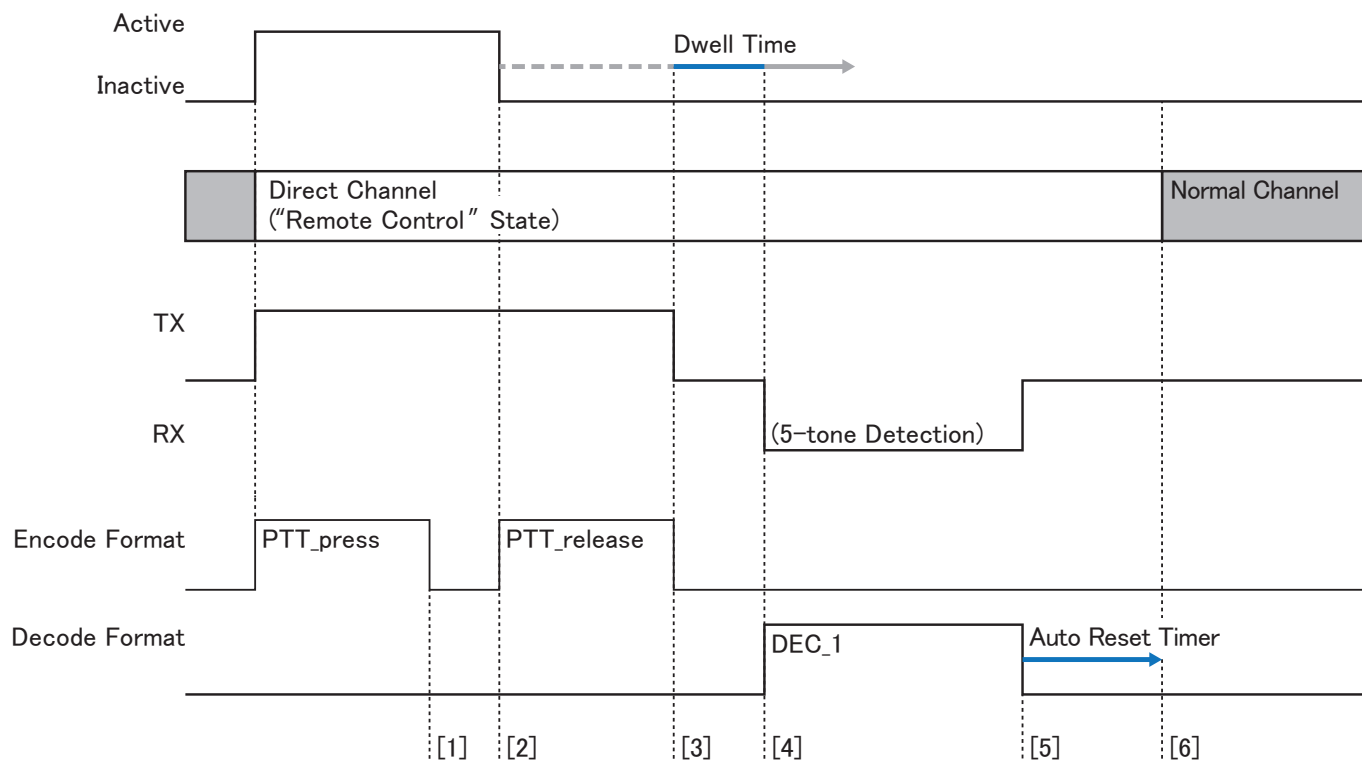


Figure 13-3 Behavior with Encode Format/ Decode Format (Example: 5-tone)

Encode Format for which Pressing **PTT** is configured ends. ...[1]

If External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) become inactive (= High), Encode Format for which Releasing **PTT** is configured is executed. ...[2]

When Encode Format for which Releasing **PTT** is configured ends, **Dwell Time** is executed, because External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) become inactive. ...[3]

Decode Format is executed by the detection of 5-tone. In this case, **Dwell Time** stops. ...[4]

If "AUTR" is configured in Decode Format, **Auto Reset Timer** is activated (if "AUTR" does not function, the behavior [4] occurs). ...[5]

If the **Auto Reset Timer** expires and the **Dwell Time** expires, the "Remote Control" display is reset. ...[6]

Also, the transceiver behavior varies as follows depending on the configuration in Return on the FPU:

- **If Return is enabled**

The transceiver returns to the previous channel of before the change to the Direct Channel.

- **If Return is disabled**

The transceiver continues to retain the Direct Channel.

For the channel with digital Encode Format or Decode Format enabled, if Talkback is received after External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice), Decode Format is executed.

In this case, the transceiver behaves in the same manner as [4] and later.

Also, the expiry of the **Auto Reset Timer**, which is one of the conditions to reset the "Remote Control" display in [6], indicates that 2 Auto Reset Timers, one for Encode Format/ Decode Format and the other for **Optional Signaling**, have expired.

 Note

- If External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) becomes active (= Low), or if the transceiver returns from the Direct Channel to the channel which was used before the change (if Return is enabled), voice guidance by Voice Announcement is not executed.
- If External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) becomes active (= Low), even if the transceiver cannot transmit on a channel changed to Direct Channel 1 to Direct Channel 5, Direct Channel 1 to Direct Channel 5 is retained while External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) is active (= Low).
- If External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) becomes active (= Low) during the scan, the transceiver pauses the scan and migrates to Direct Channel 1 to Direct Channel 5 and starts voice transmission. After voice transmission ends, the scan is resumed as follows according to the configuration in Return:
 - If Return is enabled, after voice transmission ends and the Dwell Time (Extended Function) elapses, the transceiver returns to the channel which was used before migrating to Direct Channel 1 to Direct Channel 5. After that, upon elapse of the Key Delay Time, the scan is resumed.
 - If Return is disabled, the scan is resumed after voice transmission ends and the Dwell Time (Scan Information) elapses.

Channel Select A to Channel Select D

Channel Select A to **Channel Select D** are the Channel Select ports for using a Remote Channel List.

The Zone-channel of the transceiver can be changed using the external device that is connected to the transceiver. (Refer to [Migrating to a Zone-channel by Using a Connected External Device \(Remote Zone-Channel\)](#).)

DTC

DTC is the port that migrates the transceiver to the Data System-personality used for data communications.

Normally, establishing a link is required for each data communication when making data communications in an LTR Trunking system. However, if the system is busy, and a repeater has no available channels, the possibility of failing to send data becomes higher. ARQ Mode can be used to avoid these problems and unfailingly complete data communications with a single link.

If ARQ Mode is used, the transceiver does not send the EOT until the transceiver finishes data communications after the transceiver establishes a link to the repeater. The transceiver retains the linked state using the Hung Up Time configured for the repeater and then sends or receives the acknowledgment during the Hung Up Time. With this function, the transceiver is not required to link to a repeater every time to send data, and Air Time can effectively be utilized.

The relationship between the channel where the DTC port is active and the Data Zone-channel is as follows:

Table 13-6 DTC

Current Channel	Data Zone-Channel
Conventional Zone-channel (Analog)	The transceiver migrates to an analog channel configured for the Data System-personality (Analog) in the Conventional Zone. If no Data System-personality (Analog) is configured, the transceiver migrates to the data channel (Channel Type = Analog only) with the highest channel number in the zone.
Conventional Zone-Channel (NXDN/ DMR)	The transceiver migrates to an analog channel configured for the Data System-personality (Analog) in the Conventional Zone. If no Data System-personality (Analog) is configured, a Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not respond at all.
LTR Trunking Zone- Channel	The transceiver migrates to an analog channel configured for Data System-personality in the LTR Trunking Zone to start transmitting. If no Data System-personality is configured, the transceiver migrates to the data channel with the highest channel number in the zone.
NXDN Trunking Zone-Channel	The transceiver migrates to an analog channel configured for the Data System-personality (Analog) in the NXDN Trunking Zone. If no Data System-personality (Analog) is configured, a Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not respond at all.
DMR-based Trunking Zone-Channel	A Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not transmit.

Note

- The data channel is not targeted for Revert Channel.
- When the DTC port goes low level while scanning, the transceiver migrates to a Data System-personality in a Revert Zone.
- If “Data PTT” is assigned to another port, “DTC” cannot be assigned.
- If “External PTT (Data)” is not assigned to another port, “DTC” cannot be assigned.

Speaker Mute

Speaker Mute is the port that is used to mute the speaker audio output line.

The transceiver mutes the speaker when the Speaker Mute port goes low level. Only the received audio is muted, and the control audio, such as a beep tone, is not muted. The transceiver unmutes the speaker when the Speaker Mute port goes high level. Also, the AFO output of the external terminal is not muted.

Mic Mute

Mic Mute is the port that is used to mute the microphone modulation line.

The Mic Line (Front Mic and MI2) is muted when the Mic Mute port goes low level. The Mic Line (Front Mic and MI2) is unmuted when the Mic Mute port goes high level.

External Monitor

External Monitor is the port that is used to activate the Monitor function.

The Monitor function is enabled when the External Monitor port goes low level. The Monitor function is disabled when the External Monitor port goes high level.



- If the External Monitor port is active while the Monitor function is enabled by pressing the **Monitor** button, the Monitor function for the External Monitor port is enabled.
- The enabled state of the Monitor function is not retained in the transceiver.

External Speaker

External Speaker is the port that is used to activate the **External Speaker** function.

External Speaker is enabled when the External Speaker port goes low level, regardless of the configuration status of **External Speaker Preset** or the configuration status of **External Speaker** using the **External Speaker** button.

The configuration status of **External Speaker Preset** or the configuration status of **External Speaker** using **External Speaker** button is restored when the External Speaker port goes high level.



- The configuration of **External Speaker** cannot be switched by operating the **External Speaker** button and in Menu Mode while the External Speaker port goes low level.

External Hook

External Hook is the port that is used to switch the state of the microphone hook in the same way as Local Mic Hook.

The microphone goes to the On-hook state when the External Hook port goes low level. The microphone goes to the Off-hook state when the External Hook port goes high level.

Off-hook Decode, Off-hook Horn Alert, Off-hook Scan, Off-hook Connect, On-hook Disconnect, and Optional Signaling are reset in the same manner as Local Mic Hook.

If both the Local Mic Hook and the External Hook port are used, the hook of the microphone behaves according to the configuration in **Hook Control**.

Emergency

Emergency is the port that is used to activate the Emergency function.

The transceiver enters Emergency Mode when the Emergency port goes low level.

The transceiver behaves according to the configuration using KPG-D3/ D3N in Emergency Mode. **Emergency Delay Time** needs to be configured for this port and used to avoid erroneously placing the transceiver in Emergency Mode.

AUX Input Status Message 1 to AUX Input Status Message 3

AUX Input Status Message 1 to AUX Input Status Message 3 are the trigger ports that are used to send a FleetSync, NXDN, or DMR Status Message.

The transceiver sends a Status Message configured for each port to an ID configured for Target ID (FleetSync), Base ID (NXDN), or Base ID (DMR) when the port goes high level to low level or goes low level to high level.

Two statuses (High → Low, and Low → High) can be configured for each port of AUX Input Status Message 1 to AUX Input Status Message 3 by using KPG-D3/ D3N. These ports are normally used as the sensor ports for telemetry purposes.

Note

- The transceiver does not send a Status Message immediately after the transceiver is turned ON since the transceiver does not recognize that the AUX Input port to which “AUX Input Status Message” is assigned has changed.
- If the logic of the port is not changed, the transceiver does not send a Status Message when the analog channel is changed to an NXDN or DMR channel. However, the transceiver sends a Status Message if conditions to send the Status Message are satisfied.

Zeroize

Zeroize is the port that is used to delete an Encryption Key configured for the transceiver.

If the port remains active for the amount of time configured in **Zeroize Delay Time**, the transceiver determines that the port is active. When the port is activated, the Encryption Key configured for the transceiver is deleted.

If “Zeroize” is assigned to the AUX Input port, the logic of the port can be configured Active High or Active Low. The transceiver behaves as follows according to the logic of the port:

Table 13-7 Zeroize

The Logic of the Port	Transceiver Behavior
Active Low	This logic is used to delete an Encryption Key by user operation, such as using the Foot Switch. All Encryption Keys stored in the transceiver are deleted if the port is continuously detected as active for the amount of time configured in Zeroize Delay Time .
Active High	This logic is used to automatically delete an Encryption Key when the transceiver is turned ON to avoid any leakage of encrypted information, such as when the transceiver is stolen. If the port is active when the transceiver is turned ON, all Encryption Keys stored in the transceiver are automatically deleted regardless of the configuration in Zeroize Delay Time .

Scan

Scan is the port that is used to activate the scan function.

When the Scan port goes low level, the scan is started. When the Scan port goes high level, the scan is stopped.

Light Sense

Light Sense is the port that is used to control the backlight of the LCD and the operation of the **LCD Brightness** button.

If the Light Sense port goes low level, "Off" is configured in **LCD Brightness**.

The brightness of the backlight cannot be switched by operating the **LCD Brightness** button, and in Menu Mode.

If the Light Sense port goes high level, the backlight lights at the level configured in **LCD Brightness**. The brightness of the backlight can be switched by operating the **LCD Brightness** button, and in Menu Mode.

Scrambler/Encryption

Scrambler/Encryption is the port that is used to operate the Scrambler/Encryption function.

When the Scrambler/Encryption port goes low level, Scrambler/Encryption is enabled. When the Scrambler/Encryption port goes high level, Scrambler/Encryption is disabled.

Call 1 to Call 6

Call 1 to **Call 6** are the ports that start the various following communications:

- Execution of the Encode Format configured in the 5-tone System Parameter
- Transmission of a DTMF code configured in the DTMF Autodial List
- Transmission of a 2-tone code configured in the 2-tone List
- Transmission of a Status Message configured in the FleetSync Status List
- Transmission of a Status Message configured in the NXDN Status List
- Transmission of an Individual Call to the Unit ID configured in the NXDN Individual ID List
- Transmission of a Status Message configured in the DMR Status List
- Transmission of an Individual Call to the Unit ID configured in the DMR Individual ID List

The various transmissions start when the port becomes active.

"Call 1" to "Call 6" are assigned to the AUX Input ports by using KPG-D3/ D3N, and then the DTMF code, 2-tone code, Status Message, and NXDN Unit ID corresponding to each port can be configured.

Configuration using KPG-D3/ D3N

- Assigning functions to the **AUX Input** port ( **See** Radio Configuration > Global Options > External Device > Mobile AUX > Function Setting)
- Configuring **Emergency Delay Time** ( **See** Radio Configuration > Global Options > External Device > Mobile AUX > AUX Input)
- Configuring **Zeroize Delay Time** ( **See** Radio Configuration > Global Options > External Device > Mobile AUX > AUX Input)
- Configuring various data corresponding to **Call 1** to **Call 6** ( **See** Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call > Call 1~Call 6)

Available Functions for AUX Output Ports

The following functions can be assigned to AUX Output ports:

Table 13-8 Available Functions for AUX Output Ports

Function Name	Description
None	No function is assigned.
LOK	For a Conventional Channel (Analog/ NXDN/ DMR): The output port is active while the transceiver is transmitting. Otherwise, the output port is inactive. For an LTR Trunking system: The output port is activated when the transceiver is linked with a repeater while transmitting. Otherwise, the output port is inactive. For an NXDN Trunking system: The output port is active while the transceiver is transmitting on a traffic channel. Otherwise, the output port is inactive. For a DMR-based Trunking system: The output port is active while the transceiver is transmitting on a traffic channel. Otherwise, the output port is inactive. This function applies to all audio and data communications on the traffic channel. The output signal of LOK can be configured using KPG-D3/ D3N. There are 2 types of LOK Logic Signals: "Continuous" and "Pulse". The port is always at low level while the LOK port is active if "Continuous" is selected. The LOK port is active for the first 30 ms, and then the LOK port returns to open level if "Pulse" is selected.
COR	For a Conventional Channel (Analog/ NXDN/ DMR) or an LTR Trunking system: The output port is active while the transceiver is receiving a carrier. Otherwise, the output port is inactive. However, the output port does not behave for the DMR Conventional Channel (CH Type = Mixed). For an NXDN Trunking system: The output port is active while the transceiver is receiving a carrier. Otherwise, the output port is inactive. For a DMR-based Trunking system: The output port is active while the transceiver is receiving a carrier. Otherwise, the output port is inactive. All carriers as well as DMR signals are targeted.
COR or Channel Busy	The COR or Channel Busy output port is active while the conditions to activate COR or the conditions to activate Channel Busy are satisfied. While conditions to activate COR and Channel Busy are not satisfied, the COR or Channel Busy output port is inactive.
TOR	For a Conventional Channel (Analog/ NXDN): The output port is active while the received QT tone or DQT code (Analog), or RAN code (NXDN) matches the QT tone or DQT code (Analog), or RAN code (NXDN) preconfigured for the transceiver. If QT/ DQT Decode is not configured, the output port is active while the transceiver is receiving a carrier. If RAN Decode is not configured, the output port is active while the transceiver is receiving a RAN code. Otherwise, the output port is inactive. For a DMR Conventional Channel The output port is active while the transceiver unmutes the audio. Otherwise, the output port is inactive. For an LTR Trunking system: The output port is active while a Group ID is received. Otherwise, the output port is inactive. For an NXDN Trunking and DMR-based Trunking system: The output port is active while the transceiver is unmuting the speaker on a traffic channel. Otherwise, the output port is inactive.

Function Name	Description
TOR or Channel Busy	The TOR or Channel Busy output port is active while the conditions to activate TOR or the conditions to activate Channel Busy are satisfied. If conditions to activate the TOR and Channel Busy are not satisfied, the TOR or Channel Busy output port is inactive.
Channel Busy	The output port is active while the transceiver does not accept a remote control request from an external device. The output port is active while the transceiver is in the following states. The output port is active regardless of the configuration in Data Override (AUX Input) while the transceiver is in the following states: • While the transceiver is transmitting (including while a link is established in an LTR Trunking system) • While the Public Address function is used • While System Search is being executed (LTR Trunking) • While the transceiver is in Emergency Mode • While the transceiver is in Transceiver Password Mode • While the transceiver is in the Stun state • While the transceiver is in the Radio Inhibit state • While the transceiver is on an NXDN channel • While the transceiver is on a DMR channel If Data Override (AUX Input) is disabled, the output port is active while the transceiver is in the following states: • While Auto Telephone Search is being executed (LTR Trunking) • While the transceiver is in Function Mode • While an ID is displayed by transmitting and receiving a FleetSync Selcall/ Paging Call, by transmitting and receiving an MDC-1200 Selcall/ Call Alert, by receiving an NXDN Individual Call/ Group Call, or by receiving a DMR Individual Call/ Group Call • While an ID is displayed by transmitting via Caller ID Stack List selection in Stack Mode • While the Public Address function is used • While the transceiver temporarily migrates to a channel by pressing one of the Direct Channel 1 to Direct Channel 5 buttons, Home Channel, or Channel Recall button
System Busy	The output port is active when a repeater has no available channels in an LTR Trunking system. Otherwise, this port is inactive.
AUX A	The port output is changed with the state of the AUX A button. An external device connected to the AUX A port can be controlled.
AUX B	The port output is changed with the state of the AUX B button. An external device connected to the AUX B port can be controlled.
AUX C	The port output is changed with the state of the AUX C button. An external device connected to the AUX C port can be controlled.
PTT Output	The output port is active while the PTT switch is being pressed. Otherwise, this port is inactive.
TXS	The output port is active while the transceiver is transmitting. Otherwise, this port is inactive.
AUX Output ID 1 to AUX Output ID 3	The port output changes by linking with the state of the AUX Output ID 1 port to the AUX Output ID 3 port. External devices connected to each port of AUX Output ID 1 to AUX Output ID 3 can be controlled. AUX Output ID 1 to AUX Output ID 3 can be changed to high level or low level by operating the AUX Output ID 1 to AUX Output ID 3 buttons. If “Off” is configured in State Hold Timer (Active Low): Each time one of the AUX Output ID 1 to AUX Output ID 3 buttons is pressed, the AUX Output ID 1 to AUX Output ID 3 ports are toggled from high level to low level or from low level to high level. If anything other than “Off” is configured in State Hold Timer (Active Low): Pressing the AUX Output ID 1 to AUX Output ID 3 buttons toggles the AUX Output ID 1 to AUX Output ID 3 ports to low level.

Function Name	Description
AUX Output Status Message 1 to AUX Output Status Message 3	The status of these ports are changed when the transceiver receives a FleetSync, NXDN, or DMR Status Message. The transceiver alternates the status of the AUX Output port (High to Low or Low to High) when the received Status Message matches the Status number preconfigured for the port. Two statuses (High → Low, and Low → High) can be configured for each port of AUX Output Status Message 1 to AUX Output Status Message 3 by using KPG-D3/ D3N. These ports are usually used to remotely control the transceiver by connecting an external device to the AUX Output port. Also, the port status can be retained even if the transceiver is turned OFF.  Note This function does not function when the response status for a PC command (AUX Status Request Transmission) is received. For an NXDN system and DMR system, this function is also disabled when the transceiver receives the Radio Check from Remote Control Mode.
Encryption	If the Encryption function (AES, DES, bit scramble, or ARC4) is configured for a received signal, the output port is active while receiving the signal. Otherwise, this port is inactive.
Digital Mode	For a Conventional Channel (Analog/ NXDN/ DMR): If a channel where “NXDN” or “DMR” is configured in Channel Type is selected, the output port is active. If a channel where “Analog” is configured in Channel Type is selected, the output port is inactive. For an NXDN Trunking/ LTR Trunking system: If a channel in an NXDN Trunking system is selected, the output port is active. If a channel in an LTR Trunking system is selected, the output port is inactive. If “Mixed” is configured in Channel Type: The transceiver behaves as follows according to the configuration in Transmit Mode (Analog or Digital): Analog: - While Signaling Reset Timer (or Auto Reset Timer) is not activated, the output port is inactive. - When the transceiver receives a digital signal and transmits the digital signal by activating Signaling Reset Timer or Auto Reset Timer, the output port is active. - When the duration configured by Signaling Reset Timer (or Auto Reset Timer) elapses and the output port transmits analog signals, the output port is inactive. Digital: - While Signaling Reset Timer (or Auto Reset Timer) is not activated, the output port is active. - When the transceiver receives an analog signal and transmits the analog signal by activating Signaling Reset Timer or Auto Reset Timer, the output port is inactive. - When the duration configured by Signaling Reset Timer (or Auto Reset Timer) elapses and the output port transmits digital signals, the output port is active.
Out of Range	The output port is active if Out of Range Indicator is enabled in the transceiver and the transceiver is in the Out of Range state in an NXDN Conventional system, NXDN Trunking system, NXDN Site Roaming system, DMR Conventional system, DMR-based Trunking system, and DMR Site Roaming system. Otherwise, the output port is inactive.

Configuration using KPG-D3/ D3N

- Assigning functions to the AUX Output port ( **See** Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)
- Configuring **LOK Logic Signal** ( **See** Radio Configuration > Global Options > External Device > Mobile AUX > AUX Output)
- Configuring **Data Override** ( **See** Radio Configuration > Global Options > External Device > Mobile AUX > AUX Input)

Dwell Time

Dwell Time is the delay time to return to the voice channel when the state of the DTC port or Data PTT port on the AUX Input port changes from active to inactive. Also, when the External PTT (Direct Channel 1 Voice) port to External PTT (Direct Channel 5 Voice) port change from active to inactive, this delay time is the time until the transceiver returns to the channel which was used before the change to Direct Channel.

This function is used such as when an external device waits to receive an acknowledgment from the receiving transceiver, or to receive Talkback from the other party which communicated by using the External PTT (Direct Channel 1 Voice) port to External PTT (Direct Channel 5 Voice) port.

Configuration using KPG-D3/ D3N

Configuring **Dwell Time** ( See Radio Configuration > Global Options > External Device > Mobile AUX > AUX Input)

Avoiding Noise and Chattering on the AUX Input Port (Debounce Time)

Debounce Time is the amount of time to avoid the influence of noise and chattering that occurs on the AUX Input port.

If noise or chattering does not occur while the amount of time configured in **Debounce Time** elapses, the AUX Input Port where Debounce is enabled is activated. Using this function prevents the state of the AUX Input port from being erroneously changed by noise and chattering.

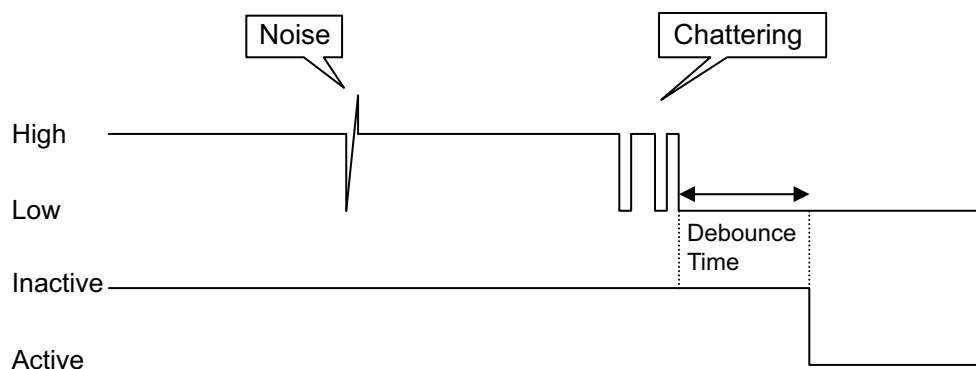


Figure 13-4 Debounce Time

Configuration using KPG-D3/ D3N

Configuring **Debounce Time** ( See Radio Configuration > Global Options > External Device > Mobile AUX > AUX Input)

State Hold Timer (Active Low)

State Hold Timer (Active Low) is the length of time that the AUX Output Status Message ports remain at the low level after these ports go low level.

The AUX Output Status Message ports go high level when the amount of time configured in **State Hold Timer (Active Low)** elapses.

If “Off” is configured in **State Hold Timer (Active Low)**, the timer is not activated. In this case, the AUX Output Status Message ports remain at low level from when the AUX Output Status Message ports go low level until the transceiver receives a Status Message which changes the AUX Output Status Message ports to high level.

Configuration using KPG-D3/ D3N

Configuring **State Hold Timer (Active Low)** ( See Radio Configuration > Global Options > External Device > Mobile AUX > AUX Output)

Retain AUX Output Status

Retain AUX Output Status can be used to retain the output status of AUX Output Status Message 1 to AUX Output Status Message 3.

If this function is enabled, the output status of each of AUX Output Status Message 1 to AUX Output Status Message 3 is retained. When the transceiver is turned ON, the transceiver restores the last status prior to the transceiver being turned OFF (high level or low level).

If this function is disabled, the output status of each of AUX Output Status Message 1 to AUX Output Status Message 3 is not retained and the port always goes high level when the transceiver is turned ON.

Configuration using KPG-D3/ D3N

Configuring **Retain AUX Output Status** ( See Radio Configuration > Global Options > External Device > Mobile AUX > AUX Output)

Functions When Sending by Using the External PTT and Data PTT

The following functions that are used for sending by using the External PTT (Voice), External PTT (Data), External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice), and Data PTT can be configured using KPG-D3/ D3N.

Note

- In this section, External PTT (Voice), External PTT (Data), and External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) are described as External PTT.

Table 13-9 External PTT, Data PTT

Configuration	Operation
Modulation Line	Which modulation line is enabled can be configured for the External PTT (Voice) ports, External PTT (Data) ports, External PTT (PA) ports, External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) ports, and Data PTT ports. The following modulation lines are available: Mic Line Whether the audio line of the microphone that is connected to the microphone connector of the transceiver or the audio line of KCT-72 is enabled when transmitting by using the Mic PTT, External PTT, and Data PTT ports can be configured. MI2 Line Whether to enable the audio modulation line of the D-sub 15-pin connector of the transceiver when transmitting by using the Mic PTT, External PTT, and Data PTT ports can be configured. If the transceiver transmits by using the External PTT (Voice) port, the transceiver is often configured to be modulated only by the MI2 Line. DI Line Whether to enable the data modulation line of the D-sub 15-pin connector of the transceiver when transmitting by using the Mic PTT, External PTT, and Data PTT ports can be configured. If the transceiver transmits by using the External PTT (Data) or Data PTT port, the transceiver is normally configured to be modulated only by the DI Line. However, the DI Line is enabled only when transmitting on an analog channel. Note - The MI2 Line and the DI Line use the same port (Pin No.5) of the D-sub 15-pin connector. By default, the port can be used as the DI Line. To use the port as the MI2 Line, the port configuration needs to be changed. Refer to the service manual for instructions on how to change the port configuration.
With QT/ DQT	Whether to multiplex the QT tone or DQT code configured for an analog channel when transmitting by using the Mic PTT, External PTT, and Data PTT ports can be configured. Normally, QT tone or DQT code is configured to be multiplexed. This function functions only on an analog channel.
With STE	Whether to send the STE (Squelch Tail Eliminator) after sending the QT tone or DQT code configured for an analog channel when transmitting by using the Mic PTT, External PTT, and Data PTT ports can be configured. Normally, the transceiver is configured to send the STE. Sending the Squelch Tail Eliminator eliminates the noise that occurs in the receiving transceiver when transmission ends. This function functions only on an analog channel.

Configuration	Operation
Control Head Mic Input	Whether the audio line path of the 8 Pin Modular Jack or of KCT-72 is used can be configured when transmitting by using the Mic PTT, External PTT, and Data PTT ports can be configured. (Refer to Separating the Control Head and RF Deck.)
Auto Microphone 7 Select	Auto Microphone 7 Select is the function to automatically switch the Microphone Type configuration to “Microphone 7” when the External PTT (Voice) port becomes active. This function is used when microphones such as KCT-73MIC and KMC-35 are simultaneously operated. Using this function, the configuration of Microphone Type does not need to be switched even if the microphone to be used is changed. If Auto Microphone 7 Select is enabled, the Microphone Type configuration is automatically switched to “Microphone 7” when the External PTT (Voice) port and the External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) ports become active. If the External PTT (Voice) port and the External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) ports become inactive, the Microphone Type configuration before the switch is restored.

Configuration using KPG-D3/ D3N

Configuring functions used when sending by using External PTT and Data PTT

( **See** Radio Configuration > Global Options > External Device > Mobile > Modulation Line)

Migrating to a Zone-channel by Using a Connected External Device (Remote Zone-Channel)

Remote Zone-Channel is the function to migrate to one of a maximum of 15 zones and channels by using the Channel Select A to Channel Select D ports.

The transceiver migrates to a zone and channel configured in the Remote Zone-Channel List if one of the Channel Select A to Channel Select D ports goes low level.

Table 13-10 Remote Zone-Channel List Number Corresponding to Each Channel Select Port

Remote Zone-Channel	AUX Input port			
	Channel Select D	Channel Select C	Channel Select B	Channel Select A
No.1	High	High	High	Low
No.2	High	High	Low	High
No.3	High	High	Low	Low
No.4	High	Low	High	High
No.5	High	Low	High	Low
No.6	High	Low	Low	High
No.7	High	Low	Low	Low
No.8	Low	High	High	High
No.9	Low	High	High	Low
No.10	Low	High	Low	High
No.11	Low	High	Low	Low
No.12	Low	Low	High	High
No.13	Low	Low	High	Low
No.14	Low	Low	Low	High
No.15	Low	Low	Low	Low
Not Configured*1	High	High	High	High

*1 If Remote Zone-Channel is not configured, the transceiver cannot migrate to a zone or channel.

Note

- A zone and channel for which no channel data is configured cannot be configured in the Remote Zone-Channel List.

Configuration using KPG-D3/ D3N

- Assigning functions to the AUX Input port ( See Radio Configuration > Global Options > External Device > Mobile AUX > Function Setting)
- Configuring **Remote Zone-Channel** ( See Radio Configuration > Global Options > External Device > Mobile AUX > Remote Zone-Channel)

Optimizing Various Signal Levels

The DI Level, DEO Level, and AFO Level can be configured using KPG-D3/ D3N.

DI Level

DI Level is the input signal level of the DI port available on the D-sub 15-pin connector of the transceiver. The input signal level can be optimized according to the devices that are connected to the transceiver.

DEO Level

DEO Level is the output signal level of the DEO port available on the D-sub 15-pin connector of the transceiver. The output signal level can be optimized according to the devices that are connected to the transceiver.

AFO Level

AFO Level is the output signal level of the AFO port available on the D-sub 15-pin connector of the transceiver. The output signal level can be optimized according to the devices that are connected to the transceiver.

The AFO port and the DEO port use the same port (Pin No.4) of the D-sub 15-pin connector.

By default, the port can be used as the DEO port. To use the port as the AFO port, the port configuration needs to be changed. Refer to the service manual for instructions on how to change the port configuration.

Configuration using KPG-D3/ D3N

- Configuring **DI Level** ( See Radio Configuration > Global Options > External Device > Mobile > Modulation Line)
- Configuring **DEO Level** ( See Radio Configuration > Global Options > External Device > Mobile > Modulation Line)
- Configuring **AFO Level** ( See Radio Configuration > Global Options > External Device > Mobile > Modulation Line)

13.3

Separating the Control Head and RF Deck

Supported Models: Mobile

By using KRK-19B and KRK-18H, the Control Head and RF Deck (the transceiver) can be separated as in the diagram below:

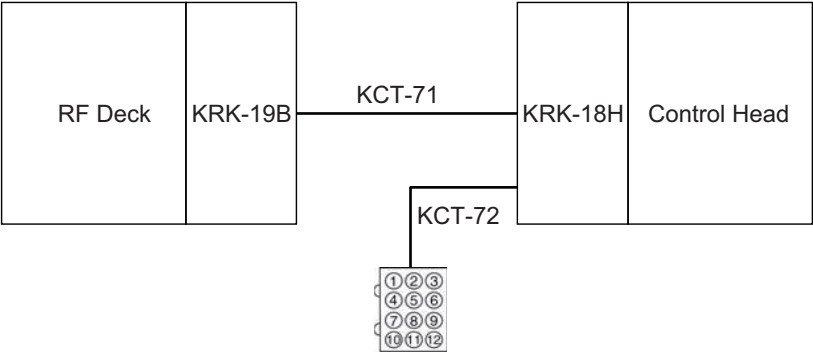


Figure 13-5 Separation of the Control Head and RF Deck

KRK-19B and KRK-18H are connected by the KCT-71 cable. The following optional accessories can be connected to KRK-18H via KCT-72 cable:

- KCT-74PTT (External PTT Kit)
- KCT-73MIC (External Mic Kit)
- KCT-18 (Ignition Sense Cable)

Note

- The KCT-72 connector specifications are as follows:

Table 13-11 KCT-72 Connector Specifications

Pin Number	Function
1	Ignition Signal Input
2	Switched B Output
3	Ground
4	AUX MIC Input
5	Ground for AUX MIC
6	AI1 Input
7	AI2 Input
8	AO1 Output
9	AO2 Output
10	NC
11	NC
12	Ground

Transceiver behavior

“Wait...” appears on the display if the FPU data of the Control Head and RF Deck do not match when the transceiver is turned ON after the Control Head and RF Deck are separated. The FPU data is transferred from the RF Deck to the Control Head while “Wait...” appears. The transceiver turns ON in user mode when the transfer of the FPU data ends.

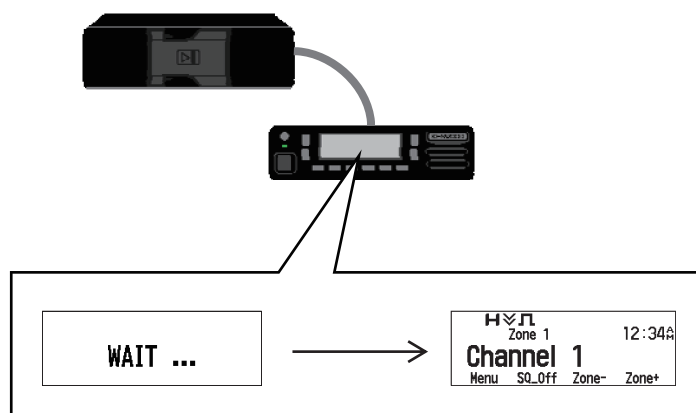


Figure 13-6 Transceiver Behavior When the Transceiver Is Turned ON

Note

- To separate the Control Head and RF Deck and use the transceiver, firmware version 1.30.00 or later needs to be written to the transceiver. If a firmware earlier than version 1.30.00 is written to the transceiver, the transceiver does not start even if the Control Head and RF Deck are separated.

Selecting the Audio Input Line for Separating and Using the Control Head (Control Head Mic Input)

Control Head Mic Input is the function to select whether to input audio from the microphone connected to 8 Pin Modular Jack of Control Head or from the MIC Input side of the connection cable (KCT-72).

If the Control Head and RF Deck (the transceiver) are separated by using KRK-19B and KRK-18H, the microphone can be connected to the 8 Pin Modular Jack of the Control Head, or KRK-18H and the microphone can be connected via KCT-72. At this time, configuring whether to input audio from the microphone connected to 8 Pin Modular Jack or from the Mic Input of KCT-72 is required.

As in the case of the following diagram, select whether to input audio from KMC-35 (Microphone) connected to 8 Pin Modular Jack or from KCT-73MIC (External Mic) connected via KCT-72.

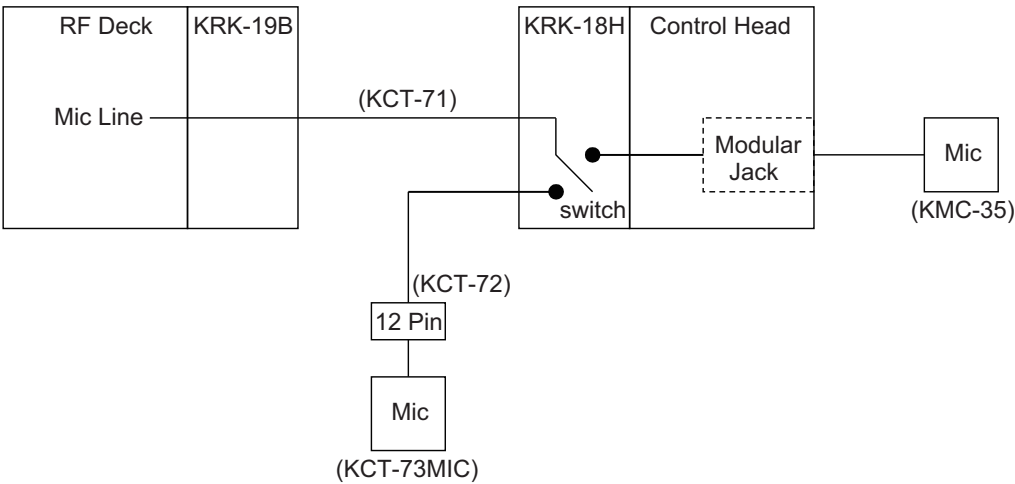


Figure 13-7 Control Head Mic Input

Table 13-12 Control Head Mic Input

Configuration	Description
Modular Jack	Inputs audio from the microphone connected to the Modular Jack.
KCT-72	Inputs audio from the Mic Input of KCT-72.

Note

- The transceiver can determine whether or not the Control Head and RF Deck are separated. For this reason, even if “KCT-72” is configured in **Control Head Mic Input**, if the Control Head and RF Deck are not separated, the audio input from the microphone which is connected to the Modular Jack becomes enabled regardless of the configuration in **Control Head Mic Input**.

Configuration using KPG-D3/ D3N

Configuring **Control Head Mic Input** (See Radio Configuration > Global Options > External Device > Horn/Modulation > Modulation Line)

13.4 Hook

Supported Models: Mobile

Hook Control exists as a function to control the microphone hook status for Mobile.

Hook Control is the function to specify the conditions to place the transceiver in the on-hook state if both the Local Mic Hook and the External Hook are used. By using this function, whether the on-hook state of the transceiver when both the Local Mic Hook and the External Hook are used is determined by AND or by OR can be changed.

The transceiver behaves as follows according to the configuration in **Hook Control** (AND, OR):

● AND

The transceiver behaves as the on-hook state if both the Local Mic Hook and External Hook are in the on-hook state. Also, the transceiver behaves as the off-hook state if either the Local Mic Hook or External Hook is in the off-hook state.

● OR

The transceiver behaves as the on-hook state if either the Local Mic Hook or External Hook is in the on-hook state. Also, the transceiver behaves as the off-hook state if both the Local Mic Hook and External Hook are in the off-hook state.

Hook Control is applied to the following configurations:

- Off-hook Scan
- Off-hook Voting
- Off-hook Site Roaming
- Off-hook Decode
- Off-hook Connect
- Off-hook Speaker Revert

Configuration using KPG-D3/ D3N

Configuring **Hook Control** ( See Radio Configuration > Global Options > Basics > General > Control > Microphone-hook)

Supported Models: Mobile

When the transceiver is installed in a vehicle, functions linked to the vehicle, such as Ignition Sense or Horn Alert, can be used.

14.1 Turning the Transceiver ON or OFF According to the State of the Ignition Sense Port (Ignition Sense)

Ignition Sense is the function to automatically turn the transceiver ON or OFF according to the status of the Ignition Sense port of a vehicle. While the vehicle engine is running, high level is entered for the Ignition Sense port, and when the vehicle engine is not running, low level is entered for the Ignition Sense port.

Note

- To use the Ignition Sense function, the optional KCT-18 Ignition Sense cable and the Ignition Line of the vehicle need to be connected.

Usage of the Ignition Sense Port

The method of turning the transceiver ON or OFF using the Ignition Sense port varies depending on the configuration in **Ignition Sense**.

● Turning the transceiver ON or OFF according to the state of the Ignition Sense port

The transceiver can be turned ON or OFF according to the state of the Ignition Sense port if “Ignition Only” is configured in **Ignition Sense**.

The transceiver is automatically turned ON when the Ignition Sense port goes high level and is automatically turned OFF when the port goes low level. The transceiver cannot be turned ON or OFF by pressing the **Power** switch.

● Turning the transceiver ON or OFF using both the Ignition Sense port and Power switch

If “Ignition & Switch” is configured in **Ignition Sense**, the transceiver can be turned ON or OFF using both the **Power** switch and the Ignition Sense port.

The transceiver can be turned OFF by pressing the **Power** switch even if the vehicle engine is running (the state of the Ignition Sense port is High). However, the state of the **Power** switch is not retained.

Also, the transceiver is turned ON when the state of the Ignition Sense port switches from low level to high level.

Configuration using KPG-D3/ D3N

Configuring **Ignition Sense** ( See Radio Configuration > Global Options > Basics > General > Power-on/off > Mobile)

The Amount of Time Until the Transceiver Is Turned OFF (Timed Power-off)

Timed Power-off is the amount of time from when the vehicle engine stops running (the state of the Ignition Sense port is at low level) until the transceiver is automatically turned OFF.

If the amount of time configured in **Timed Power-off** elapses after the vehicle engine stops running, the transceiver is automatically turned OFF. This function is used for continuing communications even if the vehicle engine is not running.

A Timed Power-off Pre-alert Tone sounds from the transceiver in the following manners if anything other than “Off” is configured in **Warning Tone**:

- 1 min before the transceiver is turned OFF: The transceiver beeps twice. (Timed Power-off Pre-alert Tone A)
- 10 sec before the transceiver is turned OFF: The transceiver beeps 4 times. (Timed Power-off Pre-alert Tone B)
- 2 sec before the transceiver is turned OFF: The transceiver beeps continuously. (Timed Power-off Pre-alert Tone C)

Note

- **Timed Power-off** is reset if the Ignition Sense port goes high level.
- If “Ignition & Switch” is configured in **Ignition Sense**, **Timed Power-off** is not activated when the transceiver is turned ON by pressing and holding the **Power** switch.
- If “Ignition & Switch” is configured in **Ignition Sense**, the **Timed Power-off** timer is reset when the **Power** switch is pressed while **Timed Power-off** is functioning. Pressing and holding the **Power** switch turns the transceiver OFF.

Configuration using KPG-D3/ D3N

Configuring **Timed Power-off** ( See Radio Configuration > Global Options > Basics > General > Power-on/off > Mobile)

14.2 Controlling Vehicle Operation According to the State of the Horn Alert Port (Horn Alert)

Horn Alert is the function to activate the Horn Alert port for a certain amount of time when the transceiver receives a call. This function turns headlights On of the vehicle connected to the Horn Alert port and makes the horn sound. Therefore, a user can recognize that the transceiver has received a call with lighting of headlights of the vehicle and the horn even if the user is away from the transceiver.

Pressing the **Horn Alert** button enables or disables Horn Alert.

Horn Alert can also be enabled or disabled by selecting “Horn Alert” after entering Menu Mode by pressing the **Menu** button. (Refer to [Using Menu Mode.](#))

Operating the transceiver

● Enabling the Horn Alert

Press the **Horn Alert** button while Horn Alert is disabled.

Horn Alert is enabled, and then the “” icon appears.



● Disabling the Horn Alert

Press the **Horn Alert** button while Horn Alert is enabled.

Horn Alert is disabled, and then the “” icon disappears.



Note

- The Horn Alert port functions according to the configuration in **Logic Pattern**. (Refer to [Logic Pattern.](#))
- While the state of the Ignition Sense port is at high level, the Horn Alert port is not activate even if the transceiver receives a call. (Refer to [Turning the Transceiver ON or OFF According to the State of the Ignition Sense Port \(Ignition Sense\).](#))

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Conditions to Activate the Horn Alert

The conditions to activate the Horn Alert vary on a Conventional Channel (Analog/ NXDN/ DMR), in an LTR Trunking system, in an NXDN Trunking system, or in a DMR-based Trunking system.

Conventional Channel (Analog/ NXDN/ DMR)

On a Conventional Channel (Analog/ NXDN/ DMR), one of the following conditions needs to be satisfied to activate the Horn Alert:

Table 14-1 Conditions to Activate the Horn Alert (Conventional Channel (Analog/ NXDN/ DMR))

Type	Conditions
Analog Conventional	- If the transceiver receives an Option Signaling while Horn Alert is enabled - If the transceiver receives a Paging Call while Horn Alert is enabled - If the transceiver receives a Call Alert while Horn Alert is enabled - If the transceiver receives Status 89 of FleetSync regardless of whether Horn Alert is enabled or disabled (except the Status of the response to a PC command for AUX Status Request Transmission)
NXDN Conventional	- If the transceiver receives an Option Signaling while Horn Alert is enabled - If the transceiver receives a Paging Call while Horn Alert is enabled - If the transceiver receives Horn Alert Status regardless of whether Horn Alert is enabled or disabled (except the Status of the response to a PC Command for AUX Status Request Transmission)
DMR Conventional	- If the transceiver receives an Individual Call or a Group Call while Horn Alert is enabled (except an Unaddressed Call) - If the transceiver receives a Paging Call while Horn Alert is enabled - If the transceiver receives Horn Alert Status regardless of the Horn Alert configuration - If the transceiver receives a Telephone Call (a Telephone Call using an Individual Call or Group Call in the KAIROS system (SIP Call))

LTR Trunking System

In an LTR Trunking system, Horn Alert can be enabled or disabled in each Group ID by using KPG-D3/ D3N.

● If Horn Alert is configured for the Horn Alert button or Menu Mode

One of the following conditions needs to be satisfied to activate Horn Alert:

- When Horn Alert is enabled by pressing the **Horn Alert** button or by selecting “Horn Alert” from Menu Mode
- If “Activation” is configured in **Power-on**

If one of the above conditions is satisfied, Horn Alert is activated under the following conditions:

- When the received Group ID matches if “None” is configured in **Optional Signaling** of the Group ID which the transceiver waits for and Horn Alert is enabled
- When the received Group ID and Optional Signaling match if “DTMF” or “FleetSync” is configured in **Optional Signaling** of the Group ID which the transceiver waits for and Horn Alert is enabled However, “FleetSync” needs to be configured in Optional Signaling for a Paging Call.
- When the Fix ID for which Horn Alert is enabled matches the received Group ID

Regardless of the above conditions, the configuration of Optional Signaling, and all other configurations related to Horn Alert, the Horn Alert port is activated according to the configuration in **Logic Pattern** when the transceiver receives Status No.89 of FleetSync.

● If Horn Alert is not configured for both the Horn Alert button and Menu Mode

Horn Alert is activated in the following conditions:

- When the received Group ID matches if “None” is configured in Optional Signaling of the Group ID which the transceiver waits for and Horn Alert is enabled
- When the received Group ID and Optional Signaling match if “DTMF” or “FleetSync” is configured in Optional Signaling of the Group ID which the transceiver waits for and Horn Alert is enabled However, “FleetSync” needs to be configured in Optional Signaling for a Paging Call.
- When the Fix ID for which Horn Alert is enabled matches the received Group ID

Regardless of the above conditions, the configuration of Optional Signaling, and all other configurations related to Horn Alert, the Horn Alert port is activated according to the configuration in **Logic Pattern** when the transceiver receives Status No.89 of FleetSync.

NXDN Trunking System

In an NXDN Trunking system, one of the following conditions needs to be satisfied to activate Horn Alert:

- If the transceiver receives an Individual Call or a Group Call while Horn Alert is enabled
- If the transceiver receives a Paging Call while Horn Alert is enabled
- If the transceiver receives Horn Alert Status regardless of whether Horn Alert is enabled or disabled (except the Status of the response to a PC Command for AUX Status Request Transmission)
- If the transceiver receives a Telephone Call while Horn Alert is enabled
- If the Option Signaling matches while Horn Alert is enabled

DMR-based Trunking System

In a DMR-based Trunking system, one of the following conditions needs to be satisfied to activate Horn Alert:

- If the transceiver receives an Individual Call or a Group Call while Horn Alert is enabled
- If the transceiver receives Horn Alert Status regardless of whether Horn Alert is enabled or disabled (except when the transceiver receives the Horn Alert Status of the response to a PC command for AUX Status Request Transmission)
- If the transceiver receives a Telephone Call while Horn Alert is enabled

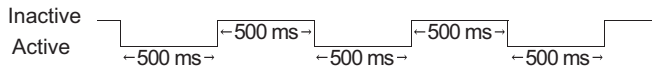
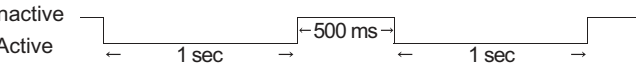
Configuration using KPG-D3/ D3N

- Configuring **Horn Alert Status** (NXDN) ( See Radio Configuration > Protocol Options > NXDN > Status > Horn Alert Status)
- Configuring **Horn Alert Status** (DMR) ( See Radio Configuration > Protocol Options > DMR > Status > Horn Alert Status)

Logic Pattern

Logic Pattern is the function to activate the Horn Alert port depending on the configuration when Horn Alert functions. The manner in which the Horn Alert port is activated when the Horn Alert functions can be configured using KPG-D3/ D3N.

Table 14-2 Logic Pattern

Configuration	Description
Until Reset	The Horn Alert port remains active until the matching status of Optional Signaling is reset.
1 sec to 30 sec	The Horn Alert port remains active for configured amount of time.
Pulse	The Horn Alert port is activated 3 times at 500 ms intervals.  Figure 14-1 Pulse Only when a Fix ID is received, the Horn Alert port becomes active for 1 sec, subsequently becomes inactive for 500 ms, and then becomes active for 1 sec again.  Figure 14-2 Pulse (Fix ID)

Note

- If the amount of time configured in **Logic Pattern** is longer than the amount of time configured in **Auto Reset Timer**, the Horn Alert port is not deactivated even if the Auto Reset Timer elapses. The Horn Alert port is deactivated when the amount of time configured in **Logic Pattern** elapses.
- Operating one of the following while Horn Alert is functioning deactivates Horn Alert:
 - When the **Horn Alert** button is pressed (the Horn Alert is disabled)
 - When the state of the microphone hook is changed
 - When a button is pressed

Configuration using KPG-D3/ D3N

Configuring **Logic Pattern** ( See Radio Configuration > Global Options > External Device > Mobile > Horn Alert)

Activating Horn Alert According to the Microphone Hook (Off-hook Horn Alert)

Off-hook Horn Alert is the function to activate the Horn Alert according to the microphone hook status when Horn Alert functions.

Refer to “[Conditions to Activate the Horn Alert](#)” for conditions to activate Horn Alert.

Table 14-3 Off-hook Horn Alert

Configuration	Description
Enabled	Horn Alert is activated regardless of the microphone on- or off-hook state.
Disabled	Horn Alert is activated only if the microphone is on-hook.

Note

- On-hook indicates the state that the microphone is hooked. Off-hook indicates the state that the microphone is not hooked.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Horn Alert** ( See Radio Configuration > Global Options > External Device > Mobile > Horn Alert)

Horn Alert Status When the Transceiver Is Turned ON (Power-on)

Power-on is the function to enable or disable Horn Alert depending on the configuration when the transceiver is turned ON. The Horn Alert state when the transceiver is turned ON can be configured using KPG-D3/ D3N.

Table 14-4 Horn Alert Mode

Configuration	Description
Deactivation	When the transceiver is turned ON, the transceiver always starts up with Horn Alert disabled.
Retention	If Horn Alert is enabled or disabled by pressing the Horn Alert button or selecting Horn Alert from Menu Mode, the status of Horn Alert, either enabled or disabled, can be retained in the transceiver. When the transceiver is turned ON, the transceiver starts up in the same Horn Alert state as was retained in the transceiver (enabled or disabled).
Activation	When the transceiver is turned ON, the transceiver always starts up with Horn Alert enabled.

Configuration using KPG-D3/ D3N

Configuring **Power-on** ( See Radio Configuration > Global Options > External Device > Mobile > Horn Alert)

The transceiver has password functions for protecting the transceiver operation and the security of the configuration data.

15.1 Password for Transceiver Operation (Transceiver Password)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Transceiver Password protects the transceiver from unauthorized usage.

Placing the transceiver in Transceiver Password Mode prevents the transceiver from being used. The transceiver exits Transceiver Password Mode and becomes available if a password is entered and the password is correct.

Pressing the **Transceiver Password** button places the transceiver in Transceiver Password Mode.

Or, pressing the **Menu** button places the transceiver in Menu Mode, and then selecting “Transceiver Password” places the transceiver in Transceiver Password Mode. (Refer to [Using Menu Mode.](#))

A password can be configured for the transceiver using KPG-D3/ D3N. The password can be configured using any numbers between 0 and 999999 inclusive.

Note

- If **Transceiver Password** is configured but no Transceiver Password is configured for the **Transceiver Password** and **Menu** buttons, the transceiver enters Transceiver Password Mode when the transceiver is turned ON.

Operating the transceiver

● Placing the transceiver in Transceiver Password Mode

Press the **Transceiver Password** button.

The transceiver enters Transceiver Password Mode.

 Password
Input Password

● Exiting the Transceiver Password Mode

1 Enter a password in Transceiver Password Mode.

Refer to “[Entering or Deleting a Code](#)” for entry methods.

 Password
0123
Confirm Delete

2 Press the **Menu** () or **[*]** button after entry.

If the password matches, a Password Authorization Tone (2 beeps) sounds from the transceiver and the transceiver enters User Mode.

Configuration using KPG-D3/ D3N

- Configuring **Password** ( [See](#) Radio Configuration > Global Options > Security > Password > Transceiver Operation > Transceiver Password > Transceiver Operation)
- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

15.2 Password When Reading Configuration Data in a PC (Password (Read))

Password (Read) is the function to protect the configuration data, such as the operating frequencies, from being read by unauthorized persons if the transceiver should ever be stolen.

To read data using KPG-D3/ D3N from the transceiver with **Password (Read)** configured, a password needs to be entered on a PC. The configuration data in the transceiver cannot be read unless the correct password is entered.

Password (Read) can be configured for the transceiver using KPG-D3/ D3N. A password can be arbitrarily configured using a maximum of 16 alphanumeric characters.

Note

- If the password authentication fails consecutively for the number of times configured in **Password Entry Limit**, the transceiver enters Transceiver Lockout Mode, and then "LOCKOUT" appears on the display. However, for Portable (Full Key Model/ Standard Key Model), even if "Simple Type" is configured in **Display Type**, "LOCKOUT" appears in the same layout as "Normal Type". Also, for Portable (Basic Model), the LED lights switching between yellow and red. In Transceiver Lockout Mode, the transceiver cannot be operated. Writing configuration data to the transceiver by using KPG-D3/ D3N, the transceiver exits Transceiver Lockout Mode.

Also, a failure in **Password (Write)** authentication counts as a failure in the password authentication. The number of failures in the password authentication is cleared by one of the following conditions:

- When the transceiver is turned OFF and then turned ON again
- When the correct password is entered
- When configuration data is written to the transceiver by using KPG-D3/ D3N

Configuration using KPG-D3/ D3N

- Configuring **Password (Read)** ( **See** Radio Configuration > Global Options > Security > Password > FPU Data File > Read/Write > Read/Write Password)
- Configuring **Password Entry Limit** ( **See** Radio Configuration > Global Options > Security > Password > FPU Data File > Read/Write > Read/Write Password)

15.3 Password for Writing Configuration Data (Password (Write))

Password (Write) is the function to protect the configuration data from being overwritten by unauthorized persons if the transceiver should ever be stolen.

To write data using KPG-D3/ D3N to the transceiver with **Password (Write)** configured, a password needs to be entered on a PC.

Password (Write) can be configured for the transceiver using KPG-D3/ D3N. A password can be arbitrarily configured using a maximum of 16 alphanumeric characters.

Note

- Copying data from another transceiver cannot occur by using the Clone function if **Password (Write)** is configured for the transceiver.
- If the password authentication fails consecutively for the number of times configured in **Password Entry Limit**, the transceiver enters Transceiver Lockout Mode, and then "LOCKOUT" appears on the display. However, for Portable (Full Key Model/ Standard Key Model), even if "Simple Type" is configured in **Display Type**, "LOCKOUT" appears in the same layout as "Normal Type". Also, for Portable (Basic Model), the LED lights switching between yellow and red. In Transceiver Lockout Mode, the transceiver cannot be operated. Writing configuration data to the transceiver by using KPG-D3/ D3N, the transceiver exits Transceiver Lockout Mode.

Also, a failure in **Password (Read)** authentication counts as a failure in the password authentication. The number of failures in the password authentication is cleared by one of the following conditions:

- When the transceiver is turned OFF and then turned ON again
- When the correct password is entered
- When configuration data is written to the transceiver by using KPG-D3/ D3N

Configuration using KPG-D3/ D3N

- Configuring **Password (Write)** ( See Radio Configuration > Global Options > Security > Password > FPU Data File > Read/Write > Read/Write Password)
- Configuring **Password Entry Limit** ( See Radio Configuration > Global Options > Security > Password > FPU Data File > Read/Write > Read/Write Password)

15.4 Restricting the Functions of KPG-D3/ D3N (Read FPU Data Inhibition)

The following are the specifications if the **Read FPU Data Inhibition** configuration is enabled:

- The following functions cannot be used:

- The reading of FPU data
- Clone Mode ^{*1}
- Front Panel Programming Mode ^{*1}
- Read/Write Password ^{*2}

^{*1} The mode cannot be configured on the FPU.

^{*2} Read/Write Password cannot be configured if **Read FPU Data Inhibition** is configured.

Also, if **Read FPU Data Inhibition** is enabled for the FPU data with Read/Write Password configured, the password configuration is deleted.

- The log can be read from the transceiver if **Read Log Data** is executed, but FPU data is not included.
- If the version of the firmware to be updated is earlier than 4.00.00 when the firmware is written, the FPU data is deleted after the firmware is updated. If the version of the firmware to be updated is 4.00.00 or later, the FPU data is not deleted even if the firmware is updated.

Configuration using KPG-D3/ D3N

Configuring **Read FPU Data Inhibition** to be enabled or disabled ( See Radio Configuration > Global Options > Security > Password > FPU Data File)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

The transceiver is equipped with an internal clock IC. Using the internal clock IC, the current time can be displayed on the display.

16.1 Displaying the Current Time

Pressing the **Clock** button displays the current time on the display.

The current time also appears when “Clock” is selected after entering Menu Mode by pressing the **Menu** button. (Refer to [Using Menu Mode](#).)

Operating the transceiver

1 Press the **Clock** button.

The current time appears.

- 12H Display



- 24H Display



2 Press the **Home** button to exit the mode.

If Menu Mode is entered by using the **Menu** button, pressing and holding the **Home** button restores Menu Mode.

Note

- If Clock Display is enabled, the current time appears on the display when the transceiver is turned ON.
- The transceiver is equipped with a separate battery for the clock IC. If the second rechargeable battery runs out, the clock will not be displayed properly. Recharge the battery and then configure the clock again. In this case, “- - : - -” appears.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Clock Display** ([See](#) Radio Configuration > Global Options > Basics > Display/Language > Display)

16.2 Adjusting the Time

Pressing the **Clock Adjustment** button causes the transceiver to enter Clock Adjustment Mode and then date and time can be adjusted.

Also, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the transceiver enters Clock Adjustment Mode by selecting “Clock Adjustment” and the date and time can be adjusted. (Refer to [Using Menu Mode.](#))

Note

- When the data configured by using KPG-D3/ D3N is written to the transceiver, the date and time of the internal clock of the transceiver can be adjusted by sending the date and time configured on the PC to the transceiver. ( [See](#) Read/Write > Write Configuration > Write Data List)

Operating the transceiver

The following is the operation example when “Year/Month/Day” is configured in **Date Format** and “12H” is configured in **Time Format**:

1 Press the **Clock Adjustment** button.

A Button Beep A (1 beep) sounds from the transceiver, and then the transceiver enters Clock Adjustment Mode.

The following operations are the same even if the transceiver enters Clock Adjustment Mode by pressing the **Menu** button:

Clock Adjust	
Date	'16/04/19
Time	12:34
OK	Back

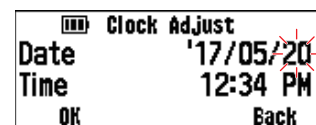
2 Configure the year by pressing the [**▲**] or [**▼**] button, and then press the [**▶**] button.

Clock Adjust	
Date	'17/04/19
Time	12:34 PM
OK	Back

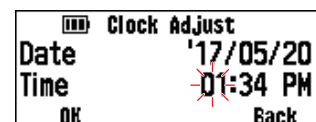
3 Configure the month by pressing the [**▲**] or [**▼**] button, and then press the [**▶**] button.

Clock Adjust	
Date	'17/05/19
Time	12:34 PM
OK	Back

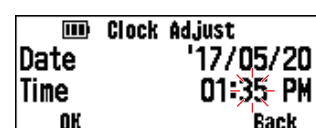
- 4** Configure the day by pressing the [▲] or [▼] button, and then press the [▶] button.



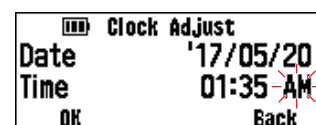
- 5** Configure the hour by pressing the [▲] or [▼] button, and then press the [▶] button.



- 6** Configure the minute by pressing the [▲] or [▼] button, and then press the [▶] button.



- 7** Configure the display format for the time by pressing the [▲] or [▼] button, and then press the Menu ([□]) or [*] button.



A Button Beep C (3 beeps) sounds from the transceiver, and then the date and time is determined.



Configuration using KPG-D3/ D3N

Assigning functions to the PF buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

The transceiver has the following modes: the mode for adjusting the transceiver, the mode for copying the configuration data to another transceiver, the mode to change the configuration of the transceiver, and the mode for updating the firmware and confirming the version number of the firmware.

- Panel Test Mode
- Panel Tuning Mode
- Clone Mode
- Front Panel Programming Mode
- Firmware Programming Mode
- Transceiver Information Mode

The transceiver can enter each mode by pressing buttons on the transceiver. Whether to permit the use of these modes can be configured using KPG-D3/ D3N.

Using KPG-D3/ D3N, the transceiver also has PC Test Mode for testing transmit and receive capabilities of the transceiver and PC Tuning Mode for adjusting the transceiver.

17.1 Testing the Transmit and Receive Capabilities of the Transceiver (Panel Test Mode)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Panel Test Mode can be used to test transmit and receive capabilities of the transceiver using the operation panel of the transceiver.

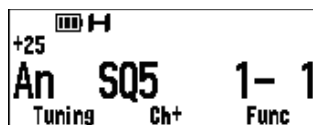
Operating the transceiver

Turn the transceiver ON while pressing and holding the **Back** () button.

A Power-on Tone A (1 beep) sounds from the transceiver, and then the market code of the transceiver appears for 2 sec. For Portable, the battery type also appears.



The transceiver enters Panel Test Mode after a lapse of 2 sec.



Note

- Refer to the service manual for instructions on how to operate the transceiver in Panel Test Mode, and on how to test transmit and receive capabilities.
- To end Panel Test Mode, the transceiver must be turned OFF.

Configuration using KPG-D3/ D3N

Configuring whether to permit the use of Panel Test Mode ( See Radio Configuration > Global Options > Basics > General > Mode)

17.2

Adjusting the Transmit and Receive Capabilities of the Transceiver (Panel Tuning Mode)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Panel Tuning Mode can be used to adjust transmit and receive capabilities of the transceiver by using the operation panel of the transceiver.

Operating the transceiver

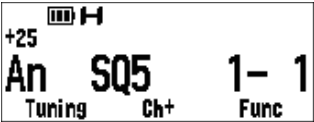
1

Turn the transceiver ON while pressing and holding the **Back** () button.

A Power-on Tone A (1 beep) sounds from the transceiver, and then the market code of the transceiver appears for 2 sec. For Portable, the battery type also appears.



The transceiver enters Panel Test Mode after a lapse of 2 sec.



2

Press the **Menu** () button.

The transceiver enters Panel Tuning Mode.



Note

- Refer to the service manual for instructions on how to operate the transceiver in Panel Tuning Mode, and on how to adjust transmit and receive capabilities.
- To end Panel Tuning Mode, the transceiver must be turned OFF.

Configuration using KPG-D3/ D3N

Configuring whether to permit the use of Panel Tuning Mode ( **See** Radio Configuration > Global Options > Basics > General > Mode)

17.3 Copying the Configuration Data to Another Transceiver (Clone Mode)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Clone Mode can be used to copy the data configured for the transceiver to another transceiver.

Operating the transceiver

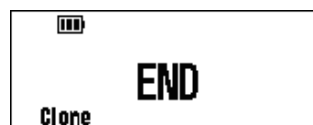
1 Turn the transceiver ON while pressing and holding the Home ([]) button.

The transceiver enters Clone Mode.



2 Copy the data.

A Button Beep A (1 beep) sounds from the transceiver and copying the data ends.



Note

- Refer to the service manual for instructions on how to operate the transceiver in Clone Mode, and for details on the Clone function.
- To end Clone Mode, the transceiver must be turned OFF.
- The following data cannot be copied in Clone Mode:
 - Tuning Data
 - Embedded Message with Password
 - KENWOOD ESN Data
 - NXDN ESN Data
- If the data is copied to a transceiver having a different firmware version number, this may result in an error or a failure of the transceiver to function correctly. In such a case, the cloned transceiver operation must be verified prior to using this transceiver on a regular basis.

Configuration using KPG-D3/ D3N

Configuring whether to permit the use of Clone Mode ( See Radio Configuration > Global Options > Basics > General > Mode)

17.4

Changing the Configuration of the Transceiver (Front Panel Programming Mode)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

This mode can be used to change data, such as the frequency on a Conventional Channel, and to add a Conventional Channel in the transceiver only.

Even if no KPG-D3/ D3N and PC is available, required data can be configured by using only the transceiver.

Pressing the **Front Panel Programming** button places the transceiver in Front Panel Programming Mode. Or, pressing the **Menu** button places the transceiver in Menu Mode, and the transceiver can be placed in Front Panel Programming Mode by selecting “Panel Program”. (Refer to [Using Menu Mode.](#))

- Note
- To use this mode, a Radio Feature License (KWD-3001FP) is required.

Operating the transceiver

1

Press the **Front Panel Programming** button.

If Clone/Front Panel Programming Password is not configured

The transceiver enters Front Panel Programming Mode.

Panel Program

Next

If Clone/Front Panel Programming Password is configured

The password entry display appears.

Panel Program

Input Password

Press the **Menu** () or **[*]** button after entering a password.

Refer to “[Entering or Deleting a Code](#)” for entry methods.

If the correct password is entered, the transceiver enters Front Panel Programming Mode.

Panel Program

Next

2

Press the **Menu** () or **[*]** button.

The zone selection display appears.

Zone Select2

Zone 2

Zone 6

Next

- Note
- Refer to the service manual for instructions on how to operate the transceiver in Front Panel Programming Mode.
 - To exit Front Panel Programming Mode, press the **Home** () button, and then press the **Menu** () or **[*]** button on the confirmation screen. The transceiver exits Front Panel Programming Mode and then restarts in User Mode.

Configuration using KPG-D3/ D3N

- Configuring whether to permit the use of Front Panel Programming Mode ([See](#) Radio Configuration > Radio Definition > Product Information > Product Information > Features)
- Configuring Clone/Front Panel Programming Password ([See](#) Radio Configuration > Global Options > Security > Password > Transceiver Operation > Clone/Front Panel Programming Mode)

17.5

Overwriting the Firmware (Firmware Programming Mode)

Firmware Programming Mode can be used to write the firmware to the transceiver.

Operating the transceiver

- 1
- Turn the transceiver ON while pressing and holding the **AUX** button.

The transceiver enters Firmware Programming Mode.



- 2
- Write the firmware to the transceiver.



Note

- Refer to the service manual for instructions on how to operate the transceiver in Firmware Programming Mode, and on how to write the firmware to the transceiver.
- To end Firmware Programming Mode, the transceiver must be turned OFF.
- If no firmware is written to the transceiver, the transceiver enters Firmware Programming Mode when the transceiver is turned ON.

Configuration using KPG-D3/ D3N

Configuring whether to permit the use of Firmware Programming Mode ( See Radio Configuration > Global Options > Basics > General > Mode)

17.6 Checking the Firmware Version (Transceiver Information Mode)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Transceiver Information Mode is the function to display the version of the firmware written in the transceiver and the AES/DES Library version.

Operating the transceiver

1 Turn the transceiver ON while pressing and holding the **Side 1** button (Portable) or the **[+]** button (Mobile).

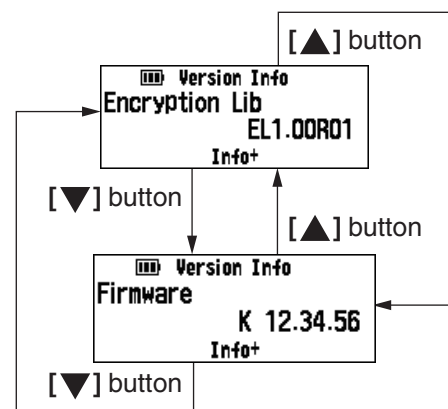
The transceiver enters Transceiver Information Mode. The version number of the transceiver written to the transceiver appears after “Version Info” is displayed for 2 sec.

```

  [Icon] Version Info
  Firmware
                K 12.34.56
                Info+
  
```

2 Toggle the display by pressing the **[▲]** or **[▼]** button.

The display toggles.



Note

- To end Transceiver Information Mode, the transceiver must be turned OFF.

Configuration using KPG-D3/ D3N

Configuring whether to permit the use of Transceiver Information Mode (See Radio Configuration > Global Options > Basics > General > Mode)

17.7

Testing or Adjusting the Transmit and Receive Capabilities of the Transceiver (PC Test Mode/ PC Tuning Mode)

PC Test Mode can be used to test transmit and receive capabilities of the transceiver by using KPG-D3/ D3N.

PC Tuning Mode can be used to adjust transmit and receive capabilities of the transceiver by using KPG-D3/ D3N.

To test or adjust the transceiver in each mode, the transceiver and a PC with KPG-D3/ D3N installed need to be connected by using the programming cable. (Refer to [Connecting the Transceiver to a PC.](#))

After connecting the transceiver and the PC, selecting “Test Mode” in Tools > Test/Tuning in the main window of KPG-D3/ D3N opens the Test Mode dialog box. By selecting an item from the tuning item list in the Test Mode dialog box and double-clicking it, the tuning dialog box of the selected item opens.

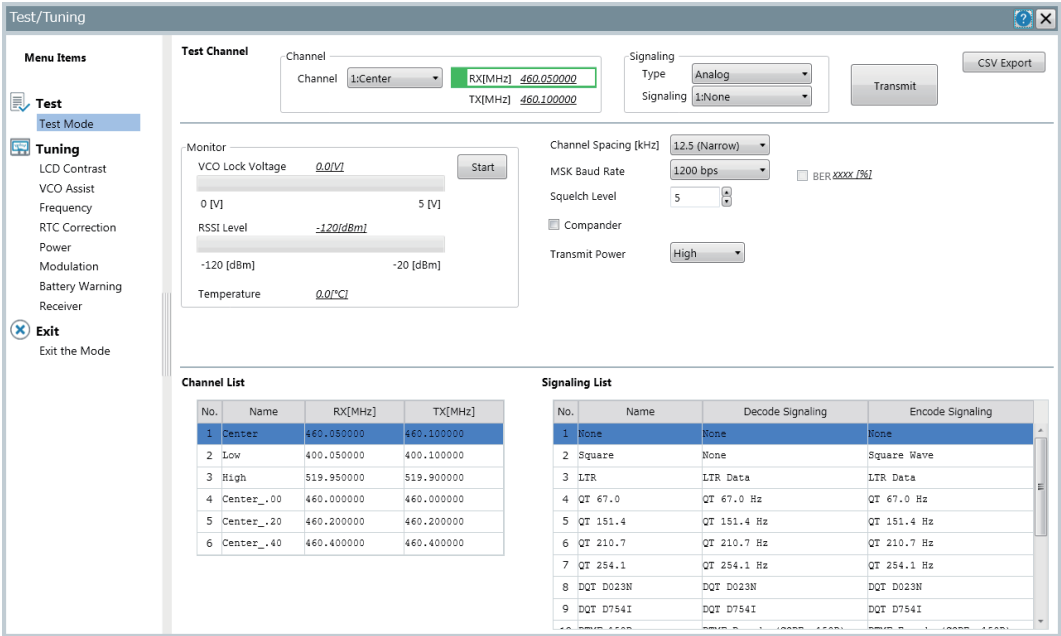


Figure 17-1 Test Mode Dialog Box

Note

- Refer to the service manual for operating the transceiver in PC Test Mode and PC Tuning Mode, and instructions on how to adjust transmit and receive capabilities.

VOX is the function to transmit audio just by speaking into a microphone without pressing the **PTT** switch.

This function can be used when a user cannot press the **PTT** switch, for instance, when a user is using both hands for other tasks.

VOX is the function that can be used only when a user wears the headset and when the transceiver is operated in a Conventional system (Analog, NXDN, DMR).

To use VOX, a headset needs to be connected to the transceiver.

Portable:

For Portable, one of the following headsets or the headset which supports Bluetooth (Headset Profile) needs to be connected to the transceiver:

- **NX-3200/ NX-3300/ NX-3400**

KHS-14, KHS-15-BH, KHS-15-OH

- **NX-3220/ NX-3320/ NX-3420**

KHS-1, KHS-21, KHS-29F, KHS-35F

The following are the behaviors of each device by the connection status.

Table 18-1 Headset Connection Status and Behavior

Connection Status		Operation
KHS-14, KHS-15-BH, KHS-15-OH, KHS-1, KHS-21, KHS-29F, KHS-35F	Bluetooth-compatible Device	
Disconnected	Disconnected	Does not transmit by VOX.
Connected	Disconnected	Transmits by VOX with the audio inputted to KHS-14, KHS-15-BH, KHS-15-OH, KHS-1, KHS-21, KHS-29F, or KHS-35F.
Disconnected	Connected	Transmits by VOX with the audio inputted to a Bluetooth-compatible device.
Connected	Connected	Transmits by VOX with the audio inputted to a Bluetooth-compatible device.

Mobile:

For Mobile, a headset which supports Bluetooth (Headset Profile) needs to be connected to the transceiver.

If **VOX Function Preset** is enabled using KPG-D3/ D3N, VOX is activated when the transceiver is turned ON.

Pressing and holding the **VOX** button toggles VOX between activated and deactivated.

VOX can also be activated or deactivated by executing "VOX" after entering Menu Mode by pressing the **Menu** button.

Note

- Refer to "**BLUETOOTH COMMUNICATION**" on how to connect to a Bluetooth-compatible device.
- The VOX transmission is disabled when the transmission is prohibited, such as when the transceiver is in the Stun state.
- If the transmission ends because the Time-out Timer is activated during the continuous transmission by VOX, the transceiver cannot start the next transmission until both audio input and the **PTT** switch are disabled.
- VOX is not activated only with the transceiver itself. Also, for NX-3200/ NX-3300/ NX-3400, although VOX is activated if the speaker microphone is connected to the transceiver, proper operation of the function cannot be guaranteed. For NX-3220/ NX-3320/ NX-3420, the transceiver cannot transmit using VOX if a speaker microphone is connected to the transceiver.

Operating the transceiver

● Enabling VOX

Press and hold the **VOX** button while VOX is disabled.

The “” icon appears and then VOX is enabled.



● Disabling VOX

Press and hold the **VOX** button while VOX is enabled.

The “” icon disappears and VOX is disabled.



Configuration using KPG-D3/ D3N

- Configuring **VOX Function Preset** to be enabled or disabled ( See Radio Configuration > Global Options > External Device > Common > VOX)
- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

18.1 Configuring the Input Sensitivity of the Microphone (VOX Gain Level)

VOX Gain Level is the input sensitivity of the microphone for activating VOX. This function is used to adjust the VOX to work properly based on the user's voice tone or the surrounding noise when a user transmits by speaking into a microphone.

VOX Gain Level can be configured using KPG-D3/ D3N. **VOX Gain Level** can also be changed by operating the transceiver. Pressing the **VOX** button places the transceiver in VOX Gain Level Mode.

Or, pressing the **Menu** button to enter Menu Mode and then executing "VOX Gain Level" places the transceiver in VOX Gain Level Mode.

Note

- For Portable, the transceiver cannot transmit using VOX if a speaker microphone is connected to the transceiver.

Operating the transceiver

1 Press the **VOX** button.

The transceiver enters VOX Gain Level Mode and the current VOX Gain Level appears. At the same time, VOX is enabled.

The following operations are the same even if the transceiver enters VOX Gain Level Mode by pressing the **Menu** button:

VOX Level	
Level	5
Exit	Back

2 Adjust the VOX Gain Level by pressing the [▲]/[▼] button.

Adjustment can be done in the range between 1 and 10. Larger values result in higher sensitivity.

VOX Level	
Level	6
Exit	Back

3 Speak into the microphone of the headset to check whether the sensitivity is configured properly.

The LED lights yellow when the audio input level reaches the reference value for transmission. In this case, the transceiver does not transmit.

4 Press the **Menu** ([□]) button.

VOX Gain Level is configured and the mode ends.

Note

- The higher sensitivity VOX Gain Level is, the smaller sound the transceiver reacts to, and the transceiver starts transmitting by VOX. Therefore, an appropriate **VOX Gain Level** needs to be configured according to the background noise in a usage environment.

Configuration using KPG-D3/ D3N

- Configuring **VOX Gain Level** ( See Radio Configuration > Global Options > External Device > Common > VOX)
- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

18.2 Retaining Transmitting State after VOX Transmission (VOX Delay Time)

VOX Delay Time is the duration for which the transceiver retains the transmission after VOX transmission. If the transceiver reverts to receive mode too quickly after a user pauses speaking, the last part of the speech may not be transmitted. To avoid this situation, VOX Delay Time needs to be configured so that the whole speech is transmitted and that the transmission retention time is not too long.

Upon the elapse of the time configured in **VOX Delay Time** after no audio is inputted to the microphone, the transceiver terminates VOX transmission.

If audio is inputted to the microphone while **VOX Delay Time** is counting down, **VOX Delay Time** is reset and the audio transmission continues.

Configuration using KPG-D3/ D3N

Configuring **VOX Delay Time** ( See Radio Configuration > Global Options > External Device > Common > VOX)

18.3 Restricting the VOX Transmission while the Audio Sounds from the Transceiver (Transmit Inhibit while Receiving)

Transmit Inhibit while Receiving is the function to restrict the VOX transmission while the speaker of the transceiver is unmuted.

This function can be used to prevent VOX from being activated by audio emitted from the speaker.

If **Transmit Inhibit while Receiving** is enabled, the VOX transmission cannot be done while the speaker is unmuted.

If **Transmit Inhibit while Receiving** is disabled, the VOX transmission can be done even while the speaker is unmuted.

Configuration using KPG-D3/ D3N

Configuring **Transmit Inhibit while Receiving** to be enabled or disabled ( See Radio Configuration > Global Options > External Device > Common > VOX)

18.4 Disabling the VOX by Using the PTT Switch (Cancel by PTT)

Cancel by PTT is the function to disable VOX by pressing the **PTT** switch when VOX is enabled.

If **Cancel by PTT** is enabled, VOX is disabled by operating the **PTT** switch, the External PTT (Voice) port, or the **PTT** switch of a Bluetooth-compatible device when VOX is enabled.

Even if VOX is disabled by **Cancel by PTT**, VOX is enabled by pressing and holding the **VOX** button or by executing "VOX" after entering Menu Mode by pressing the **Menu** button.

If the **VOX** button is not configured and "VOX" is not configured in Menu Mode, VOX can be enabled by turning the transceiver OFF and ON again.

Configuration using KPG-D3/ D3N

Configuring **Cancel by PTT** to be enabled or disabled ( See Radio Configuration > Global Options > External Device > Common > VOX)

18.5 Notifying a User of the Start of the VOX Transmission with a Tone (VOX Proceed Tone)

VOX Proceed Tone is the tone that sounds from the transceiver to notify that the audio transmission becomes available after the transmission is started by using VOX.

If **VOX Proceed Tone** is enabled, a VOX Proceed Tone that notifies that the audio transmission becomes available sounds from the transceiver after the transmission is started by using VOX.

Note

- A VOX Proceed Tone does not sound from the transceiver if other tones, such as a Sidetone or a PTT ID Sidetone, are configured to sound.

Configuration using KPG-D3/ D3N

Configuring **VOX Proceed Tone** to be enabled or disabled ( See Radio Configuration > Global Options > External Device > Common > VOX)

The transceiver always records the hardware failure information and the software status.

The Field Support function can read the log information in the transceiver to a PC by using KPG-D3/ D3N.

JVCKENWOOD Corporation uses the information recorded by the Field Support function in order to verify the cause of the transceiver failure.

The log information is retained in the non-volatile memory of the transceiver by one of the following operations or the resetting behavior:

- Turning the transceiver OFF
- Pressing the **Save Log Data** button, or executing “Save Log Data” after entering Menu Mode by pressing the **Menu** button
- Restart of the transceiver by the software reset

The following is the procedure to read the log information:

1 Select “Read Log Data” from the **Read/ Write** menu.

The communication port needs to be configured in **Preferences > COM port** after connecting the transceiver to a PC. After the configuration, select “Read Log Data”. (Refer to [Connecting the Transceiver to a PC.](#))

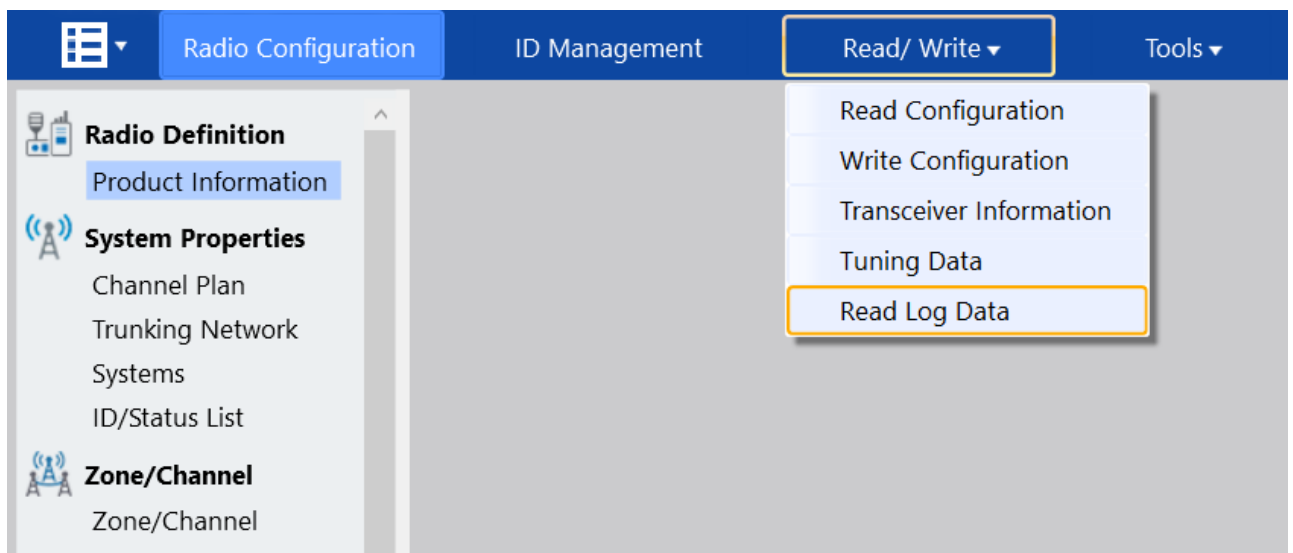


Figure 19-1 KPG-D3/ D3N Main Window

2 Click the “Read” button.

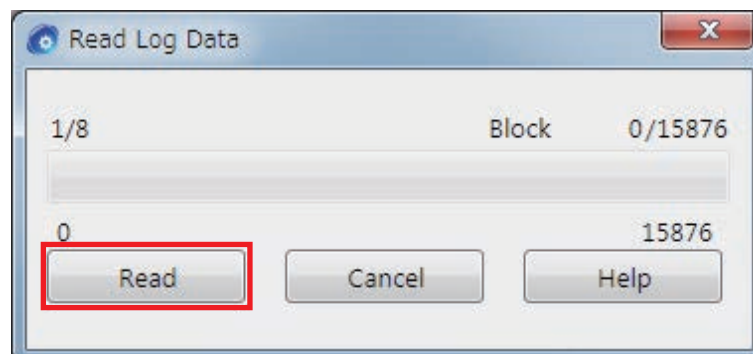


Figure 19-2 Read Log Data

The message “Reading completed.” appears after reading ends.

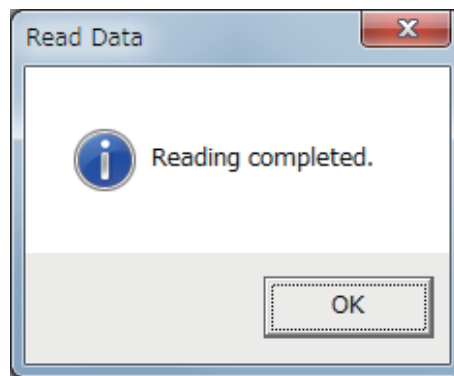


Figure 19-3 Read Data

3 Click the “OK” button.

The location to save the Log file which contains each history information is displayed, and the file needs to be saved in a PC.

The type of file to be saved: Log Files (*.log)

Send the saved Log file by e-mail, etc. to the technical staff of the JVCKENWOOD sales company.

Note

- Minimize the number of times that the transceiver is turned ON/OFF and that “Save Log Data” is operated in order to save the most recent log file.

20.1 Available Functions for the PF Buttons

The following are the functions that can be assigned to the PF buttons:

Table 20-1 Available Functions for the PF Buttons

Function Name	Description	Available Communication Systems* ¹
None	No function is activated.	-
2-tone	The transceiver enters 2-tone Mode. In 2-tone Mode, the transceiver can send a 2-tone code by selecting a 2-tone code configured in Encode List of 2-tone.	Analog Conventional NXDN Conventional
Activity Detection (Portable only)	Toggles Activity Detection between enabled and disabled. See - Analog Function Part Placing the Transceiver in Emergency Mode by Using the Activity Detection Function - NXDN Function Part Using the Activity Detection Function to Place the Transceiver in Emergency Mode - DMR Function Part Placing the Transceiver in Emergency Mode by Using the Activity Detection Function	ALL
Activity Reset (Portable only)	The Man-down Delay Time , Stationary Delay Time , or Motion Delay Time timer is reset and then restarts counting down from the beginning. See - Analog Function Part Placing the Transceiver in Emergency Mode by Using the Activity Detection Function - NXDN Function Part Using the Activity Detection Function to Place the Transceiver in Emergency Mode - DMR Function Part Placing the Transceiver in Emergency Mode by Using the Activity Detection Function	ALL
Auto Telephone	The transceiver searches an LTR Trunking system that can connect to a telephone line and connects.	LTR Trunking
Autodial	The transceiver enters Autodial Mode. In Autodial Mode, the transceiver can transmit by selecting a DTMF Code from the Autodial List or by entering a DTMF Code.  Note - For NXDN Trunking and DMR-based Trunking, Autodial Mode can be used only while connection is done by Telephone Call. See - NXDN Function Part Communicating with a Telephone (Telephone Call) - DMR Function Part Communicating with a Telephone (Telephone Call)	Analog Conventional NXDN Conventional DMR Conventional LTR Trunking NXDN Trunking DMR-based Trunking
Autodial Programming	The transceiver enters Autodial Programming Mode. In Autodial Programming Mode, the data configured in Autodial List can be added, changed, and deleted.	ALL
AUX (NX-3200/ NX-3300/ NX-3400 only)	Alternates the status of the AUX Output port. The AUX Output port status is changed to inactive if the status is active; or, the AUX Output port status is changed to active if the status is inactive. Status of the AUX port can be changed by pressing the AUX button, hence an external device connected to the AUX port can be controlled. See Assigning Functions to the Universal Connector	ALL
AUX A (Mobile only)	Alternates the status of the AUX A Output port. The AUX A Output port status is changed to inactive if the status is active; or, the AUX A Output port status is changed to active if the status is inactive. Status of the AUX A port can be changed by pressing the AUX A button, hence an external device connected to the AUX A port can be controlled.	ALL

Function Name	Description	Available Communication Systems* ¹
AUX B (Mobile only)	Alternates the status of the AUX B Output port. The AUX B Output port status is changed to inactive if the status is active; or, the AUX B Output port status is changed to active if the status is inactive. Status of the AUX B port can be changed by pressing the AUX B button, hence an external device connected to the AUX B port can be controlled.	ALL
AUX C (Mobile only)	Alternates the status of the AUX C Output port. The AUX C Output port status is changed to inactive if the status is active; or, the AUX C Output port status is changed to active if the status is inactive. Status of the AUX C port can be changed by pressing the AUX C button, hence an external device connected to the AUX C port can be controlled.	ALL
AUX Output ID 1 (Mobile only)	If “Off” is configured in State Hold Timer (Active Low): Each time the AUX Output ID 1 button is pressed, the AUX Output ID 1 port is toggled from high level to low level or from low level to high level. If anything other than “Off” is configured in State Hold Timer (Active Low): Pressing the AUX Output ID 1 button switches the AUX Output ID 1 port to low level.	ALL
AUX Output ID 2 (Mobile only)	If “Off” is configured in State Hold Timer (Active Low): Each time the AUX Output ID 2 button is pressed, the AUX Output ID 2 port is toggled from high level to low level or from low level to high level. If anything other than “Off” is configured in State Hold Timer (Active Low): Pressing the AUX Output ID 2 button switches the AUX Output ID 2 port to low level.	ALL
AUX Output ID 3 (Mobile only)	If “Off” is configured in State Hold Timer (Active Low): Each time the AUX Output ID 3 button is pressed, the AUX Output ID 3 port is toggled from high level to low level or from low level to high level. If anything other than “Off” is configured in State Hold Timer (Active Low): Pressing the AUX Output ID 3 button switches the AUX Output ID 3 port to low level.	ALL
Backlight (Portable only)	The backlight of the transceiver lights. See Lighting the Backlight (Backlight)	ALL
Battery Status (Portable only)	The transceiver notifies by blinking the LED or emitting a Beep that the remaining battery power is low. See Displaying the Remaining Battery Power by Operating the Transceiver (Battery Status)	ALL
BLE Beacon Display (Portable only)	The transceiver enters BLE Beacon Display Mode. BLE Beacon Display is the function to display on the LCD of the transceiver the beacon information received while the Indoor Location function functions. See BLE Beacon Display	NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking
BLE Scan (Portable only)	Toggles BLE Scan between enabled and disabled. See BLE Scan	NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking

Function Name	Description	Available Communication Systems* ¹
Bluetooth	Toggles Bluetooth between On and Off. See Toggling Bluetooth On/ Off	ALL
Bluetooth Speaker	Switches the speaker to emit audio between the built-in speaker of the transceiver and the speaker of the Bluetooth-compatible device connected to the transceiver by Headset Profile. See Switching the Speaker to Emit Audio (Bluetooth Speaker)	ALL
Bluetooth Connect/ Disconnect	Pairing is started for a Bluetooth-compatible device having an address configured in Define Bluetooth Device . The connection to the connected Bluetooth-compatible device is reset. See Registering and Connecting a Bluetooth-compatible Device to the Transceiver (Pairing/ HSP Connection)	ALL
Broadcast	Alternates between Broadcast Call and Conference Call. This function can be used only for initiating a Group Call. See NXDN Function Part Making an Informative Group Call (Broadcast Group Call) DMR Function Part (Conventional) Making an Informative Group Call (Broadcast Group Call) DMR Function Part (Trunking) Making an Informative Group Call (Broadcast Group Call)	NXDN Trunking DMR Conventional DMR-based Trunking
Button Lock	Toggles the Button Lock between enabled and disabled. See Locking the Transceiver Buttons (Button Lock)	ALL
Call 1 to Call 6	Sends the signaling (Status List (NXDN), Individual ID List (NXDN)) configured for the transceiver.	NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking Analog Conventional
Call Interruption	A Call Interruption request message is sent. See DMR Function Part Terminating Voice Communications by a Transceiver Other Than the Transmitting Transceiver (Call Interruption)	DMR Conventional
Call Response	Pressing the Call Response button when receiving an Individual Call causes the transceiver to respond. See - NXDN Function Part Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Individual Call Acknowledge Request) - NXDN Function Part Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Message Trunked (Enhanced)) - DMR Function Part (Trunking) Making an Individual Call	NXDN Conventional NXDN Trunking DMR-based Trunking
Channel Down	Decreases the channel number in steps of 1.	ALL
Channel Down (Continuous)	Pressing and holding the Channel Down button causes the channel number to be decreased in steps of 1 every 200 ms.  Note Channel Down (Continuous) can be configured only in Hold for the Channel Down button, and the configuration cannot be changed.	ALL

Function Name	Description	Available Communication Systems*1
Channel Entry	Directly specify the channel number by pressing a key(s) on the keypad. See Changing the Channel by Specifying the Number (Channel Entry)	ALL
Channel Information	Changes the display of the transceiver in order of the channel name, Zone-channel number, frequency, QT/ DQT, and RAN code.	ALL
Channel Recall	Pressing the Channel Recall button while scanning causes Channel Recall to be toggled between enabled and disabled. If Channel Recall is enabled, the transceiver migrates to the channel on which a signal was last received. See - NXDN Function Part USING SCAN - Analog Function Part USING SCAN - DMR Function Part USING SCAN	ALL
Channel Up	Increases the channel number in steps of 1.	ALL
Channel Up (Continuous)	Pressing and holding the Channel Up button causes the channel number to be increased in steps of 1 every 200 ms.  Note Channel Down (Continuous) can be configured only in Hold for the Channel Up button, and the configuration cannot be changed.	ALL
Clear	Aborts the current mode, disconnects communication, or cancels data transmission.	NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking
Clock	The current time appears. See Displaying the Current Time	ALL
Clock Adjustment	The current time can be adjusted. See Adjusting the Time	ALL
CW Message	Sends the CW Message configured for the transceiver. See NXDN Function Part Communicating using a CW Message	NXDN Conventional
Dialing	Enters Dialing Mode. The various communications can be executed by entering a dialing code in Dialing Mode. See DMR Function Part Executing Various Communications by Using the Dialing Function	DMR Tier III Trunking S-Trunking
Digit 10x Down	The code in the 2nd digit from the last digit of the Selcall code of 5-tone decreases by one. See Analog Function Part Changing the Selcall Code with the Digit Specified	Analog Conventional
Digit 10x Up	The code in the 2nd digit from the last digit of the Selcall code of 5-tone increases by one. See Analog Function Part Changing the Selcall Code with the Digit Specified	Analog Conventional

Function Name	Description	Available Communication Systems* ¹
Digit 1x Down	The code in the 1st digit from the last digit of the Selcall code of 5-tone decreases by one. See Analog Function Part Changing the Selcall Code with the Digit Specified	Analog Conventional
Digit 1x Up	The code in the 1st digit from the last digit of the Selcall code of 5-tone increases by one. See Analog Function Part Changing the Selcall Code with the Digit Specified	Analog Conventional
Direct Channel 1 to Direct Channel 5	Migrates to a channel configured as a Direct Channel. See Changing the Channel with a Single Touch	ALL
Direct Channel 1 Select to Direct Channel 5 Select	Determines the displayed channel as a Direct Channel. See Changing the Channel with a Single Touch  Note Direct Channel 1 Select to Direct Channel 5 Select can be configured only in Hold for the Direct Channel 1 to Direct Channel 5 buttons, and the configuration cannot be changed.	ALL
Display Format	Toggles between the Channel Name display and the Zone-channel display.	ALL
Emergency	Enters Emergency Mode. See - NXDN Function Part USING COMMUNICATIONS IN AN EMERGENCY - Analog Function Part USING COMMUNICATIONS IN AN EMERGENCY - DMR Function Part USING COMMUNICATIONS IN AN EMERGENCY  Note - For Portable, "Emergency" can be assigned to the AUX button or the PF 1 button of the speaker microphone only as the function when the button is held. - For Mobile, "Emergency" can be assigned to the AUX button only as the function when the button is held.	ALL
External Speaker	Toggles between the external speaker (KES-5, KES-5A) connected via KCT-60 connected to the transceiver and the internal speaker of the transceiver.	ALL
Fixed Volume	Changes the tone level in the following order: Low → High → Off. See SOUND OF THE TRANSCEIVER	ALL
Front Panel Programming	Enters Front Panel Programming Mode. In Front Panel Programming mode, data such as the frequency of a Conventional Channel can be changed, or a Conventional Channel can be added. See Changing the Configuration of the Transceiver (Front Panel Programming Mode)	Analog Conventional NXDN Conventional DMR Conventional
Function	Waits for the activation of the Button Function assigned to the 2nd Function and starts counting down the Mode Reset Timer . The Function status will be reset if no button is pressed before the amount of time configured in Mode Reset Timer elapses.	ALL

Function Name	Description	Available Communication Systems* ¹
GPS	Toggles the built-in GPS receiver between On and Off.	ALL
GPS Position Display (Portable (Full Key Model/ Standard Key Model)/ Mobile only)	Enters GPS Position Display Mode. See USING THE GPS POSITION DISPLAY FUNCTION	ALL
Group ID/Channel Entry (Portable (Full Key Model/ Standard Key Model)/ Mobile only)	If an NXDN Trunking system is selected, the Group ID in the NXDN Trunking system can be specified directly by using the keypad. See Changing the Group ID by Specifying the ID (Group ID Entry) (NXDN Trunking System Only) If a system other than an NXDN Trunking system is selected, the channel number can be specified directly by using the keypad. See Changing the Channel by Specifying the Number (Channel Entry)	ALL
Group	Analog Conventional: The transceiver enters Selcall Mode of FleetSync or of MDC-1200. In Selcall Mode, a call can be initiated by selecting an ID configured in the ID List of FleetSync or of MDC-1200, or by directly entering an ID. NXDN Conventional/ DMR Conventional: Enters Group Call Mode in NXDN Conventional or DMR Conventional. In Group Call Mode, a Group Call can be initiated by selecting a Group ID registered in the Group ID List. See - Analog Function Part Making a Selective Call - Analog Function Part Making a Selective Call - NXDN Function Part Making a Group Call - DMR Function Part Making a Group Call	Analog Conventional NXDN Conventional DMR Conventional
Group + Short Message	Analog Conventional: The transceiver enters Selcall Mode of FleetSync or of MDC-1200. Pressing the [▶] button while the transceiver is in Selcall Mode of FleetSync places the transceiver in Short Message Mode. Even if the [▶] button is pressed while the transceiver is in Selcall Mode of MDC-1200, the transceiver does not respond at all. NXDN Conventional/ DMR Conventional: Enters Group Call Mode in NXDN Conventional or DMR Conventional. In Group Call Mode, a call can be initiated by selecting a Group ID registered in the Group ID List of NXDN or DMR. Then, pressing the [▶] button while the transceiver is in Group Call Mode allows the transceiver to enter Short Message Mode. In Short Message Mode, a Short Message can be sent by directly entering a Short Message. NXDN Trunking/ DMR-based Trunking: The transceiver enters Short Message Mode. In Short Message Mode, a Short Message can be sent by directly entering a Short Message. See - Analog Function Part Sending and Receiving a Short Message (Short Data Call) - Analog Function Part Making a Selective Call - NXDN Function Part Sending and Receiving a Short Message (Short Data Call) - DMR Function Part Sending and Receiving a Short Message (Short Data Call)	Analog Conventional NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking

Function Name	Description	Available Communication Systems*1
Group + Status	Analog Conventional: The transceiver enters Selcall Mode of FleetSync or of MDC-1200. Pressing the  button while the transceiver is in Selcall Mode of FleetSync places the transceiver in Status Mode. Even if the  button is pressed while the transceiver is in Selcall Mode of MDC-1200, the transceiver does not respond at all. NXDN Conventional/ DMR Conventional: Enters Group Call Mode in NXDN Conventional or DMR Conventional. In Group Call Mode, a call can be initiated by selecting a Group ID registered in the Group ID List of NXDN or DMR. Then, pressing the  button while the transceiver is in Group Call Mode allows the transceiver to enter Status Mode. In Status Mode, a Status Message can be sent by selecting a status configured in NXDN or DMR Status List, or by directly entering a status number. NXDN Trunking/ DMR-based Trunking: The transceiver enters Status Mode. In Status Mode, a Status Message can be sent by selecting a status configured in NXDN Status List or by directly entering a status number. See - Analog Function Part Sending and Receiving a Status Message (Status Call) - Analog Function Part Making a Selective Call - NXDN Function Part Sending and Receiving a Status Message (Status Call) - DMR Function Part Sending and Receiving a Status Message (Status Call)	Analog Conventional NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking
High Transmit Power	Analog Conventional/ NXDN Conventional/ DMR Conventional: Selecting a channel with “Medium” or “Low” configured for the transmission power and then pressing the High Transmit Power button switches the transmission power to “High”. NXDN Trunking/ DMR-based Trunking: Selecting a channel in a system with “Medium”, “Low”, or “Auto” configured for the transmission power and then pressing the High Transmit Power button switches the transmission power to “High”. See Transmit Power	ALL
Home Channel	Migrates to a channel configured as the Home Channel. See Changing the Channel with a Single Touch	ALL
Home Channel Select	Determines the displayed channel as the Home Channel. See Changing the Channel with a Single Touch  Note Home Channel Select can be configured only in Hold for the Home Channel button, and the configuration cannot be changed.	ALL
Horn Alert (Mobile only)	Toggles Horn Alert between enabled and disabled. See Controlling Vehicle Operation According to the State of the Horn Alert Port (Horn Alert)	ALL

Function Name	Description	Available Communication Systems*1
Individual	Analog Conventional: The transceiver enters Selcall Mode of FleetSync or of MDC-1200. In Selcall Mode, a call can be initiated by selecting an ID configured in the ID List of FleetSync or of MDC-1200, or by directly entering an ID. NXDN system/ DMR system: Enters Individual Call Mode in an NXDN system or DMR system. In Individual Call Mode, a call can be initiated by selecting a Unit ID registered in the Individual ID List of NXDN or DMR, or by directly entering a Unit ID. See • Analog Function Part Making a Selective Call • Analog Function Part Making a Selective Call • NXDN Function Part (Conventional) Making an Individual Call • NXDN Function Part (Conventional) Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Individual Call Acknowledge Request) • NXDN Function Part (Trunking) Making an Individual Call (Transmission Trunked) • NXDN Function Part (Trunking) Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Message Trunked (Enhanced)) • DMR Function Part (Conventional) Making an Individual Call • DMR Function Part (Conventional) Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Individual Call Acknowledge Request) • DMR Function Part (Trunking) Making an Individual Call	Analog Conventional NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking
Individual + Short Message	Analog Conventional: The transceiver enters Selcall Mode of FleetSync or of MDC-1200. Pressing the [▶] button while the transceiver is in Selcall Mode of FleetSync places the transceiver in Short Message Mode. Even if the [▶] button is pressed while the transceiver is in Selcall Mode of MDC-1200, the transceiver does not respond at all. NXDN system/ DMR system: Enters Individual Call Mode in an NXDN system or DMR Conventional. In Individual Call Mode, a call can be initiated by selecting a Unit ID registered in the Individual ID List of NXDN or DMR, or by directly entering a Unit ID. Then, pressing the [▶] button while the transceiver is in Individual Call Mode allows the transceiver to enter Short Message Mode. In Short Message Mode, a Short Message can be sent by directly entering a Short Message. See • Analog Function Part Making a Selective Call • Analog Function Part Making a Selective Call • NXDN Function Part Sending and Receiving a Short Message (Short Data Call) • DMR Function Part Sending and Receiving a Short Message (Short Data Call)	Analog Conventional NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking

Function Name	Description	Available Communication Systems*1
Individual + Status	Analog Conventional: The transceiver enters Selcall Mode of FleetSync or of MDC-1200. Pressing the  button while the transceiver is in Selcall Mode of FleetSync places the transceiver in Status Mode. Even if the  button is pressed while the transceiver is in Selcall Mode of MDC-1200, the transceiver does not respond at all. NXDN system/ DMR system: Enters Individual Call Mode in an NXDN system or DMR Conventional. In Individual Call Mode, a call can be initiated by selecting a Unit ID registered in the Individual ID List of NXDN or DMR, or by directly entering a Unit ID. Then, pressing the  button while the transceiver is in Individual Call Mode allows the transceiver to enter Status Mode. In Status Mode, a Status Message can be sent by selecting a status configured in NXDN or DMR Status List, or by directly entering a status number. See - Analog Function Part Sending and Receiving a Status Message (Status Call) - Analog Function Part Making a Selective Call - NXDN Function Part Sending and Receiving a Status Message (Status Call) - DMR Function Part Sending and Receiving a Status Message (Status Call)	Analog Conventional NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking
Intercom (Mobile only)	The communication between Control Head 1 and Control Head 2 can be toggled between enabled and disabled.  Note This function can be used only in a Dual Control Head structure of Mobile.	
Key Delete	Enters Key Delete Mode. In Key Delete Mode, an Encryption Key can be selected and then deleted. See NXDN Function Part Deleting Encryption Key Data (Key Delete)	ALL
LCD Brightness	Gradates the brightness of the backlight. See Changing the Brightness of the Backlight (LCD Brightness)	ALL
Lone Worker	Toggles the Lone Worker between enabled and disabled. See - Analog Function Part Placing the Transceiver in Emergency Mode Using the Lone Worker Function - NXDN Function Part Placing the Transceiver in Emergency Mode Using the Lone Worker Function - DMR Function Part Placing the Transceiver in Emergency Mode Using the Lone Worker Function	ALL

Function Name	Description	Available Communication Systems*1
Low Transmit Power	Analog Conventional/ NXDN Conventional/ DMR Conventional: Selecting a channel with “High” or “Medium” configured for the transmission power and then pressing the Low Transmit Power button switches the transmission power to “Low”. NXDN Trunking/ DMR-based Trunking: Selecting a channel in a system with “High”, “Medium”, or “Auto” configured for the transmission power and then pressing the Low Transmit Power button switches the transmission power to “Low”. See Transmit Power	ALL
Maintenance	Enters Maintenance Display Mode. See Displaying the Signal Strength Level (RSSI Level, BER) (Maintenance Display)	ALL
Manual Site Hunt	Starts searching for the repeaters that can be synchronized by using the Site Roaming function in a DMR Conventional system. See DMR Function Part Migrating Automatically to the Site Providing Better Radio Environment (Site Roaming)	DMR Conventional
Menu (Portable (Full Key Model/ Standard Key Model)/ Mobile only)	Enters Menu Mode. In Menu Mode, various functions can be configured or activated. See Using Menu Mode	ALL
Monitor	Analog Conventional: The transceiver disables the QT tone or DQT code and the Optional Signaling and unmutes the speaker upon detection of a carrier. NXDN Conventional: The transceiver resets the matching state of RAN code and Optional Signaling and unmutes the speaker upon detection of an NXDN frame. See - Analog Function Part Temporarily Disabling the Signaling (Monitor) - NXDN Function Part Temporarily Disabling the Signaling (Monitor)	Analog Conventional NXDN Conventional
Monitor Momentary	Analog Conventional: The transceiver disables the QT tone or DQT code and the Optional Signaling and unmutes the speaker upon detection of a carrier while the Monitor Momentary button is pressed and held. NXDN Conventional: The transceiver resets the matching state of RAN code and Optional Signaling and unmutes the speaker upon detection of an NXDN frame while the Monitor Momentary button is pressed and held. See - Analog Function Part Temporarily Disabling the Signaling (Monitor) - NXDN Function Part Temporarily Disabling the Signaling (Monitor)	Analog Conventional NXDN Conventional

Function Name	Description	Available Communication Systems* ¹
Operator Selectable Tone	Toggles the OST between enabled and disabled. See Analog Function Part Changing the Decode/ Encode Combination of the QT/ DQT (OST)	Analog Conventional
OST List	Enters OST List Mode. In OST List Mode, an OST List can be selected. See Analog Function Part Changing the Decode/ Encode Combination of the QT/ DQT (OST)  Note OST List can be configured only in Hold for the Operator Selectable Tone button, and the configuration cannot be changed.	Analog Conventional
OST Down	Decreases the OST list number in steps of 1.	Analog Conventional
OST Down (Continuous)	Pressing and holding the OST Down button decreases the OST list number in steps of 1 every 100 ms.	Analog Conventional
OST Up	Increases the OST list number in steps of 1.	Analog Conventional
OST Up (Continuous)	Pressing and holding the OST Up button increases the OST list number in steps of 1 every 100 ms.	Analog Conventional
OVCN	Toggles the OVCN between enabled and disabled. See DMR Function Part Causing Transceivers Other than the Transceiver of the Specified ID to Participate in a Conversation (Open Voice Channel Mode)	DMR Conventional

Function Name	Description	Available Communication Systems*1
Playback	Enters Playback Mode. In Playback Mode, the transceiver can play back audio recorded using Auto Recording. See Playing Back the Recorded Audio (Playback)	ALL
Playback (Last Recording)	Enters Playback Mode. In Playback Mode, the transceiver can play back the latest audio recorded using Auto Recording. See Playing Back the Recorded Audio (Playback)	ALL
Priority-channel Select	Enters Priority-channel Select Mode. In Priority-channel Select Mode, the channel selected on the transceiver can be changed as a Priority-channel. See - Analog Function Part Scanning the Specific Channel Preferentially (Priority Scan) - NXDN Function Part Scanning the Specific Channel Preferentially (Priority Scan) - DMR Function Part Scanning the Specific Channel Preferentially (Priority Scan)	Analog Conventional NXDN Conventional DMR Conventional
Public Address (Mobile only)	Toggles the Public Address between enabled and disabled. See Using the Transceiver as a Megaphone (Public Address)	ALL
Receive Entry	Places the transceiver in Receive Entry Mode. In Receive Entry Mode, the Receive code can be changed by directly entering a Receive code. See Analog Function Part Changing the Receive Code	Analog Conventional
Redial	Enters Redial Mode. In Redial Mode, a list can be resent by selecting the list from the past dialing history. See DMR FUNC Initiating a Communication in Redial Mode	DMR-based Trunking
Remote Control	Places the transceiver in Remote Control Mode. See - NXDN Function Part Remote Operation by Radio Communication (Remote Control) - DMR Function Part Remote Operation by Radio Communication (Remote Control)	NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking
Save Log Data	The operation history and communication history of the transceiver are saved in the Flash ROM. See READING THE LOG INFORMATION OF THE TRANSCEIVER (FIELD SUPPORT)	ALL
Scan	Starts or stops scanning. See - NXDN Function Part USING SCAN - Analog Function Part USING SCAN - DMR Function Part USING SCAN	ALL
Scan Delete/ Add	The selected channel is added to or excluded from the target channels for scan. See - NXDN Function Part Adding or Deleting a Channel to/from the Target Channels for Scan (Scan Delete/Add) - Analog Function Part Adding or Deleting a Channel to/from the Target Channels for Scan (Scan Delete/Add) - DMR Function Part Adding or Deleting a Channel to/from the Target Channels for Scan (Scan Delete/Add)	ALL

Function Name	Description	Available Communication Systems*1
Scan Normal	Starts a Non-Priority Scan. See - NXDN Function Part USING SCAN - Analog Function Part USING SCAN - DMR Function Part USING SCAN	ALL
Scan Program	Enters Scan Program Mode. The Scan List can be edited in Scan Program Mode. See - NXDN Function Part Changing the Scan List (Scan Program) - Analog Function Part Changing the Scan List (Scan Program) - DMR Function Part Changing the Scan List (Scan Program)	ALL
Scrambler/ Encryption	Toggles the Voice Scrambler/ Encryption between enabled and disabled. See - Analog Function Part USING COMMUNICATION SECURITY - NXDN Function Part USING COMMUNICATION SECURITY - DMR Function Part USING COMMUNICATION SECURITY	Voice Scrambler: Analog Conventional Encryption: NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking
Scrambler/ Encryption Code	Pressing and holding the Scrambler/ Encryption button causes the transceiver to enter Scrambler/ Encryption Code Mode. In Scrambler/ Encryption Code Mode, the Scrambler Code or Encryption Key data can be changed. See - Analog Function Part USING COMMUNICATION SECURITY - NXDN Function Part USING COMMUNICATION SECURITY - DMR Function Part USING COMMUNICATION SECURITY  Note - Scrambler/Encryption Code can be configured only in Hold for the Scrambler/ Encryption button, and the configuration cannot be changed.	Voice Scrambler: Analog Conventional Encryption: NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking
Send the GPS Data	The GPS data received from the GPS receiver unit is manually sent to the base station.	NXDN Conventional NXDN Trunking DMR Conventional Analog Conventional DMR-based Trunking
Send the Location Data (Portable only)	Sends the location information of the nearest beacon or the location information of the own station received from the GPS Unit. See - NXDN Function Part Sending BLE Data Manually by Using a Button (Send the Location Data (Indoor Location)) - DMR Function Part Sending BLE Data Manually by Using a Button (Send the Location Data (Indoor Location))	NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking

Function Name	Description	Available Communication Systems*1
Short Message	The transceiver enters Short Message Mode. In Short Message Mode, a Short Message can be sent by directly entering a Short Message. See - Analog Function Part Sending and Receiving a Short Message (Short Data Call) - NXDN Function Part Sending and Receiving a Short Message (Short Data Call) - DMR Function Part Sending and Receiving a Short Message (Short Data Call)	NXDN Conventional NXDN Trunking Analog Conventional DMR Conventional DMR-based Trunking
Site Down	Decreases the site number in steps of 1. See NXDN Function Part Locking the Site to Be Used (Site Lock/ Site Select)	NXDN Trunking
Site Down (Continuous)	Pressing and holding the Site Down button causes the site number to be decreased in steps of 1 every 100 ms.  Note Site Down (Continuous) can be configured only in Hold for the Site Down button, and the configuration cannot be changed.	NXDN Trunking
Site Lock	Toggles the Site Lock between enabled and disabled. See NXDN Function Part Locking the Site to Be Used (Site Lock/ Site Select) DMR Function Part Locking the Site to Be Used (Site Lock)	NXDN Trunking DMR-based Trunking
Site Select	Pressing and holding the Site Lock button causes the transceiver to enter Site Select Mode, and then the site to be locked can be selected. See NXDN Function Part Locking the Site to Be Used (Site Lock/ Site Select)  Note Site Select can be configured only in Hold for the Site Lock button, and the configuration cannot be changed.	NXDN Trunking
Site Up	Increases the site number in steps of 1. See NXDN Function Part Locking the Site to Be Used (Site Lock/ Site Select)	NXDN Trunking
Site Up (Continuous)	Pressing and holding the Site Up button causes the site number to be increased in steps of 1 every 100 ms.  Note Site Up (Continuous) can be configured only in Hold for the Site Up button, and the configuration cannot be changed.	NXDN Trunking
Speaker Attenuation	Temporarily attenuates the volume level of the speaker microphone. See Temporarily Reducing the Volume Level of the Speaker Microphone (Speaker Attenuation)	ALL

Function Name	Description	Available Communication Systems* ¹
Squelch Level	Enters Squelch Level Mode. In Squelch Level Mode, the Squelch level can be changed. See Analog Function Part Adjusting the Reception Sensitivity of the Transceiver (Squelch Level)	Analog Conventional
Squelch Off	Analog Conventional: The transceiver opens squelch and unmutes the speaker. NXDN Conventional: The transceiver resets the matching state of RAN code and Optional Signaling and unmutes the speaker upon detection of an NXDN frame. See - Analog Function Part Temporarily Disabling the Squelch (Squelch Off) - NXDN Function Part Temporarily Disabling the Squelch (Squelch Off)	Analog Conventional NXDN Conventional
Squelch Off Momentary	Analog Conventional: The transceiver opens squelch and unmutes the speaker while the Squelch Off Momentary button is pressed and held. NXDN Conventional: The transceiver resets the matching state of RAN code and Optional Signaling and unmutes the speaker upon detection of an NXDN frame while the Squelch Off Momentary button is pressed and held. See - Analog Function Part Temporarily Disabling the Squelch (Squelch Off) - NXDN Function Part Temporarily Disabling the Squelch (Squelch Off)	Analog Conventional NXDN Conventional
Stack	Enters Stack Mode. In Stack Mode, the data stored in the stack memory of the transceiver, such as call records, Status Messages and Short Messages, can be referred or cleared. See Viewing the Receive History (Stack)	ALL
Status	The transceiver enters Status Mode. In Status Mode, a status configured in the Status List in a FleetSync, NXDN, or DMR system can be selected. Also, in a FleetSync or NXDN system, a Status Message can be sent by directly entering a status number. See - Analog Function Part Sending and Receiving a Status Message (Status Call) - NXDN Function Part Sending and Receiving a Status Message (Status Call) - DMR Function Part Sending and Receiving a Status Message (Status Call)	Analog Conventional NXDN Conventional NXDN Trunking DMR Conventional DMR-based Trunking
Surveillance	Toggles the Surveillance between enabled and disabled. While the Surveillance function is enabled, the transceiver does not emit a tone or light the backlight even when the transceiver functions.	ALL

Function Name	Description	Available Communication Systems* ¹
System Down	Decreases the system name in steps of 1. System Lock is enabled in the selected system.	NXDN Trunking
System Down (Continuous)	Pressing and holding the System Down button causes the system name to be decreased in steps of 1 every 100 ms. System Lock is enabled in the selected system.	NXDN Trunking
System Lock	Toggles the System Lock between enabled and disabled.	NXDN Trunking
System Search	The Site No. appears. See NXDN Function Part Starting the Control Channel Hunt Manually (Forced Search)	NXDN Trunking
System Search Function	Pressing and holding the System Search button starts a control channel hunt. See NXDN Function Part Starting the Control Channel Hunt Manually (Forced Search)  Note System Search Function can be configured only in Hold for the System Search button, and the configuration cannot be changed.	NXDN Trunking
System Select	Enters System Select Mode.	NXDN Trunking
System Up	Increases the system name in steps of 1. System Lock is enabled in the selected system.	NXDN Trunking
System Up (Continuous)	Pressing and holding the System Up button causes the system name to be increased in steps of 1 every 100 ms. System Lock is enabled in the selected system.	NXDN Trunking
Tactical Zone	When the transceiver is not in Tactical Zone Mode, pressing the Tactical Zone button registers the selected channel in Tactical Zone.	Analog Conventional
Tactical Zone (All Channels)	When the transceiver is not in Tactical Zone Mode, pressing the Tactical Zone (All Channels) button registers all at once all the corresponding channels of the selected zone in Tactical Zone.	Analog Conventional
Talk Around	Toggles the Talk Around between enabled and disabled. See - Analog Function Part Communicating Without Using a Repeater (Talk Around) - NXDN Function Part Communicating Without Using a Repeater (Talk Around) - DMR Function Part Communicating Without Using a Repeater (Talk Around/ DMR Direct Mode)	Analog Conventional NXDN Conventional LTR Trunking DMR Conventional
Task Request Confirmation	The transceiver enters Task Request Confirmation Mode and the contents of the received Task Request are checked. See - NXDN Function Part USING TASK REQUEST - DMR Function Part USING TASK REQUEST	NXDN Conventional NXDN Trunking DMR Conventional DMR Tier III Trunking S-Trunking
Telephone Disconnect	The transceiver sends a disconnect signal (# of DTMF Code) when the transceiver is connecting to a telephone line of an LTR Trunking system.	LTR Trunking
Transceiver Password	Enters Transceiver Password Mode. In Transceiver Password Mode, the transceiver cannot be used until the correct password is entered. See Password for Transceiver Operation (Transceiver Password)	ALL

Function Name	Description	Available Communication Systems*1
Transfer (Mobile only)	Toggles the Transfer between enabled and disabled. See Analog Function Part Transferring the Received 5-tone Code (Transfer)	Analog Conventional
Vibrator (NX-3200/ NX-3300/ NX-3400 only)	Toggles the Vibrator between enabled and disabled. See Using the Vibrator	ALL
Volume Down (Mobile only)	Decreases the volume level in steps of 1.	ALL
Volume Down (Continuous) (Mobile only)	Pressing and holding the Volume Down (Continuous) button will decrease the volume level in steps of 1 every 100 ms.  Note Volume Down (Continuous) can be configured only in Hold for the Volume Down button, and the configuration cannot be changed.	ALL
Volume Up (Mobile only)	Increases the volume level in steps of 1.	ALL
Volume Up (Continuous) (Mobile only)	Pressing and holding the Volume Up (Continuous) button will increase the volume level in steps of 1 every 100 ms.  Note Volume Up (Continuous) can be configured only in Hold for the Volume Up button, and the configuration cannot be changed.	ALL
VOX	Enters VOX Gain Level Mode. In VOX Gain Level Mode, the microphone sensitivity of VOX can be adjusted. See USING VOX	Analog Conventional NXDN Conventional DMR Conventional
VOX Function	Pressing and holding the VOX button toggles VOX between enabled and disabled. See USING VOX  Note VOX Function can be configured only in Hold for the VOX button, and the configuration cannot be changed.	Analog Conventional NXDN Conventional DMR Conventional
Zeroize	Deletes all Encryption Keys stored in the transceiver. See NXDN Function Part Deleting Encryption Key Data by Using the Zeroize Function	NXDN Conventional NXDN Trunking
Zone Delete/Add	The selected zone is added to or excluded from the target for scan.	ALL
Zone Down	Decreases the zone number in steps of 1.	ALL
Zone Down (Continuous)	Pressing and holding the Zone Down button will decrease the zone number in steps of 1 every 200 ms.  Note Zone Down (Continuous) can be configured only in Hold for the Zone Down button, and the configuration cannot be changed.	ALL
Zone Up	Increases the zone number in steps of 1.	ALL
Zone Up (Continuous)	Pressing and holding the Zone Up button will increase the zone number in steps of 1 every 200 ms.  Note Zone Up (Continuous) can be configured only in Hold for the Zone Up button, and the configuration cannot be changed.	ALL

*1 ALL indicates that a function can be used in all the following communication systems:

- Analog Conventional
- NXDN Conventional
- NXDN Trunking
- DMR Conventional
- DMR-based Trunking
- LTR Trunking

 Note

- The transceiver migrates to the function's own mode by pressing a button to which the following functions are assigned. This mode is referred to as "Function Mode".

Table 20-2 Function Mode

Button Function	Function Mode
2-tone	2-tone Mode
Autodial	Autodial Mode
Autodial Programming	Autodial Programming Mode
BLE Beacon Display	BLE Beacon Display Mode
Channel Entry	Channel Entry Mode
Clock Adjustment	Clock Adjustment Mode
GPS Position Display	GPS Position Display Mode
Group Group + Short Message Group + Status	Group Call Mode Selcall Mode (FleetSync or MDC-1200)
Group ID/Channel Entry	Group ID Entry Mode
Individual Individual + Short Message Individual + Status	Individual Call Mode Selcall Mode (FleetSync or MDC-1200)
Key Delete	Key Delete Mode
Maintenance	Maintenance Display Mode
Menu	Menu Mode
OST List	OST List Mode
Playback Playback (Last Recording)	Playback Mode
Priority-channel Select	Priority-channel Select Mode
Receive Entry	Receive Entry Mode
Remote Control	Remote Control Mode
Scan Program	Scan Program Mode
Scrambler/Encryption Code	Scrambler/Encryption Code Mode
Short Message Group + Short Message Individual + Short Message	Short Message Mode
Site Select	Site Select Mode
Squelch Level	Squelch Level Mode
Stack	Stack Mode
Status Group + Status Individual + Status	Status Mode
System Select	System Select Mode
Transceiver Password	Transceiver Password Mode
VOX	VOX Gain Level Mode

- If the transceiver migrates to each Function Mode, the assigned functions will not be activated by pressing the following buttons, but the mode's own behavior will be executed.

Portable:

- / button
- / button
- **Menu** () button
- **Back** () button
- **Function** () button
- **Home** () button
- Keypad
- **PTT** switch

Mobile:

- / button
- / button
- **Menu** () button
- **Back** () button
- **Home** () button
- Microphone Keypad
- **PTT** switch

- To directly enter a Unit ID or status in a FleetSync, MDC-1200, NXDN, or DMR system, Manual Dialing needs to be enabled using KPG-D3/ D3N. (Refer to [Manual Dialing](#).)

- The following functions are the common buttons between **Primary** and **Secondary**. If one of the following functions is configured in **Primary**, the same function is automatically configured in **Secondary**.

Channel Down
 Channel Down (Continuous)
 Channel Up
 Channel Up (Continuous)
 Direct Channel 1 to Direct Channel 5
 Direct Channel 1 Select to Direct Channel 5 Select
 Emergency
 Function
 Home Channel
 Home Channel Select
 Button Lock
 Scan
 Scan Normal
 Zone Down
 Zone Down (Continuous)
 Zone Up
 Zone Up (Continuous)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

20.2 Available Functions for Menu Mode

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Following are the functions that can be configured for Menu Mode. Each function is identical to the corresponding **PF** button. Refer to “[Available Functions for the PF Buttons](#)” for details of each function.

Table 20-3 Available Functions for Menu Mode

Function Name	Display	Corresponding PF Buttons
2-tone	2-tone	2-tone
Activity Detection (Portable only)	Activity Det	Activity Detection
ANR Preset	ANR Preset	-
Audio Profile	Audio Profile	-
Auto Telephone	Auto Telephone	Auto Telephone
Autodial	Auto Dial	Autodial
Autodial Programming	Auto Dial Prog	Autodial Programming
AUX (NX-3200/ NX-3300/ NX-3400 only)	AUX	AUX
AUX A (Mobile only)	AUX A	AUX A
AUX B (Mobile only)	AUX B	AUX B
AUX C (Mobile only)	AUX C	AUX C
Battery Status (Portable only)	Battery Status	Battery Status
BLE Beacon Display (Portable (Full Key Model/ Standard Key Model) only)	BLE BCN Disp	BLE Beacon Display
BLE Scan (Portable only)	BLE Scan	BLE Scan
Bluetooth	Bluetooth	Bluetooth
Bluetooth Device	BT Device	-
Bluetooth Discoverable	Discoverable	-
Bluetooth Headset Connection Type	BT Headset Typ	-
Bluetooth Information	Bluetooth Info	-
Bluetooth Speaker	BT Speaker	Bluetooth Speaker
Broadcast	Broadcast	Broadcast
Clock	Clock	Clock
Clock Adjustment	Clock Adjust	Clock Adjustment
Dialing	Dialing	Dialing
Direct Channel 1 Select to Direct Channel 5 Select	Direct Ch1 Sel	Direct Channel 1 Select to Direct Channel 5 Select
Display Format	Display Format	Display Format
Display Type (Portable (Full Key Model/ Standard Key Model) only)	Display Type	-
External Speaker	External SP	External Speaker
External Microphone Sense	Ext Mic Sense	-
Fixed Volume	Fixed Volume	Fixed Volume
Front Panel Programming	Panel Program	Front Panel Programming
GPS	GPS	GPS
GPS/Bluetooth Reset	GPS/BT Reset	-
GPS Position Display	GPS Pos Disp	GPS Position Display
Group	Group	Group
Group + Short Message	Group+SDM	Group + Short Message

Function Name	Display	Corresponding PF Buttons
Group + Status	Group+Status	Group + Status
High Transmit Power	High TX Power	High Transmit Power
Home Channel Select	Home Ch Sel	Home Channel Select
Horn Alert (Mobile only)	Horn Alert	Horn Alert
Individual	Individual	Individual
Individual + Short Message	Indiv+SDM	Individual + Short Message
Individual + Status	Indiv+Status	Individual + Status
IP Address	IP Address	-
Key Delete	Key Delete	Key Delete
Language	Language	-
LCD Brightness	LCD Brightness	LCD Brightness
Lone Worker *1	Lone Worker	Lone Worker
Low Transmit Power	Low TX Power	Low Transmit Power
Maintenance	Maintenance	Maintenance
Manual Site Hunt	Manual Hunt	-
Medium Transmit Power	Med TX Power	-
Microphone Sense	Mic Sense	-
Microphone Type	Mic Type	-
Monitor	Monitor	Monitor
Operator Selectable Tone	OST	Operator Selectable Tone
OST List	OST List	OST List
OVCN	OVCN	OVCN
Playback	Playback	Playback
Priority-channel Select	Pri Ch Select	Priority-channel Select
Public Address	Public Address	Public Address
Radio Check	Radio Check	-
Radio Inhibit	Inhibit	-
Radio Uninhibit	Uninhibit	-
Receive Entry	Receive Entry	Receive Entry
Redial	Redial	Redial
Remote Control	Remote Control	Remote Control
RX Audio Equalizer (High)	RX EQ High	-
RX Audio Equalizer (High Midrange)	RX EQ High Mid	-
RX Audio Equalizer (Midrange)	RX EQ Midrange	-
RX Audio Equalizer (Low Midrange)	RX EQ Low Mid	-
RX Audio Equalizer (Low)	RX EQ Low	-
RX Auto Gain Control	RX AGC	-
Save Log Data	Save Log Data	Save Log Data
Scan	Scan	Scan
Scan Delete/Add	Scan Del/Add	Scan Delete/Add
Scan Normal	Scan Normal	Scan Normal
Scan Program	Scan Program	Scan Program
Scrambler/Encryption	Scram/Encryp	Scrambler/ Encryption
Scrambler/Encryption Code	Scram/Enc Code	Scrambler/ Encryption Code
Send the Location Data (Portable only)	Send LOC Data	Send the Location Data

Function Name	Display	Corresponding PF Buttons
Send the GPS Data	Send GPS Data	Send the GPS Data
Short Message	Short Message	Short Message
Site Lock	Site Lock	Site Lock
Site Number	Site No.	System Search
Site Select	Site	Site Select
Speaker Type	Speaker Type	-
Squelch Level	Squelch Level	Squelch Level
Squelch Off	Squelch Off	Squelch Off
Stack	Stack	Stack
Status	Status	Status
System Search	System Search	System Search
Surveillance	Surveillance	Surveillance
System Lock	System Lock	System Lock
System Select	System	System Select
Talk Around	Talk Around	Talk Around
Task Request Confirmation	Task	Task Request Confirmation
Transceiver Password	Password	Transceiver Password
Transfer	Transfer	Transfer
TX Audio Equalizer (High)	TX EQ High	-
TX Audio Equalizer (High Midrange)	TX EQ High Mid	-
TX Audio Equalizer (Midrange)	TX EQ Midrange	-
TX Audio Equalizer (Low Midrange)	TX EQ Low Mid	-
TX Audio Equalizer (Low)	TX EQ Low	-
TX Auto Gain Control	TX AGC	-
Vibrator (NX-3200/ NX-3300/ NX-3400 only)	Vibrator	Vibrator
VOX	VOX Level	VOX
VOX Function	VOX	VOX Function
Zeroize	Zeroize	Zeroize
Zone Delete/Add	Zone Del/Add	Zone Delete/Add

*1 If “Transmit/Receive Inhibit” is configured in **Lone Worker Type**, Lone Worker cannot be turned ON or OFF in Menu Mode.

20.3 Available Functions for the Selector

Supported Models: Portable

By using KPG-D3/ D3N, the following functions can be assigned to the **Selector**. What function can be selected varies depending on the configuration in **16 Zone/Channel Selector**.

● If 16 Zone/Channel Selector is enabled

Table 20-4 Available Functions for the Selector

Function Name	Description	Available Communication Systems ^{*1}
None	No function is activated. Rotating the Selector causes the Button-entry Error Tone (1 beep) to sound.	ALL
Channel Select	Rotating the Selector causes the transceiver to migrate to the channel having the same number specified by the pointer of Selector .	ALL
Zone Select	Rotating the Selector causes the transceiver to migrate to the zone indicated by the pointer of the Selector .	ALL
Site Select	Turning the Selector causes the transceiver to migrate to the site specified by the Selector . (Refer to NXDN Function Part Locking the Site to Be Used (Site Lock/ Site Select) .)	NXDN Trunking
System Select	Rotating the Selector causes the transceiver to migrate to the system indicated by the pointer of the Selector . (Refer to NXDN Function Part Locking the System to Be Used (System Lock/ System Select) .)	NXDN Trunking

^{*1} ALL indicates a function that can be used in all systems.

● If 16 Zone/Channel Selector is disabled

Table 20-5 Available Functions for the Selector

Function Name	Description	Available Communication Systems ^{*1}
None	No function is activated. Rotating the Selector causes the Button-entry Error Tone (1 beep) to sound.	ALL
Channel Up/Down	Rotating the Selector causes the channel number to be increased or decreased in steps of 1.	ALL
Zone Up/Down	Rotating the Selector causes the zone number to be increased or decreased in steps of 1.	ALL
Site Up/Down	Turning the Selector increases or decreases the site number in steps of 1. (Refer to NXDN Function Part Locking the Site to Be Used (Site Lock/ Site Select) .)	NXDN Trunking
System Up/Down	Turning the Selector increases or decreases the system number in steps of 1. (Refer to NXDN Function Part Locking the System to Be Used (System Lock/ System Select) .)	NXDN Trunking

^{*1} ALL indicates that a function can be used in all the following communication systems:

- Analog Conventional
- NXDN Conventional
- NXDN Trunking
- DMR Conventional
- DMR-based Trunking

Configuration using KPG-D3/ D3N

- Assigning functions to the **Selector** on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Selector)
- Configuring **16 Zone/Channel Selector** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Selector)

20.4 Available Functions for COM Port

Portable

- **NX-3200/ NX-3300/ NX-3400**

The COM port 0 is assigned to the 14-pin universal connector (TXD: Pin No.12/ RXD: Pin No.13).

- **NX-3220/ NX-3320/ NX-3420**

The COM port 0 is assigned to the 2-pin connector (RXD: Pin No.1/ TXD: Pin No.7).

Table 20-6 Available Functions for COM Ports

Range	Communication Ports
	COM port 0
None	The transceiver can communicate with KPG-D3/ D3N.
Data	The transceiver can remotely be controlled using PC commands. The transceiver can communicate with KPG-D3/ D3N.
GPS	Position data can be acquired from the GPS receiver unit. Also, the transceiver can send the received GPS data when the transceiver receives the GPS data from another transceiver. The transceiver can communicate with KPG-D3/ D3N.
Data + GPS Data Output	The transceiver can remotely be controlled using PC commands. The transceiver will send GPS data by adding STX and ETX when the transceiver receives GPS data from another transceiver. The transceiver can communicate with KPG-D3/ D3N. "Data + GPS Data Output" can be configured for the transceiver having firmware version earlier than 4.30.00.
Data + Location Data Output	The transceiver can remotely be controlled using PC commands. The transceiver will send GPS data by adding STX and ETX when the transceiver receives GPS data from another transceiver. The transceiver will send BLE data by adding STX and ETX when the transceiver receives BLE data from another transceiver. The transceiver can communicate with KPG-D3/ D3N. "Data + Location Data Output" can be configured for the transceiver having firmware version 4.30.00 or later.
Transparent	The port functions as the data communication port for the Transparent data communication. The transceiver can communicate with KPG-D3/ D3N. However, the transceiver can communicate only for 10 sec on the COM port 0 after the transceiver is turned ON.
Transparent (Digital)	The port functions as the data communication port for the Transparent data communication using NXDN protocol which the communication method is optimized. By using Transparent (Digital), data can be sent more efficiently than by using Transparent. The transceiver can communicate with KPG-D3/ D3N. However, the transceiver can communicate only for 10 sec on the COM port 0 after the transceiver is turned ON.

Mobile

Mobile has the following 2 communication ports:

- **COM port 0**

The COM port 0 is assigned to the microphone jack on the front panel. (TXD: Pin No.4/ RXD: Pin No.7)

- **COM port 1**

The COM port 1 is assign to the 15-pin connector on the rear panel. (TXD: Pin No.6/ RXD: Pin No.7)

COM port 1 is also used for Pin No. 6 and Pin No. 7 of the 15-pin connector; hence, if any function is assigned to COM port 1, Pin No. 6 and Pin No. 7 of the 15-pin connector become disabled.

The following functions can be assigned to communication ports by using KPG-D3/ D3N:

Table 20-7 Available Functions for COM Ports

Range	Communication Ports	
	COM port 0	COM port 1
None	The transceiver can communicate with KPG-D3/ D3N.	
Data	The transceiver can remotely be controlled using PC commands. The transceiver can communicate with KPG-D3/ D3N.	
GPS	-	Position data can be acquired from the GPS receiver unit. Also, the transceiver can send the received GPS data when the transceiver receives the GPS data from another transceiver. The transceiver can communicate with KPG-D3/ D3N.
Data + GPS Data Output	The transceiver can remotely be controlled using PC commands. The transceiver will send GPS data by adding STX and ETX when the transceiver receives GPS data from another transceiver. The transceiver can communicate with KPG-D3/ D3N. “Data + GPS Data Output” can be configured for the transceiver having firmware version earlier than 4.30.00.	
Data + Location Data Output	The transceiver can remotely be controlled using PC commands. The transceiver will send GPS data by adding STX and ETX when the transceiver receives GPS data from another transceiver. The transceiver will send BLE data by adding STX and ETX when the transceiver receives BLE data from another transceiver. The transceiver can communicate with KPG-D3/ D3N. “Data + Location Data Output” can be configured for the transceiver having firmware version 4.30.00 or later.	
Transparent	-	The port functions as the data communication port for the Transparent data communication.
Transparent (Digital)	-	The port functions as the data communication port for the Transparent data communication using NXDN protocol which the communication method is optimized. By using Transparent (Digital), data can be sent more efficiently than by using Transparent.

COM port Bluetooth

Various functions can be assigned to Bluetooth communication ports.

Table 20-8 Available Functions for Bluetooth Communication Ports

Range	Bluetooth Communication Port
None	The transceiver can communicate with KPG-D3/ D3N.
Data	The transceiver can remotely be controlled using PC commands. The transceiver can communicate with KPG-D3/ D3N.
Data + GPS Data Output	The transceiver can remotely be controlled using PC commands. The transceiver will send GPS data by adding STX and ETX when the transceiver receives GPS data from another transceiver. The transceiver can communicate with KPG-D3/ D3N. “Data + GPS Data Output” can be configured for the transceiver having firmware version earlier than 4.30.00.
Data + Location Data Output	The transceiver can remotely be controlled using PC commands. The transceiver will send GPS data by adding STX and ETX when the transceiver receives GPS data from another transceiver. The transceiver will send BLE data by adding STX and ETX when the transceiver receives BLE data from another transceiver. The transceiver can communicate with KPG-D3/ D3N. “Data + Location Data Output” can be configured for the transceiver having firmware version 4.30.00 or later.
Transparent	The port functions as the data communication port for the Transparent data communication.
Transparent (Digital)	The port functions as the data communication port for the Transparent data communication using NXDN protocol which the communication method is optimized. By using Transparent (Digital), data can be sent more efficiently than by using Transparent.

Note

- For Mobile, the PC command such as J Command which notifies a user that the transceiver status has been changed cannot be sent from the COM port 0.
- If “Display Unit” is configured in **Bluetooth Interface Selection**, “Transparent” and “Transparent (Digital)” cannot be configured in **COM port Bluetooth**.
- For Mobile, if “Transparent” or “Transparent (Digital)” is configured for the configuration of COM port, some of the transmission functions by the PC command become unavailable in an NXDN system, DMR system, and FleetSync system.
- To use **COM port Bluetooth**, a connection by Serial Port Profile of Bluetooth is required. Refer to “[About Serial Port Profile \(SPP Connection/ SPP Disconnection\)](#)” for the connection by Serial Port Profile.
- The transceiver is equipped with a communication port on the connection of the internal PC board in the transceiver. Refer to the service manual for details.

Configuration using KPG-D3/ D3N

Assigning functions to **COM port** ( **See** Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1, Bluetooth)

Flow Control of the Communication Port (Flow Control)

Flow Control is the function that operates a port as the flow control port when the transceiver sends data communications using Transparent. (Refer to NXDN Function Part [Transparent](#).)

Caution

For Portable, if “RTS/CTS” is configured in Flow Control, both the external microphone and the external PTT do not function.

For Mobile, if “RTS/CTS” is configured in Flow Control, Pin No. 8 and Pin No. 9 of the 15-pin connector become disabled.



- For **COM port Bluetooth**, the flow control does not function regardless of the configuration in **Flow Control**.

Configuration using KPG-D3/ D3N

Configuring **Flow Control** (**See** Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1, Bluetooth)

COM Port Functions

The following functions of each communication port can be configured using KPG-D3/ D3N.

Table 20-9 COM Port Functions

Function	Description
Polarity	Polarity is the logic of data lines for sending data using a communication port where "GPS" is assigned. However, Polarity of COM port 0 and Polarity of COM port 1 are fixed at Normal in order to communicate with KPG-D3/ D3N and the configuration cannot be changed.
Stop Bit	Stop Bit is the bit information for sending data using a communication port where "Data", "GPS", "Data + GPS Data Output", "Data + Location Data Output", "Transparent", or "Transparent (Digital)" is assigned. "1" or "2" can be configured for Stop Bit. However, for Mobile, Stop Bit of COM port 0 is fixed at "2" in order to communicate with KPG-D3/ D3N and the configuration cannot be changed.
Baud Rate	Baud Rate is the communication rate for sending data using a communication port where "Data", "GPS", "Data + GPS Data Output", "Data + Location Data Output", "Transparent", or "Transparent (Digital)" is assigned. Baud Rate can be configured by selecting from 1200 bps, 2400 bps, 4800 bps, 9600 bps or 19200 bps.

Note

- "Data + Location Data Output" can be configured for the transceiver having firmware version 5.30.00 or later.
"Data + GPS Data Output" can be configured for the transceiver having firmware version earlier than 4.30.00.

Configuration using KPG-D3/ D3N

- Configuring **Polarity** ( See Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1, Bluetooth)
- Configuring **Stop Bit** ( See Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1, Bluetooth)
- Configuring **Baud Rate** ( See Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1, Bluetooth)

Serial Protocol Types

There are 2 types of serial protocols to be used for controlling a transceiver by using PC commands: Version 1 and Version 2. The serial protocol type (PC Interface Protocol) can be configured using KPG-D3/ D3N.

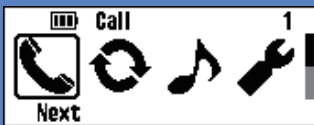
Table 20-10 Serial Protocol Types

Configuration	Description
Version 1	The command sequence of this version starts with STX (Start of Text) and ends with ETX (End of Text). This version is compatible with transceivers that support the KENWOOD PC Interface Protocol.
Version 2	This version is almost the same as the Version 1 data format, but it has the command sequence of Version 1 and a sequence number (SEQ).

Configuration using KPG-D3/ D3N

Configuring **PC Interface Protocol** ( See Radio Configuration > Global Options > External Device > General > Serial Interface)

Button operations for selecting a list or entering characters are described for each mode in this section. Refer to “[Operating the Transceiver in Each Mode \(Common Operation\)](#)” for operation methods.

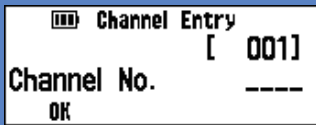
Button		Transceiver Password Mode	Menu Mode
			
Menu ([) ^{*1}	Press	Confirms the code (while the code blinks). Checks the password (after the code is confirmed).	Migrates to the Function List.
Back ([) ^{*1}	Press	Deletes a code.	-
	Hold Down	Deletes all codes.	-
Function ([) ^{*2}	Press	-	The configured function functions.
Home ([) ^{*1}	Press	Restores the “Input Password” display.	Aborts the current mode.
Side 1 ^{*3}	Press	-	The configured function functions.
Side 2 ^{*3}	Press	-	The configured function functions.
[] / [) ^{*1}	Press	Selects a code one at a time.	Moves the cursor up or down.
	Hold Down	Selects codes continuously.	Moves the cursor up or down continuously.
[] / [) ^{*1}	Press	-	Moves the cursor to the left or right.
	Hold Down	-	Moves the cursor to the left or right continuously.
Selector ^{*3}	-	-	The configured function functions after aborting the current mode.
[0] to [9] ^{*4}	Press	Enters a code.	Directly selects an option registered in the list.
[*] ^{*4}	Press	Confirms the code (while the code blinks). Checks the password (after the code is confirmed).	Migrates to the Function List.
[#] ^{*4}	Press	Deletes a code.	-
	Hold Down	Deletes all codes.	-
PTT Switch	Press	-	Transmits after aborting the current mode.

*1 Portable (Full Key Model/ Standard Key Model)/ Mobile only

*2 Portable (Full Key Model/ Standard Key Model) only

*3 Portable only

*4 Portable (Full Key Model)/ Mobile only

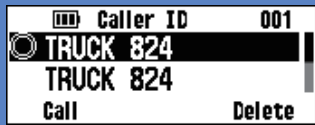
Button		Channel Entry Mode
		
Menu ([) ^{*1}	Press	Confirms the channel number and then aborts the current mode.
Back ([) ^{*1}	Press	Deletes a channel number.
	Hold Down	Deletes all channel numbers.
Function ([) ^{*2}	Press	The configured function functions.
Home ([) ^{*1}	Press	Aborts the current mode.
Side 1 ^{*3}	Press	The configured function functions.
Side 2 ^{*3}	Press	The configured function functions.
[]/ [ *1	Press	Changes the channel number.
	Hold Down	Changes the channel number continuously.
[]/ [ *1	Press	-
	Hold Down	-
Selector ^{*3}	-	The configured function functions after aborting the current mode.
[0] to [9] ^{*4}	Press	Enter the channel number.
[*] ^{*4}	Press	Confirms the channel number and then aborts the current mode.
[#] ^{*4}	Press	Deletes a channel number.
	Hold Down	Deletes all channel numbers.
PTT Switch	Press	Transmits after aborting the current mode.

^{*1} Portable (Full Key Model/ Standard Key Model)/ Mobile only

^{*2} Portable (Full Key Model/ Standard Key Model) only

^{*3} Portable only

^{*4} Portable (Full Key Model)/ Mobile only

Button		Stack Mode	
		Selecting a list (Caller ID)	
			
Menu ([M]) ^{*1}	Press	Transmits after aborting the current mode (when Caller ID Stack is selected).	
Back ([←]) ^{*1}	Press	Deletes one stack data.	
	Hold Down	Deletes all stack data.	
Function ([F]) ^{*2}	Press	The configured function functions.	
Home ([H]) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
Side 2 ^{*3}	Press	The configured function functions.	
[▲]/[▼] ^{*1}	Press	Selects stack data one at a time.	
	Hold Down	Selects stack data continuously.	
[◀] ^{*1}	Press	Switches the display. Caller ID → receive channel → receive date and time → Caller ID → ...	
[▶] ^{*1}	Press	Switches the display. Caller ID → receive date and time → receive channel → Caller ID → ...	
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Directly selects stack data registered in the list.	
[*] ^{*4}	Press	Transmits after aborting the current mode (when Caller ID Stack is selected).	
[#] ^{*4}	Press	Deletes one stack data.	
	Hold Down	Deletes all stack data.	
PTT Switch	Press	Transmits after aborting the current mode (when Caller ID Stack is selected).	

^{*1} Portable (Full Key Model/ Standard Key Model)/ Mobile only

^{*2} Portable (Full Key Model/ Standard Key Model) only

^{*3} Portable only

^{*4} Portable (Full Key Model)/ Mobile only

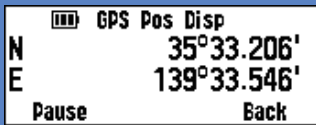
Button		Maintenance Display Mode	
		Conventional	NXDN Trunking
			
Menu () ^{*1}	Press	-	
Back () ^{*1}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Function () ^{*2}	Press	The configured function functions.	
Home () ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
Side 2 ^{*3}	Press	The configured function functions.	
 ^{*1}	Press	-	Changes the channel number.
	Hold Down	-	Changes the channel number continuously.
 ^{*1}	Press	-	Switches the display. NXDN Trunking: RSSI/ Site display → ID/ CH No. display → frequency display → RSSI/ Site display → ... NXDN Trunking (with Multi-System Hunt configured): RSSI/Site No. display → System Name/ Site No. display → frequency display → RSSI/BER display → RSSI/Site No. display → ...
 ^{*1}	Press	-	Switches the display. NXDN Trunking: RSSI/Site No. display → RSSI/BER display → frequency display → RSSI/Site No. display → ... NXDN Trunking (with Multi-System Hunt configured): RSSI/Site No. display → RSSI/BER display → frequency display → System Name/Site No. display → RSSI/Site No. display → ...
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	-	
[*] ^{*4}	Press	-	
[#] ^{*4}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
PTT Switch	Press	Transmits.	

^{*1} Portable (Full Key Model/ Standard Key Model)/ Mobile only

^{*2} Portable (Full Key Model/ Standard Key Model) only

^{*3} Portable only

^{*4} Portable (Full Key Model)/ Mobile only

Button		GPS Position Display Mode	
			
Menu ([) ^{*1}	Press	Pauses or resumes the automatic switching of the display.	
Back ([) ^{*1}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Function ([) ^{*2}	Press	The configured function functions.	
Home ([) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
Side 2 ^{*3}	Press	The configured function functions.	
[] / [) ^{*1}	Press	Changes each display one at a time. Latitude/Longitude → Altitude → Latitude/Longitude → ...	
	Hold Down	Changes the display continuously. Latitude/Longitude → Altitude → Latitude/Longitude → ...	
[] / [) ^{*1}	Press	-	
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	-	
[*] ^{*4}	Press	Pauses or resumes the automatic switching of the display.	
[#] ^{*4}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
PTT Switch	Press	Transmits.	

^{*1} Portable (Full Key Model/ Standard Key Model)/ Mobile only

^{*2} Portable (Full Key Model/ Standard Key Model) only

^{*3} Portable only

^{*4} Portable (Full Key Model)/ Mobile only

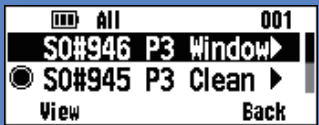
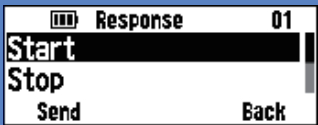
Button		Playback Mode	Clock Adjustment Mode
		Selecting a list 	
Menu ([) ^{*1}	Press	Starts the playback of audio data.	Confirms the configuration and then aborts the current mode.
Back ([) ^{*1}	Press	Deletes an audio datum.	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
	Hold Down	Deletes all audio data.	-
Function ([) ^{*2}	Press	The configured function functions.	
Home ([) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
Side 2 ^{*3}	Press	The configured function functions.	
[]/ [] ^{*1}	Press	Selects audio data one at a time.	Changes the year/ month/ date/ hour/ minute one at a time.
	Hold Down	Selects audio data continuously.	Changes the year/ month/ date/ hour/ minute continuously.
[] ^{*1}	Press	Switches the display. Recording Start Date and Time Display → ID Display → Recording Start Date and Time Display → ...	Moves to the previous configuration item.
	Hold Down	-	Selects the previous configuration item continuously.
[] ^{*1}	Press	Switches the display. Recording Start Date and Time Display → ID Display → Recording Start Date and Time Display → ...	Moves to the next configuration item.
	Hold Down	-	Selects the next configuration item continuously.
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Directly selects audio data registered in the list.	-
[*] ^{*4}	Press	Starts the playback of audio data.	Confirms the configuration and then aborts the current mode.
[#] ^{*4}	Press	Deletes an audio datum.	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
	Hold Down	Deletes all audio data.	-
PTT Switch	Press	Transmits after aborting the current mode.	

^{*1} Portable (Full Key Model/ Standard Key Model)/ Mobile only

^{*2} Portable (Full Key Model/ Standard Key Model) only

^{*3} Portable only

^{*4} Portable (Full Key Model)/ Mobile only

Button		Task Request Confirmation Mode	
		Selecting a Category (All)	Selecting a Response
			
Menu ([) ^{*1}	Press	Migrates to the Task Request View display.	Migrates to the Response selection screen after aborting the current mode.
Back ([) ^{*1}	Press	Returns to the Category list display (if Message Deletable is disabled). Deletes the selected item.	Returns to the Task Request list display of Category.
	Hold Down	Deletes all Category messages (if Message Deletable is enabled).	-
Function ([) ^{*2}	Press	The configured function functions.	
Home ([) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
Side 2 ^{*3}	Press	The configured function functions.	
[▲]/[▼] ^{*1}	Press	Selects a list display one at a time.	Selects a display line one at a time.
	Hold Down	Selects list displays continuously.	Selects display lines continuously.
[◀] ^{*1}	Press	Switches the display. Message Display → Receive Date and Time → Message Display → ...	-
[▶] ^{*1}	Press	Switches the display. Message Display → Receive Date and Time → Message Display → ...	-
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Enters by a shortcut.	
[*] ^{*4}	Press	Migrates to the Task Request View display.	Migrates to the Response selection screen after aborting the current mode.
[#] ^{*4}	Press	Returns to the Category list display (if Message Deletable is disabled). Deletes the selected item.	Returns to the Task Request list display of Category.
	Hold Down	Deletes all Category messages (if Message Deletable is enabled).	-
PTT Switch	Press	Transmits after aborting the current mode.	

*1 Portable (Full Key Model/ Standard Key Model)/ Mobile only

*2 Portable (Full Key Model/ Standard Key Model) only

*3 Portable only

*4 Portable (Full Key Model)/ Mobile only

Button		BLE Beacon Display Mode	
Menu ([) ^{*1}	Press	Pauses the automatic switching of the displayed contents. Resumes the automatic switching of the displayed contents.	
Back ([) ^{*1}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Function ([) ^{*1}	Press	-	
Home ([) ^{*1}	Press	Aborts the current mode.	
	Hold Down	-	
Side 1 ^{*2}	Press	The configured function functions.	
Side 2 ^{*2}	Press	The configured function functions.	
[]/[) ^{*1}	Press	Changes each display one at a time. UUID List No./RSSI/Measured Power → Major/Minor → UUID List No./RSSI/ Measured Power → ...	
	Hold Down	Changes the display continuously. UUID List No./RSSI/Measured Power → Major/Minor → UUID List No./RSSI/ Measured Power → ...	
[]/[) ^{*1}	Press	-	
	Hold Down	-	
Selector ^{*2}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*3}	Press	-	
[*] ^{*3}	Press	Pauses the automatic switching of the displayed contents. Resumes the automatic switching of the displayed contents.	
[#] ^{*3}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
	Hold Down	-	
PTT Switch	Press	Transmits.	

*1 Portable (Full Key Model/ Standard Key Model) only

*2 Portable only

*3 Portable (Full Key Model) only

● Power-on Tone

Tone Name	Pattern	Reference
Power-on Tone A	1 beep  1480 Hz (500 ms)	Power-on Power-on Tone Panel Test Mode Panel Tuning Mode
Power-on Tone B	2 beeps  1630 Hz (50 ms)	Power-on Tone

● Control Tone

Tone Name	Pattern	Reference
Button Beep A	1 beep  1630 Hz (50 ms)	Home Channel Direct Channel Control Tone Playback BLE Scan Bluetooth On Bluetooth Find Device Bluetooth Find Device (pairing) Define Bluetooth Device Pairing Request Bluetooth My Devices GPS/Bluetooth Reset Clock Adjustment
Button Beep B	2 beeps  1630 Hz (50 ms)	Home Channel Direct Channel Control Tone BLE Scan Bluetooth Off Bluetooth My Devices
Button Beep C	3 beeps  1630 Hz (50 ms)	Home Channel Direct Channel Control Tone Clock Adjustment
Button-entry Error Tone	1 beep  700 Hz (50 ms)	Keypad Operation Group ID Entry Stack Button Lock Control Tone BLE Scan Define Bluetooth Device Bluetooth My Devices Bluetooth Speaker Off-hook Speaker Revert AUX Input Selector

Tone Name	Pattern	Reference
Rollover Tone	1 beep  1630 Hz (200 ms)	Menu Mode Rollover/End Stop Control Tone
Stop Tone	1 beep  700 Hz (50 ms)	Rollover/End Stop Control Tone
Password Authorization Tone	2 beeps  1630 Hz (50 ms)	Power-on Control Tone Transceiver Password
Priority-channel Tone	1 beep  2000 Hz (50 ms)	Control Tone
Scan Stop Tone	2 beeps  700 Hz (50 ms)	Home Channel Direct Channel Control Tone
Search Mode Tone	1 beep  770 Hz (400 ms)	Control Tone
Out of Range Tone	1 beep  770 Hz (400 ms)	Control Tone
In-service Tone	3 beeps  770 Hz (50 ms)	Control Tone
Call Request Tone	1 beep  1630 Hz (50 ms)	Control Tone
Zone 1 Select Tone	1 beep  1630 Hz (50 ms)	Changing the Zone
Zone 2 Select Tone	2 beeps  1630 Hz (50 ms)	Changing the Zone

Tone Name	Pattern	Reference
Zone 3 Select Tone	3 beeps  1630 Hz (50 ms)	Changing the Zone
Zone 4 Select Tone	4 beeps  1630 Hz (50 ms)	Changing the Zone
Call In Progress Tone	2 beeps  980 Hz (100 ms)	Control Tone
Disconnect Indication Tone	2 beeps  980 Hz (300 ms) 490 Hz (300 ms)	Control Tone
Key Load Alert Tone	1 beep  1633 Hz (500 ms)	Control Tone
Bluetooth Find Device Mode Tone	2 beeps  940 Hz (50 ms)	Control Tone Bluetooth Find Device
Bluetooth Connect Tone	2 beeps  980 Hz 1920 Hz (100 ms) (100 ms)	Control Tone Bluetooth Find Device Define Bluetooth Device Pairing Request
Bluetooth Disconnect Tone	2 beeps  980 Hz 490 Hz (300 ms) (100 ms)	Control Tone Bluetooth My Devices HSP Disconnection
Complete Tone	5 beeps  980 Hz (20 ms)	Control Tone
Playback End Tone	3 beeps  2100 Hz (400 ms)	Playback

● Warning Tone

Tone Name	Pattern	Reference
Warning Tone A	continuous beep  700 Hz (until the PTT switch is released)	Stack Warning Tone
Warning Tone B	1 beep  700 Hz (1 sec)	Warning Tone
Warning Tone C	1 beep  700 Hz (50 ms)	Warning Tone
TOT Pre-alert Tone	3 beeps  1630 Hz (50 ms)	Warning Tone
Battery Warning Tone	3 beeps  700 Hz (50 ms)	Warning Tone Condition
PLL Unlock Tone	1 beep  1400 Hz (50 ms)	Warning Tone
Busy Tone	continuous beep  940 Hz (150 ms)	Warning Tone
Busy Tone 2	3 beeps  940 Hz (150 ms)	Warning Tone
Timed Power-off Pre-alert Tone A	2 beeps  1480 Hz (50 ms)	Warning Tone Timed Power-off
Timed Power-off Pre-alert Tone B	4 beeps  1480 Hz (50 ms)	Warning Tone Timed Power-off

Tone Name	Pattern	Reference
Timed Power-off Pre-alert Tone C	1 beep  1480 Hz (2 sec)	Warning Tone Timed Power-off
Call Queue Tone	2 beeps  940 Hz (50 ms)	Warning Tone
System Busy Tone	3 beeps  440 Hz (200 ms)	Warning Tone
System Search Tone	1 beep  1630 Hz (50 ms)	Warning Tone
System Search End Tone	3 beeps  940 Hz (150 ms) 770 Hz (150 ms) 940 Hz (150 ms)	Warning Tone
System Select Tone	4 beeps  980 Hz (50 ms) 1220 Hz (50 ms) 980 Hz (50 ms) 1220 Hz (50 ms)	Warning Tone
Call Invalid Tone	4 beeps  440 Hz (1 sec) 440 Hz (50 ms)	Warning Tone
No Reply Tone	4 beeps  440 Hz (50 ms) 440 Hz (1 sec)	Warning Tone
Call Fail Tone	2 beeps  440 Hz (50 ms) 440 Hz (1 sec)	Warning Tone

Tone Name	Pattern	Reference
Call Deny Tone	3 beeps  440 Hz (200 ms) 440 Hz (80 ms) 440 Hz (900 ms)	Warning Tone
Lone Worker Tone	2 beeps  1630 Hz (150 ms) 940 Hz (150 ms)	Warning Tone
Group-registration Invalid Tone	2 beeps  440 Hz (50 ms)	Warning Tone
Group Subscription Invalid Indicator Tone	2 beeps  440 Hz (50 ms)	Warning Tone
Call Processing Tone	2 beeps  940 Hz (50 ms)	Warning Tone
Network Failure Tone A	2 beeps  620 Hz (100 ms) 930 Hz (100 ms)	Warning Tone
Network Failure Tone B	1 beep  1630 Hz (1 sec)	Warning Tone
Man-down Pre-alert Tone	1 beep  1630 Hz (50 ms)	Warning Tone
Stationary Pre-alert Tone	1 beep  770 Hz (50 ms)	Warning Tone

Tone Name	Pattern	Reference
Motion Pre-alert Tone	1 beep  1210 Hz (50 ms)	Warning Tone
Key Fail Alert Tone	6 beeps  940 Hz (100 ms)	Warning Tone
Trunking Tone	2 beeps  1180 Hz (50 ms) 1480 Hz (50 ms)	Warning Tone
Invalid Dialing Entry Tone	1 beep  490 Hz (2 sec)	Warning Tone
Bluetooth No Response Tone	1 beep  440 Hz (1 sec)	Warning Tone Bluetooth No Response (Pairing) Bluetooth No Response (Headset Profile)
Bluetooth Connect Denied Tone	2 beeps  440 Hz (1 sec) 440 Hz (100 ms)	Warning Tone Bluetooth No Response (Pairing) Bluetooth No Response (Headset Profile)
Bluetooth Connect Invalid Tone	3 beeps  440 Hz (1 sec) 440 Hz (50 ms)	Warning Tone Bluetooth Connect Invalid (Pairing)
Bluetooth No Service Tone	3 beeps  440 Hz (50 ms)	Warning Tone Bluetooth No Service (Pairing) Bluetooth No Service (Headset Profile)
Battery Level Tone	1 beep  700 Hz (500 ms)	Warning Tone Battery Status

Tone Name	Pattern	Reference
Delay Tone	1 beep  940 Hz (150 ms)	Warning Tone
Intercept Tone	2 beeps  940 Hz (200 ms) 770 Hz (200 ms)	Warning Tone
Intercept Tone 2	6 beeps  940 Hz (200 ms) 770 Hz (200 ms) 940 Hz (200 ms) 770 Hz (200 ms) 940 Hz (200 ms) 770 Hz (200 ms)	Warning Tone
Deny Tone	3 beeps  940 Hz (150 ms) 770 Hz (150 ms) 940 Hz (150 ms)	Warning Tone

● Locator Tone

Tone Name	Pattern	Reference
Emergency Locator Tone	2 beeps  1630 Hz (90 ms) 940 Hz (90 ms)	Locator Tone

● Sidetone

Tone Name	Pattern	Reference
Proceed Tone	3 beeps  1000 Hz (20 ms)	PTT Proceed Tone Sidetone
VOX Proceed Tone	1 beep  1550 Hz (30 ms)	Sidetone
PTT ID Sidetone	4 beeps  1210 Hz (30 ms) 1630 Hz (30 ms) 1210 Hz (30 ms) 1630 Hz (30 ms)	Sidetone

● Alert Tone

Tone Name	Pattern	Reference
Unencrypted Call Alert Tone	1 beep  1477 Hz (50 ms)	Alert Tone

● Volume Level Tone

Tone Name	Pattern	Reference
Volume Button Tone	1 beep  1630 Hz (50 ms)	Volume Level Tone
Fixed Volume Button Tone	1 beep  1630 Hz (50 ms)	Volume Level Tone

● Transmit Tone

Tone Name	Pattern	Reference
Transpond Tone	1 beep  2100 Hz (1 sec)	Transmit Tone
Stun-on Tone	1 beep  1477 Hz (2 sec)	Transmit Tone
Stun-off Tone	2 beeps  1477 Hz (2 sec) 1477 Hz (2 sec)	Transmit Tone
PTT Release Tone	1 beep  1397 Hz (100 ms)	Transmit Tone
Background Tone	1 beep  1630 Hz (50 ms)	Transmit Tone

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Functions for an NXDN Conventional System

Making an Individual Call

A user can establish voice communication by calling an individual target transceiver.

[Making an Individual Call](#)

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Making a Group Call

A user can establish two-way voice communications with multiple target transceivers registered for a call group.

[Making a Group Call](#)

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Initiating an Individual Call after Ensuring That the Target Party Is Available for Communications

A user can initiate an Individual Call after identifying whether the receiving transceiver is available for communications.

[Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications \(Individual Call Acknowledge Request\)](#)

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Sending and Receiving a Status Message

A user can send and receive a simple message called a status.

[Sending and Receiving a Status Message \(Status Call\)](#)

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Sending and Receiving a Short Message

A user can send and receive a message with a maximum of 100 characters.

[Sending and Receiving a Short Message \(Short Data Call\)](#)

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Sending GPS Data

By using a built-in or external GPS receiver unit, a user can send the own location information to the base station.

[Sending GPS Data](#)

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Avoiding Interference with Other Communications

If a channel to be used for the transceiver to transmit is being used by other parties, the transmission of the transceiver on the channel is automatically restricted.

[Avoiding Interference with Other Communications \(Busy Channel Lockout\)](#)

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Using the Indoor Location Function

Indoor Location is the function to manage the position of the transceiver by using Bluetooth.

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Security	Enhancing Communication Security The transceiver is equipped with functions to enhance secrecy in communications on each analog channel or digital channel. USING COMMUNICATION SECURITY Page 593	

NXDN is a generic name for a digital communication system protocol utilizing 4-level FSK. Using NXDN, the transceiver can initiate an Individual Call or Group Call for voice calls, communicate various types of messages, or send and receive GPS data. Also, connecting a transceiver to an external device (such as a PC) allows communication because the NEXEDGE transceiver supports serial command communication.

In an NXDN Conventional system, communications are realized by sending and receiving digital signals on an NXDN digital channel. Using an NXDN ID (Unit ID or Group ID) allows the various communications.

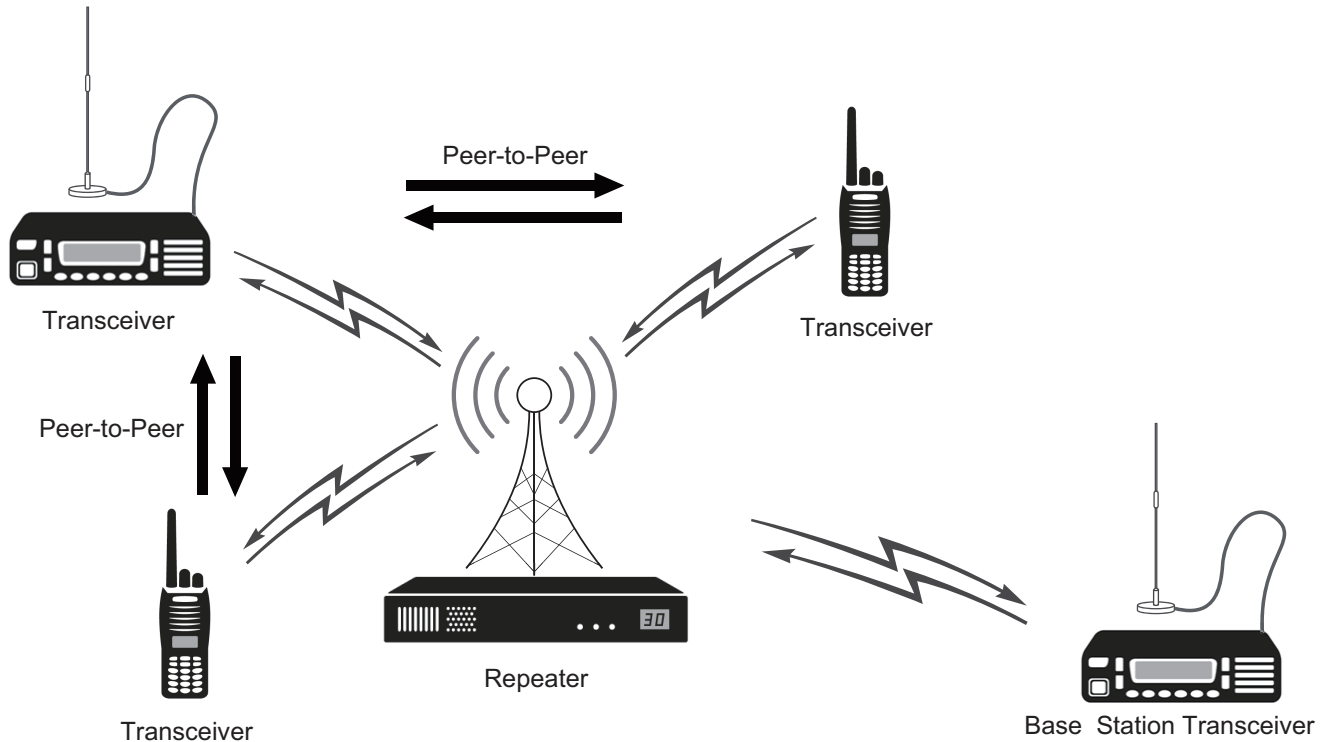


Figure 2-1 Image of Communications in an NXDN Conventional System

2.1 Initiating Voice Communications (Basic Transmission and Reception)

This section describes the basic methods for transmission and reception in an NXDN Conventional system and the relevant functions.

About Own ID

To initiate various communications using NXDN, a Unit ID, the identification code of a transceiver, needs to be configured for the transceiver.

A Unit ID can be configured in the range between 0001 and FFEF (hexadecimal), or between 1 and 65519 (decimal).

If **Global ID** is enabled, a Unit ID is shared by all NXDN Conventional and NXDN Trunking.

If **Global ID** is disabled, a Unit ID needs to be configured for each NXDN Conventional and NXDN Trunking.

Also, a name specific to the transceiver can be configured for Unit ID, with Unit ID Name.

Configuration using KPG-D3/ D3N

- Configuring **Unit ID** and **Unit ID Name**
- Configuring **Global ID** to be enabled or disabled
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > General > ID (Own))
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > General > ID (Own))

About Communication Security (Encryption)

The transceiver is equipped with the Encryption function (Bit scramble encryption type and AES/ DES encryption type) which can enhance the confidentiality of communications by encrypting communication data when making various communications on an NXDN digital channel. (Refer to [USING COMMUNICATION SECURITY](#).)

Receive

Received audio sounds from the speaker if the transceiver receives digital signals, and the frequency matches the frequency of the channel on which the transceiver has waited for or the NXDN ID matches the NXDN ID preconfigured for the transceiver. When a signaling (RAN) is used, communications are possible if the received RAN code matches the RAN code which the transceiver waits for.

Auto Reset Timer

Auto Reset Timer is the amount of time from when the received Unit ID or Group ID matches the Unit ID or Group ID preconfigured for the transceiver until the LCD, flashing of LED and emission of Alert Tone will automatically be reset. By using KPG-D3/ D3N, **Auto Reset Timer** can be configured. Also, how the transceiver behaves after the amount of time configured in **Auto Reset Timer** elapses can be configured.

Respective **Auto Reset Timer** can be configured for each voice communication (Voice) and data communication (Message).

Table 2-1 Auto Reset Timer

Configuration		Description
Auto Reset Timer (Voice or Message)	Off	Auto Reset Timer will not be activated.
	0 sec to 300 sec	After the configured time elapses, the matching state of the Unit ID or Group ID is automatically reset.
LED (Voice only)		If this function is enabled, the flashing Busy LED for the Selective Call Alert LED turns off when the length of time configured in Auto Reset Timer elapses.
Alert Tone (Voice or Message)		If this function is enabled, the intermittently emitted Alert Tone stops when the length of time configured in Auto Reset Timer elapses.
LCD (Voice or Message)		While this function is enabled, the display will change from one of the following displays to the previous channel display if the amount of time configured for Auto Reset Timer elapses. • ID display after receiving an Individual Call or Group Call • Status Message display after receiving a Status Message • Short Message display after receiving a Short Message

Configuration using KPG-D3/ D3N

- Configuring **Auto Reset Timer** (Voice) ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Common Options > Auto Reset > Voice)
- Configuring **Auto Reset Timer** (Message) ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Common Options > Auto Reset > Message)

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a call using an NXDN ID. A user can notice by the LED that the transceiver is receiving a call.

One of the 7 colors can be used to make the LED flash, and the flashing color can be configured for each type of call.

- Yellow
- Purple
- Blue
- Light Blue
- Red
- Green
- White

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **LED Color** ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)

Optional Signaling LED

Optional Signaling LED is the function to make the LED flash yellow when the Optional Signaling matches.

A user can notice by the LED that the transceiver is receiving a call.

If the matching state of Optional Signaling is disabled when the buttons on the transceiver are pressed, or when the time configured in **Auto Reset Timer** elapses, the LED is turned off.

However, if **Selective Call Alert LED** is enabled even if **Optional Signaling LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

Configuration using KPG-D3/ D3N

Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > RX Options)

Displaying the ID of the Communicating Caller on the LCD (Caller ID Display)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Caller ID Display can be used to display the caller's Unit ID Name or Unit ID on the display when the transceiver receives a call in an NXDN Conventional system.

In addition to the above function, the received Unit ID or Group ID can be displayed on the display upon the receipt of the signals transmitted by the transceiver using Group Call.

A user can identify the caller not only by voice, but also through the display.

Depending on the configuration of **Caller ID Display** (Off, RAN, or RAN and Selcall), the operation of the transceiver receiving a call in an NXDN Conventional system is as follows.

● Off

When the transceiver receives an NXDN digital signal in an NXDN Conventional system, the received ID does not appear on the display.

● RAN

When the transceiver receives a signal transmitted only using the RAN code, the received Unit ID Name or Unit ID appears on the main display if the received RAN code matches the RAN code preconfigured in the transceiver, regardless of the **Optional Signaling** configuration.

If the transceiver receives a Group Call, **Caller ID Display** will not be activated.

● RAN and Selcall

When the transceiver receives a signal transmitted only using the RAN code, the received Unit ID Name or Unit ID appears on the main display if the received RAN code matches the RAN code preconfigured in the transceiver, regardless of the **Optional Signaling** configuration.

If the transceiver stands by on the channel where "None", "DTMF", or "2-tone" is configured in **Optional Signaling** when the transceiver receives a Group Call, and if the received RAN code matches the RAN code preconfigured in the transceiver, the received Unit ID Name or Unit ID, and Group ID appear on the display according to the **Group Call Display Type** configuration.

If the transceiver receives a Group ID which is not registered in the Group ID List, Group ID No. will appear. If the Group ID is not registered in the Group ID List upon the receipt of a Group ID for which "ALL" is configured, **Caller ID Display** will not be activated. Also, if the transceiver stands by on the channel where "NXDN ID" is configured for **Optional Signaling**, Caller ID Display will not be activated.



Note

- If the transceiver receives an individual call or a group call using NXDN ID, **Caller ID Display** will not be activated. If the transceiver receives an individual call using NXDN ID, the caller's ID appears. If the transceiver receives a group call using NXDN ID, the message appears according to the configuration in **Group Call Display Type**. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)
- **Caller ID Display** is the function to display the caller information while communicating with the caller. Therefore, a user cannot reply to the displayed Unit ID or Group ID, unlike an individual call or group call using NXDN ID.
- The transceiver can acquire the log data of operating time by sending information of the received Unit ID to a PC.

Configuration using KPG-D3/ D3N

Configuring **Caller ID Display** (**See** Radio Configuration > Protocol Options > NXDN > General > Conventional)

Over-the-Air Alias

Over-the-Air Alias allows the receiving transceiver to display the ID Name of the transmitting transceiver when receiving a call even if the ID Name of the transmitting transceiver is not configured for the receiving transceiver.

Using this function, Unit ID Name of the added unit does not need to be configured such as when a unit is added to the system in service.

The transmitting transceiver sends Unit ID Name when making voice calls. If the receiving transceiver receives a call such as an Individual Call, the Unit ID Name stored in the reception frame will appear on the display.

Note

- The received Unit ID Name appears after displaying differently from the received Unit ID Name in the following cases.
 - The Unit ID of the transmitting transceiver is not configured in the Individual ID List.
 - The Unit ID of the transmitting transceiver is not stored as Caller ID.
 - The received Unit ID Name is different from the ID Name configured in the Individual ID List or the ID Name stored in the transceiver.
- When Lookback is being executed during Priority Scan, Unit ID Name may not be displayed depending on the configuration in Lookback Time.
- If **Caller ID Stack** is enabled, received Unit ID Name also is stored in the transceiver stack memory. The stored Unit ID Name is also reflected to ID Name with Individual ID List selected.
- Configure **Over-the-Air Alias** for each of NXDN Conventional and NXDN Trunking systems. The Unit ID Name (Own) configured for each system is used for the Unit ID Name to be transmitted.

Configuration using KPG-D3/ D3N

- Configuring **Over-the-Air Alias** to be enabled or disabled
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > TX Options)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Site NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > TX Options)
- Configuring **Unit ID Name**
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > General > ID (Own))
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > General > ID (Own))

Participating in an On-going Voice Call Midway Through the Call (Late Entry)

The transceiver can participate in an on-going voice call even if the transceiver receives this call midway through.

The transceiver in an NXDN Conventional system can participate in an on-going voice call by decoding control data always sent along with audio data, even if the transceiver receives a voice call midway through the call. However, the transceiver cannot participate in an on-going individual call or group call using signaling (such as DTMF and 2-tone) even if the transceiver receives signaling midway through the call, since signaling is sent one-time when starting transmission.

Searching Whether the Transceiver Receives a Call (Scan)

Using the Scan function, the transceiver can check each channel in turn whether the channel has a signal. If a channel has a signal, the transceiver receives the signal on the channel.

The following scan functions can be used in an NXDN Conventional system.

- Single Scan
- List Scan
- Multi-Zone Scan

Refer to “[USING SCAN](#)” for details of Scan.

Changing the Standby Display (Channel Information)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Channel Information is the function to change the standby display by operating the transceiver.

The standby display can be changed to the channel name display, Zone-channel number display, transmit and receive frequencies display, transmit and receive QT/DQT display, or transmit and receive RAN display.

By pressing the **Channel Information** button, the display toggles in the following order:

channel name → Zone-channel number → transmit and receive frequencies → transmit and receive QT/DQT → transmit and receive RAN → channel name ...

In **Channel Information**, the frequency display is available, but the display is restricted from being toggled for the zone number 100 or later in order to avoid disclosure of frequency information. The display can be toggled only if the selected Zone-channel satisfies all of the following conditions:

Protocol: Analog Conventional or NXDN Conventional

Channel Type: Analog, NXDN or Mixed

Zone: 1 to 99

If a Zone-channel which does not satisfy these conditions is selected, the display is not toggled even if the **Channel Information** button is pressed.

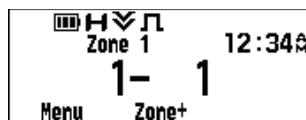
Channel name display

The channel name appears. The default after writing the configuration data is the channel name display.



Zone-channel number display

The Zone-channel number appears.



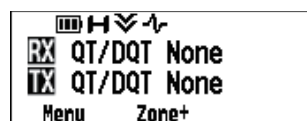
Transmit and receive frequencies display

The transmit and receive frequencies configured for the selected Zone-channel appear. If no frequency is configured, “No Frequency” appears.



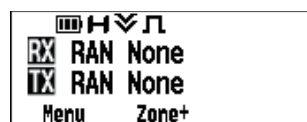
Transmit and receive QT/DQT display

The QT/DQT configuration of the transmitting transceiver and the QT/DQT configuration of the receiving transceiver configured for the selected Zone-channel appear. If “None” is configured for QT/DQT, “QT/DQT None” appears.



Transmit and receive RAN display

The RAN configuration of the transmitting transceiver and the RAN configuration of the receiving transceiver configured for the selected Zone-channel appear. If “None” is configured for RAN, “RAN None” appears.



Note

- If **Talk Around** is enabled, in each display of the transmit and receive frequencies, the transmit and receive QT/DQT, and the transmit and receive RAN, the transmitting transceiver (TX) displays the same information as the receiving transceiver (RX) according to the configuration in **Talk Around**. However, for a channel for which the transmit frequency is not configured, “No Frequency” appears on the transmitting transceiver (TX).
- If **OST** is enabled, the transmit and receive QT/DQT appears according to the configuration in **OST**.
- The **Channel Information** button and the **Display Format** button cannot be configured at the same time for the transceiver. Also, the same applies to when “Display Format” is configured for Menu Mode.
- If the **Channel Information** button is configured for the transceiver, the standby display appears according to the specifications of **Channel Information**. If the **Display Format** button is configured for the transceiver, the standby display appears according to the specifications of **Display Format**.
- If neither the **Display Format** button nor the **Channel Information** button is configured for the transceiver, the standby display appears according to the configuration in **Display Format** of KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Transmitting

Transmitting can be initiated by pressing the **PTT** switch, or by selecting an NXDN ID and then pressing the **PTT** switch. When a signaling (RAN) is used, the transceiver sends the RAN code. In this case, if the transmitted RAN code matches the RAN code preconfigured for the receiving transceiver, the transceivers can communicate.

Restricting the Continuous Transmission Duration (Time-out Timer)

Time-out Timer (TOT) is the function to restrict the duration for the transceiver to continuously transmit.

This function is used to avoid occupying a repeater or frequency which is shared with other users. The transceiver automatically stops transmitting and releases the channel if it continuously transmits longer than the configured time.

Time-out Timer can be configured for each system. Also, timers, such as **TOT Pre-alert**, **TOT Rekey Time**, and **TOT Reset Time**, relevant to **Time-out Timer** can be configured.

TOT Pre-alert

TOT Pre-alert is the function to notify a user that a continuous transmission is about to end by the **Time-out Timer**. A TOT Pre-alert Tone (3 beeps) sounds from the transceiver before the transceiver stops the continuous transmission by the **Time-out Timer**.

Example: Time-out Timer: 30 sec, TOT Pre-alert: 4 sec

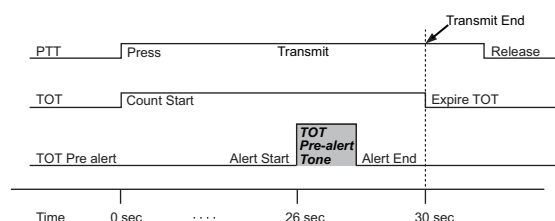


Figure 2-2 TOT Pre-alert

Note

- If "Off" is configured for **TOT Pre-alert**, no TOT Pre-alert tone will sound from the transceiver.

TOT Rekey Time

TOT Rekey Time is the amount of time from when the transceiver stops the transmission by the **Time-out Timer** until transmission becomes possible again.

Example: Time-out Timer: 30 sec, TOT Rekey Time: 20 sec

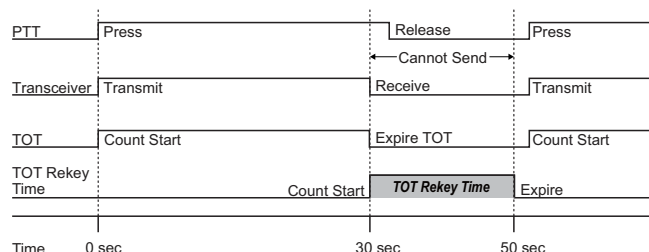


Figure 2-3 TOT Rekey Time

Note

- If "Off" is configured for **TOT Rekey Time**, the transceiver will immediately be ready to transmit.
- The timer will be reset and transmission becomes possible if the zone or channel is changed while the **TOT Rekey Time** is counting down.
- TOT Rekey Time** will not be reset if **Revert Channel** is not changed during the scan.

TOT Reset Time

TOT Reset Time is the time required to initialize and reset the elapsed time for **Time-out Timer**.

Example 1: Time-out Timer: 30 sec, TOT Reset Time: 10 sec

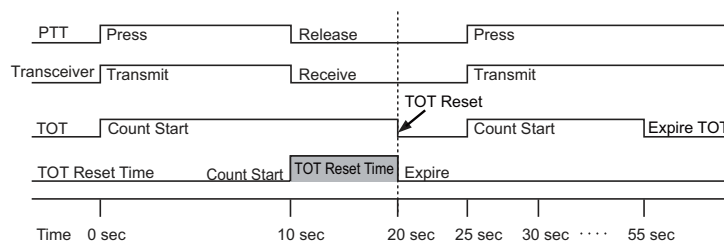


Figure 2-4 TOT Reset Time 1

The transceiver considers a retransmission within this configured length of time as a continuous transmission. In the following example, the counting of **Time-out Timer** continues because the transmission was started by a user pressing the **PTT** switch while the **TOT Reset Time** was counting down.

Example 2: Time-out Timer: 30 sec, TOT Reset Time: 10 sec

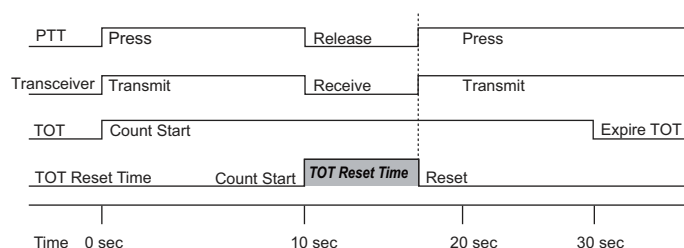


Figure 2-5 TOT Reset Time 2

Note

- If "Off" is configured for **TOT Reset Time**, the **Time-out Timer** will be reset immediately after the transceiver finishes transmitting.
- The timer will be reset if the zone or channel is changed while the **TOT Reset Time** is counting down.
- **TOT Reset Time** will not be reset if **Revert Channel** is not changed during the scan.

Configuration using KPG-D3/ D3N

Configuring various functions of **Time-out Timer**

([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > General > MDC-1200 > Other Options > TX > Time-out Timer)

([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > General > FleetSync > Other Options > TX > Time-out Timer)

([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > General > 5-tone > Other Options > TX > Time-out Timer)

([See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > General > Other Options > TX > Time-out Timer)

Avoiding Interference with Other Communications (Busy Channel Lockout)

Busy Channel Lockout is the function to automatically restrict the transmission so as not to interfere with other communications.

If an attempt is made to transmit on a channel that is already being used by other users, the transceiver automatically restricts the transmission.

If the **PTT** switch is pressed while **Busy Channel Lockout** is enabled, the transceiver cannot transmit with “BUSY” appearing on the display and a Warning Tone A (continuous beep) sounding from the transceiver at the same time. The Warning Tone A (continuous beep) sounds from the transceiver until the **PTT** switch is released.

The following are conditions to disable transmission by Busy Channel Lockout:

Table 2-2 Busy Channel Lockout

Configuration	Description
No	Busy Channel Lockout is disabled. Transmission is not restricted even if the channel on which the transceiver attempts to transmit is busy.
Carrier Only	The transceiver cannot transmit while the transceiver is receiving a carrier.
Incorrect RAN	The transceiver cannot transmit if the transceiver receives a carrier and the received RAN code does not match the RAN code preconfigured for the transceiver.
Correct RAN	The transceiver cannot transmit if the transceiver receives a carrier and the received RAN code matches the RAN code preconfigured for the transceiver.
Any RAN	The transceiver cannot transmit while receiving a RAN code.

The transceiver is controlled in the following manner according to the configuration for Transmit Mode on a channel with “Mixed” configured in **Channel Type**.

- **If “Analog” is configured in Transmit Mode:**

The transceiver transmits according to the configuration in **Busy Channel Lockout** (Analog).

- **If “NXDN” is configured for Transmit Mode:**

The transceiver transmits according to the configuration in **Busy Channel Lockout** (NXDN).

Also, while the **Signaling Reset Timer** or **Auto Reset Timer** is activated on a channel with “Mixed” configured in **Channel Type**, the transceiver transmits according to the configuration in **Busy Channel Lockout** in the same mode as that of the received signal (Analog or NXDN). If the transceiver receives an analog signal, the transceiver transmits according to the configuration in **Busy Channel Lockout** (Analog). If the transceiver receives an NXDN signal, the transceiver transmits according to the configuration in **Busy Channel Lockout** (NXDN).



- **Busy Channel Lockout** cannot be activated in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Busy Channel Lockout**

(**See**) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > NXDN)

(**See**) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > NXDN)

Using a Channel Being Used by Other Parties (BCL Override)

BCL Override is the function to transmit on a busy channel even if **Busy Channel Lockout** is activated and transmission is restricted.

Operating the transceiver

1 Press the **PTT** switch while transmission is restricted by **Busy Channel Lockout**.

2 Release the **PTT** switch, then press the **PTT** switch again within 500 ms.

Busy Channel Lockout is temporarily disabled, and the transceiver starts transmitting.

Note

- This function also works while the transceiver is transmitting using the VOX function. For a transmission using VOX, **Busy Channel Lockout** is temporarily disabled and the transceiver can transmit if audio is input within 500 ms after audio input terminates.

Configuration using KPG-D3/ D3N

Configuring **BCL Override** to be enabled or disabled

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > General > MDC-1200 > Other Options > TX)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > General > FleetSync > Other Options > TX)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > General > 5-tone > Other Options > TX)

( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > General > Other Options > TX)

Communicating Without Using a Repeater (Talk Around)

Talk Around is the function that allows transceivers to communicate directly without using a repeater.

If the transceiver cannot link to a repeater due to too great distance between the transceiver and the repeater, the transceiver can directly communicate with the target transceiver by using **Talk Around**.

The transceiver, with **Talk Around** enabled, transmits on the receive frequency and uses the Decode Signaling (RAN code) configured for the selected channel.

On a channel with **Allow Talk Around** enabled, **Talk Around** can be toggled between enabled and disabled by operating the transceiver.

- Pressing the **Talk Around** button toggles **Talk Around** between enabled and disabled.
- Pressing the **Menu** button causes the transceiver to enter Menu Mode, and then **Talk Around** can be toggled between enabled and disabled by selecting "Talk Around". (Refer to Common Function Part [Using Menu Mode](#).)

Note

- For the 800 MHz/ 900 MHz model, the 800 MHz model, and the 900 MHz model, **Talk Around** cannot be toggled between enabled and disabled by operating the transceiver even on a channel with **Allow Talk Around** enabled.

Operating the transceiver

● Enabling the Talk Around

Press the **Talk Around** button while **Talk Around** is disabled.

The “” icon appears and **Talk Around** will be enabled.



● Disabling the Talk Around

Press the **Talk Around** button while **Talk Around** is enabled.

The “” icon disappears and **Talk Around** will be disabled.



Note

- **Talk Around** is disabled by changing the zone or channel while **Talk Around** is enabled.
- On a channel with **Allow Talk Around** disabled, **Talk Around** cannot be toggled between enabled and disabled by operating the **Talk Around** button.
- If **Talk Around** is enabled by operating the **Talk Around** button, **Talk Around** becomes disabled when the transceiver enters Emergency Mode.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)
- Configuring **Allow Talk Around** to be enabled or disabled
 - ( See Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > General)
 - ( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > General)

2.2 Using the Signaling

RAN code is the signaling to be used for facilitating communication within a group if the same channel is shared by several groups. Also, NXDN ID, DTMF, and 2-tone can be used as the Optional Signaling to initiate a selective call.

Sharing the Same Channel (Frequency) by Several Groups (RAN)

RAN (Radio Access Number) is a digital signaling type having the same function as analog QT tone or DQT code. This signaling is used when the transceiver transmits or receives on a digital channel.

The transceiver mutes calls from a zone having a restricted RAN code if a RAN code is configured for each channel. Therefore, a user can communicate in a group without listening to conversations from other groups.

The transceiver can distinguish the signaling even if the transceiver receives any signaling during a call since this signaling type has a continuous waveform.

The following is transmission and reception behavior of a RAN code.

Table 2-3 RAN Transmission/ Reception Behavior

Behavior	Description
Reception	If the transceiver receives a signal and the received RAN code matches the RAN code preconfigured for the transceiver, the transceiver unmutes the speaker and emits the received audio from the speaker.
Transmission	The transceiver sends the preconfigured RAN code while transmitting. Pressing the PTT switch causes the transceiver to send the RAN code.

Configuration using KPG-D3/ D3N

Configuring RAN Decode/Encode

( See Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > NXDN)

( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > NXDN)

Using the Optional Signaling

Optional Signaling is the signaling used to initiate a selective call. NXDN ID, DTMF, and 2-tone are the Optional Signaling which can be used in an NXDN Conventional system.

(Refer to [Using NXDN ID to Initiate a Selective Call](#).)

● NXDN ID

NXDN ID is the signaling type using the Unit ID or Group ID stored in the NXDN data frame. The transceiver emits a ring tone (Alert Tone) if the received RAN code matches the RAN code preconfigured in the transceiver and the received Unit ID or Group ID matches the Individual ID or Group ID preconfigured in the transceiver.

To decode an NXDN ID in an NXDN Conventional system, “NXDN ID” needs to be configured in **Optional Signaling** to be used on the channel.

● DTMF

DTMF is a signaling type using audible frequencies. The transceiver emits a ring tone (Alert Tone) and starts Transpond if the received RAN code matches the RAN code preconfigured in the transceiver and the received DTMF code matches the DTMF code preconfigured in the transceiver.

To decode a DTMF code in an NXDN Conventional system, “DTMF” needs to be configured in **Optional Signaling** to be used on the channel.

● 2-tone

2-tone signaling uses a pair of 2 different tone frequencies in series for an individual call. The transceiver emits a ring tone (Alert Tone) and starts Transpond if the received RAN code matches the RAN code preconfigured in the transceiver and the received tone signal matches the tone signal preconfigured in the transceiver.

To decode a 2-tone code in an NXDN Conventional system, “2-tone 1”, “2-tone 2”, “2-tone 3”, or “2-tone 4” needs to be configured in **Optional Signaling** to be used for the channel.

The transceiver behaves as follows according to the type of a received signal on a channel with “Mixed” configured in **Channel Type**.

● If the transceiver receives analog signals

The transceiver behaves according to the configuration in **Optional Signaling** (Analog).

● If the transceiver receives digital signals

The transceiver behaves according to the configuration in **Optional Signaling** (NXDN).

Configuration using KPG-D3/ D3N

Configuring **Optional Signaling**

( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > NXDN)

( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > NXDN)

Unmuting the Speaker (Audio Control)

Audio Control is the condition which allows the transceiver to unmute the speaker by a RAN code and an Optional Signaling. Using KPG-D3/ D3N, the condition which allows the transceiver to unmute the speaker can be configured for each system configured with Personal Features.

The transceiver unmutes the speaker and emits received audio if the conditions configured for **Audio Control** are satisfied.

Conditions to unmute the speaker can be changed by a combination of the RAN code and the Optional Signaling.

The following are the conditions to unmute the speaker.

Table 2-4 Audio Control

Configuration	Description
RAN	The transceiver unmutes the speaker if the received RAN code matches the RAN code preconfigured for the transceiver. Conditions remain unchanged even if the transceiver transmits.
RAN and Optional Signaling	While the received RAN code matches the RAN code preconfigured for the transceiver, the transceiver unmutes the speaker if Optional Signaling matches the Optional Signaling preconfigured for the transceiver. Conditions remain unchanged even if the transceiver transmits.

The transceiver behaves as follows according to the type of a received signal on a channel with “Mixed” configured in **Channel Type**.

- **If the transceiver receives analog signals**

The transceiver behaves according to the configuration in **Audio Control** (Analog).

- **If the transceiver receives digital signals**

The transceiver behaves according to the configuration in **Audio Control** (NXDN).

Configuration using KPG-D3/ D3N

Configuring **Audio Control**

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > RX Options)

( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > RX Options)

Temporarily Disabling the Squelch (Squelch Off)

Squelch Off is the function to disable the RAN code and Optional Signaling configured for the channel on which the transceiver waits for and unmutes the speaker upon detection of an NXDN frame.

The same as with the Monitor function, the Squelch Off function is used to monitor the availability of channels prior to transmitting in order to avoid interfering with other parties.

Also, if an analog channel is configured in an NXDN Conventional system, the Squelch Off function is used to listen to the audio even when the speaker is muted due to a very weak carrier on an analog channel.

To use this function, the **Squelch Off** button or the **Squelch Off Momentary** button is used.

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then Squelch Off can be toggled between enabled and disabled by selecting “Squelch Off”. (Refer to Common Function Part [Using Menu Mode.](#))

Operating the transceiver

● Squelch Off button

1 Press the **Squelch Off** button while **Squelch Off** is disabled.

The “” icon appears. The **Busy LED** lights green if **Busy LED** is enabled.

The transceiver disables the RAN code and Optional Signaling and unmutes the speaker upon detection of an NXDN frame.

2 Press the **Squelch Off** button while **Squelch Off** is enabled.

The “” icon disappears. A channel where **RAN Decode** or Optional Signaling is configured resumes Signaling Squelch.

● Squelch Off Momentary button

1 Press and hold the **Squelch Off Momentary** button.

The “” icon appears.

The **Busy LED** lights green if **Busy LED** is enabled.

The transceiver disables the RAN code and Optional Signaling and unmutes the speaker upon detection of an NXDN frame.

2 Release the **Squelch Off Momentary** button.

The “” icon disappears.

A channel where **RAN Decode** or Optional Signaling is configured resumes Signaling Squelch.



Note

- Pressing the **Squelch Off** button or the **Squelch Off Momentary** button while the Optional Signaling matches resets the matching state of the Optional Signaling.
- If **Squelch Off** becomes enabled during the scan, the transceiver pauses scanning on a channel where the transceiver is scanning. The transceiver does not resume scanning until **Squelch Off** is disabled.
- If **Squelch Off** is enabled on a channel with “Mixed” configured in **Channel Type**, the transceiver forcibly unmutes the speaker. White noise is audible if no carrier is present. In this case, QT tone, DQT code, or RAN code is disabled. If the transceiver receives an analog signal, the transceiver unmutes the speaker only with a carrier. The transceiver unmutes the speaker when the transceiver receives a digital signal even if the received RAN code does not match the RAN code preconfigured for the transceiver.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( **See** Radio Configuration > Global Options > Button Assignment)

Temporarily Disabling the Signaling (Monitor)

Monitor is the function that temporarily disables the RAN code and Optional Signaling that are configured for a channel on which the transceiver waits.

Monitor is used to check the availability of channels prior to transmitting in order to avoid interfering with other parties.

Using the Monitor function temporarily unmutes the speaker if the speaker is muted because the RAN code and Optional Signaling do not match. However, if the speaker is muted due to a very weak carrier, the speaker is not unmuted even by using the Monitor function. In this case, using the Squelch Off function temporarily unmutes the speaker and the audio can be heard.

To use this function, the **Monitor** button or the **Monitor Momentary** button is used.

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then **Monitor** can be toggled between enabled and disabled by selecting "Monitor". (Refer to Common Function Part [Using Menu Mode.](#))

When **Monitor** is enabled, the "🔊" icon appears, and the RAN code and Optional Signaling will be disabled.

When **Monitor** is enabled on a channel with "Mixed" configured in **Channel Type**, the "🔊" icon appears, and the RAN code, QT tone or DQT code, and Analog or NXDN Optional Signaling will be disabled.

Operating the transceiver

● Monitor button

1 Press the **Monitor** button while **Monitor** is disabled.

The "🔊" icon appears.

The transceiver disables the RAN code and Optional Signaling and unmutes the speaker upon detection of an NXDN frame.

2 Press the **Monitor** button while **Monitor** is enabled.

The "🔊" icon disappears.

A channel where a RAN Decode is configured resumes Signaling Squelch.

● Monitor Momentary button

1 Press and hold the **Monitor Momentary** button.

The "🔊" icon appears. The transceiver disables the RAN code and Optional Signaling and unmutes the speaker upon detection of an NXDN frame.

2 Release the **Monitor Momentary** button.

The "🔊" icon disappears. A channel where a RAN Decode is configured resumes Signaling Squelch.



- Pressing the **Monitor** button or the **Monitor Momentary** button while the Optional Signaling matches resets the matching state of the Optional Signaling.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)

Unmuting the Speaker by Linking with the Microphone (Off-hook Decode)

Supported Models: Mobile

Off-hook Decode is the function linked with a microphone on- or off-hook state to unmute the speaker upon detection of an NXDN frame.

The transceiver behaves as follows according to the configuration in **Off-hook Decode**.

Table 2-5 Off-hook Decode

Configuration	Description
Enabled	The transceiver unmutes the speaker according to the configuration in Audio Control while the microphone is in either the on-hook state or off-hook state.
Disabled	The transceiver unmutes the speaker when the transceiver detects a frame if the microphone is in the off-hook state. The transceiver unmutes the speaker according to the configuration in Audio Control while the microphone is in the on-hook state.

Note

- If “Mixed” is configured in **Channel Type**, the transceiver behaves according to the type of a received signal (Analog or NXDN).
- **Stun** can be activated regardless of the status of **Off-hook Decode** and the microphone on- or off-hook state.
- The matching state of Optional Signaling will be reset by hooking the microphone on a hanger (On-hook state) after receiving a call by Optional Signaling.
- On-hook indicates the state that the microphone is hooked. Off-hook indicates the state that the microphone is not hooked.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Decode** to be enabled or disabled ( **See** Radio Configuration > Global Options > Basics > General > Control > Microphone-hook)

2.3 Waiting for Both Digital Signals and Analog Signals (Mixed Mode)

Mixed Mode is the function to wait for both digital signals and analog signals.

The channel used in analog mode can also be used in digital mode, hence the transceiver can easily migrate from analog mode to digital mode.

The following is the transceiver behavior for transmission and reception on a channel with “Mixed” configured in **Channel Type**:

● Reception

Mixed Mode can be used to wait for a call in both digital (RAN code) and analog (QT tone and DQT code) modes. The transceiver unmutes the speaker if the received signaling (QT tone, DQT code or RAN code) matches the signaling preconfigured for the transceiver (QT tone, DQT code or RAN code).

● Transmission

The transceiver transmits in the mode (Analog or NXDN) configured in **Transmit Mode**.

If the received signaling (QT tone, DQT code, or RAN code) matches the signaling preconfigured for the transceiver, the transceiver can transmit in the same mode as that of the received signal regardless of the configuration in **Transmit Mode** before the length of time configured in **Signaling Reset Timer** elapses (except if the transceiver is doing data communications).

If the received Optional Signaling (DTMF, 2-tone, FleetSync, MDC-1200, or NXDN ID) matches the Optional Signaling preconfigured for the transceiver, the transceiver can transmit in the same mode as that of the received signal regardless of the configuration in **Transmit Mode** before the length of time configured in **Auto Reset Timer** elapses. The transceiver can also transmit in the same mode as that of the received signal regardless of the configuration in **Transmit Mode** while doing data communications as well.

The following is the difference in operation for transmission depending on the transceiver configuration and the received signal.

Table 2-6 Mixed Mode

Optional Signaling	Transmit Mode	Received signal	Transmission Operation
Disabled	Analog	Digital	The transceiver can transmit using the RAN code configured for the transceiver until the length of time configured in Signaling Reset Timer elapses.
Disabled	Analog	Analog	The transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver.
Disabled	NXDN	Digital	The transceiver can transmit using the RAN code configured for the transceiver.
Disabled	NXDN	Analog	The transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver until the length of time configured in Signaling Reset Timer elapses.
Enabled	Analog	Digital	The transceiver can transmit using the RAN code configured for the transceiver and specifying the received ID until the length of time configured in Auto Reset Timer elapses.
Enabled	Analog	Analog	By specifying the received ID, the transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver. However, ID can be specified only if the transceiver receives the FleetSync signaling. The transceiver can transmit using only QT tone or DQT code preconfigured for the transceiver if the transceiver receives a DTMF or 2-tone code, or an MDC-1200 ID.
Enabled	NXDN	Digital	The transceiver can transmit specifying the received ID and using the RAN code configured for the transceiver.

Optional Signaling	Transmit Mode	Received signal	Transmission Operation
Enabled	NXDN	Analog	By specifying the received ID, the transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver until the length of time configured in Auto Reset Timer elapses. However, ID can be specified only if the transceiver receives the FleetSync signaling. The transceiver can transmit using only QT tone or DQT code preconfigured for the transceiver if the transceiver receives a DTMF or 2-tone code, or an MDC-1200 ID.

 Note

- Conditions for unmuting the speaker vary depending on the **Audio Control** configuration. (Refer to [Unmuting the Speaker \(Audio Control\)](#), Analog Function Part [Unmuting the Speaker \(Audio Control\)](#))
- While the transceiver is in Emergency Mode, the transceiver transmits according to the configuration in **Transmit Mode**.
- If the transceiver receives FleetSync data, the transceiver sends an ACK in analog mode, and if the transceiver receives NXDN data, the transceiver sends an ACK in digital mode. The transceiver transmits according to the configuration in **Transmit Mode** after the transceiver ends data communications regardless of the configuration in **Signaling Reset Timer** or **Auto Reset Timer**.
- If “Off” is configured in **Signaling Reset Timer**, the transceiver retains the status of transmission in the same mode as that of the received signal. This status will be reset by an operation such as changing a channel.
- If “0” is configured in **Signaling Reset Timer**, the transceiver transmits according to the configuration in **Transmit Mode**.

Configuration using KPG-D3/ D3N

- Configuring **Channel Type** and **Transmit Mode**
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > General)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > General)
- Configuring **Signaling Reset Timer** ( **See** Radio Configuration > Protocol Options > NXDN > General > Conventional)

2.4 Using NXDN ID to Initiate a Selective Call

An individual call and group call are available by using NXDN IDs. In addition, a message can be sent to a specified target ID in various types of message communications.

Available Calls

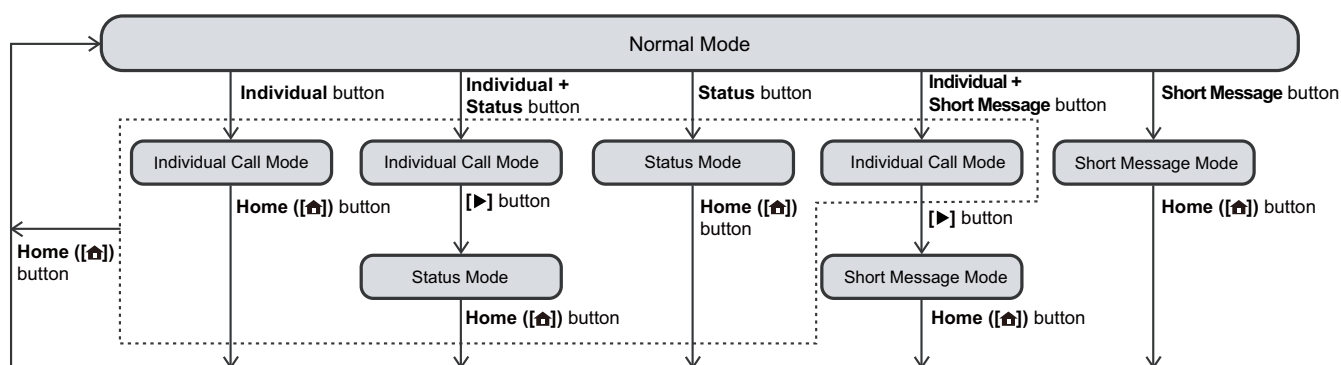
The following various types of calls can be used in an NXDN Conventional system. For transceiver operations and behaviors, refer to the instructions of each call type.

- Individual Call
- Individual Call (Individual Call Acknowledge Request)
- Group Call
- Status Call
- Short Data Call
- Long Data Call

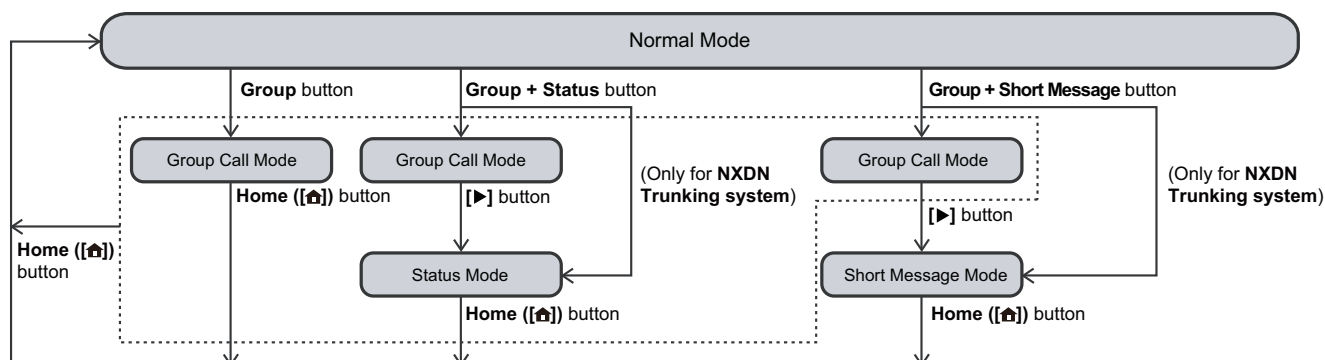
Transition for Each Mode

If a user wishes to send or receive an Individual Call, Group Call, Status Message, or Short Message, the user must operate the transceiver after selecting the desired mode. The following are the transition diagrams for each mode. The figure below presents information for both an NXDN Conventional system and NXDN Trunking system.

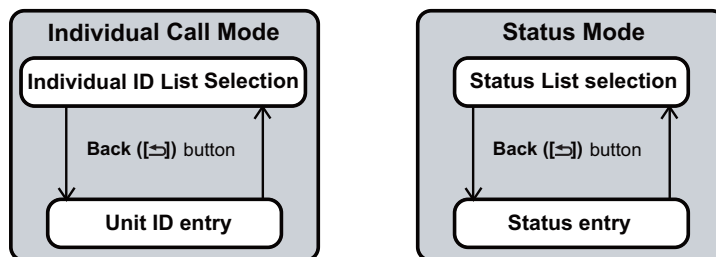
Transmission (Individual Call)



Transmission (Group Call)



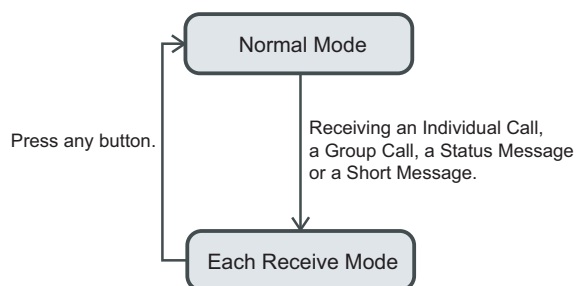
In Individual Call Mode, a Unit ID of the target transceiver can be selected from the Individual ID List or a Unit ID can directly be entered. Also, in Status Mode, a status to be sent can be selected from the Status List or the status can directly be entered. In either mode, the entry method can be switched by pressing the **Back** ([↵]) button.



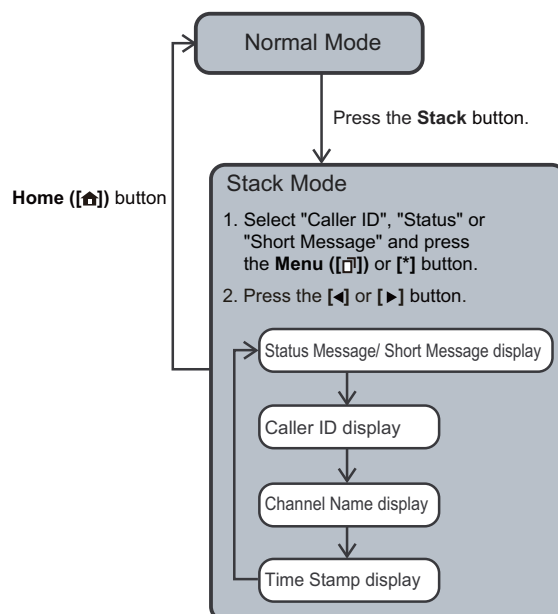
Note

- If **Manual Dialing** is enabled, a Unit ID and status can be manually entered.

Reception



Checking the incoming call history of a received Individual Call, Group Call, Status Message or Short Message



2.5 Making an Individual Call

Individual Call can be used to initiate a call to a target transceiver individually to establish voice calls.

By specifying a Unit ID, the transceiver can initiate a call to the transceiver having the Unit ID.

Initiating an Individual Call

An Individual Call can be started by one of the following methods:

- **Individual Call Mode**

In Individual Call Mode, an Individual Call is initiated by selecting a Unit ID configured in the Individual ID List or directly entering a Unit ID.

Pressing the **Individual**, **Individual + Status**, or **Individual + Short Message** button places the transceiver in Individual Call Mode.

The transceiver also enters Individual Call Mode by selecting “Individual”, “Individual + Status”, or “Individual + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

If “Individual”, “Individual + Status”, or “Individual + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad also places the transceiver in Individual Call Mode. The transceiver enters Unit ID Shortcut Entry Mode or will be on hold as the first digit of the Unit ID is entered. (Refer to Common Function Part [Keypad Operation](#).)

- **Selcall on PTT**

The transceiver initiates an Individual Call when the **PTT** switch is pressed on a channel where “Individual Call” is configured for **Selcall on PTT**. The Unit ID of the target transceiver can be configured by selecting one Unit ID from the Individual ID List by using KPG-D3/ D3N.

- **Talkback**

By pressing the **PTT** switch while the **Auto Reset Timer** is counting down after the transceiver receives an Individual Call, the transceiver can respond (Talkback) to the transceiver which made the Individual Call.

- **Stack Mode**

Selecting the receive history in Stack Mode and pressing the **PTT** switch initiates an Individual Call. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

- **PC command**

The transceiver starts an Individual Call upon the receipt of a PC command from the communication port.

The following describes how to initiate an Individual Call in Individual Call Mode.

Operating the transceiver

● Initiating an Individual Call by list selection

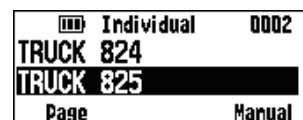
1 Press the **Individual**, **Individual + Status**, or **Individual + Short Message** button.

The transceiver enters Individual Call Mode, and a selection screen for the Individual ID List will appear.

The following operations are identical even if the transceiver enters Individual Call Mode by a user pressing the **Menu** button or using the keypad.

2 Press the **[▲]** or **[▼]** button to select a Unit ID from the Individual ID List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

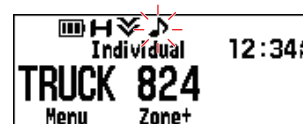


3 Initiating an Individual Call.

Press the **PTT** switch to initiate a Voice Call. The “” icon blinks, and the display changes to “Individual” and the ID name of the target transceiver.

Press the **Menu** () or **[*]** button to initiate a Paging Call.

If Individual Call Mode has been entered with “Individual + Status” or “Individual + Short Message”, Status Mode or Short Message Mode is entered by pressing the **[▶]** button.



Note

- The selection screen for the Individual ID List closes at the same time as pressing the **PTT** switch. If selecting an ID and sending an Individual Call again, reexecute the operations from step 1.

● Initiating an Individual Call using Manual Dialing

To initiate an Individual Call using Manual Dialing, **Manual Dialing** needs to be enabled.

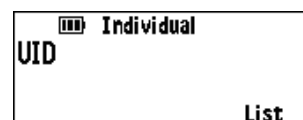
1 Press the **Individual**, **Individual + Status**, or **Individual + Short Message** button.

The transceiver enters Individual Call Mode, and a selection screen for the Individual ID List will appear.

The following operations are identical even if the transceiver enters Individual Call Mode by a user pressing the **Menu** button or using the keypad.

2 Press the **Back** () button.

The Unit ID entry display appears.



3 Enter a Unit ID.

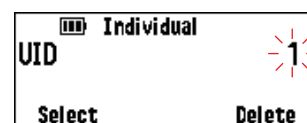
Refer to Common Function Part [“Entering or Deleting a Code”](#) for entry method.

- **If using the keypad:**

A Unit ID can be entered by pressing the [0] to [9] buttons.

- **Using the PF buttons**

Press the [▲] or [▼] button to select the number and press the **Menu** ([□]) or [*] button to confirm the selected number.



4 Initiating an Individual Call.

Press the **PTT** switch to initiate a Voice Call. The “” icon blinks, and the display changes to “Individual” and the ID of the target transceiver.

Press the **Menu** ([□]) or [*] button to initiate a Paging Call.

If Individual Call Mode has been entered with “Individual + Status” or “Individual + Short Message”, Status Mode or Short Message Mode is entered by pressing the button.



Note

- If the Individual Call Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode by pressing the **Individual** button. A selection screen for the Individual ID List will appear by pressing the **Back** ([←]) button.
- If no ID is registered in the Individual ID List, the transceiver enters Manual Dialing mode by pressing the **Individual** button if **Manual Dialing** is enabled. In this case, the transceiver cannot enter Individual Call Mode if **Manual Dialing** is disabled.
- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- The transceiver finishes transmitting when the **PTT** switch is released. In this case, a PTT Release Tone (1 beep) is transmitted to the target transceiver if **PTT Release Tone** is enabled. (Refer to Common Function Part [Using Sound to Notify the Other Party that the Communication Ends \(PTT Release Tone\)](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Manual Dialing** to be enabled or disabled
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > TX Options)
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > TX Options > MDC-1200)
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > FleetSync)
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > TX Options)
- Configuring **Selcall on PTT**
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > NXDN > Selcall on PTT)
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > NXDN > Selcall on PTT)

Receiving an Individual Call

The transceiver can receive an Individual Call if the received Unit ID matches the Unit ID preconfigured for the transceiver.

Note

- To receive an Individual Call in an NXDN Conventional system, “NXDN ID” needs to be configured for Optional Signaling to be used on the channel. (Refer to [Using the Optional Signaling.](#))

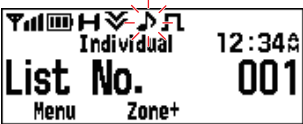
Transceiver behavior

1 The transceiver receives an Individual Call.

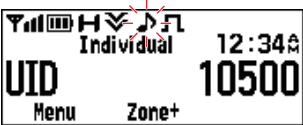
If the received Unit ID exists in the Individual ID List and a Unit ID Name is configured for the received Unit ID, the “🔊” icon blinks, and the ID Name of the transmitting transceiver appears.



If the ID Name is not configured in the Individual ID List, the Individual ID List number appears.



If the Unit ID is not configured in the Individual ID List, the Unit ID appears.



2 Press the PTT switch.

The transceiver can respond to the received Unit ID. When a button other than the PTT switch is pressed, the configured function will be activated.

 Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving an Individual Call/ Paging Call](#).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to Transceiver behavior when receiving an Individual Call/ Paging Call.)
- If the transceiver receives the Unit ID Name by Over-the-Air Alias, the received Unit ID Name will appear.
- If the Unit ID Name received using Over-the-Air Alias is stored in the stack memory of the transceiver, the stored Unit ID Name will appear. If the received Unit ID Name differs from the Unit ID Names stored in the transceiver, the Unit ID Names stored in the transceiver appear, and then the received Unit ID Name appears.
- The transceiver can send the ID of the transmitting transceiver from the communication port on the transceiver when receiving an Individual Call. (Refer to [Sending the Received Unit ID from the Communication Port \(Unit ID \(Serial Output\)\)](#).)

Transceiver behavior when receiving an Individual Call/ Paging Call**● Alert Tone**

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration of **Alert Tone (Individual Call)** or **Alert Tone (Paging Call)** for the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert Tone (Individual Call)** or **Alert Tone (Paging Call)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to NXDN Conventional.

● Selective Call Alert LED

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration of **Alert LED (Individual)** or **Alert LED (Paging Call)** for the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert LED (Individual Call)** or **Alert LED (Paging Call)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration in **LED Color** common to NXDN Conventional.

● Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration in **Selective Call Alert LED**.

Also, if the buttons on the transceiver are pressed while the LED flashes according to the configuration of **Selective Call Alert LED**, and if the matching state of the Optional Signaling continues, the LED flashes yellow.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **Alert Tone (Individual Call)/ Alert Tone (Paging Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Individual ID > NXDN Individual ID List)
- Configuring **Alert LED (Individual Call)/ Alert LED (Paging Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Individual ID > NXDN Individual ID List)
- Configuring **Tone Number** common to NXDN Conventional ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **LED Color** common to NXDN Conventional ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)

Individual ID List

If making Individual Calls, the desired Unit IDs need to be preconfigured in the transceiver using KPG-D3/ D3N prior to use of the transceiver. A maximum of 1500 Unit IDs can be configured for Individual ID List.

Individual ID List is commonly used in an NXDN Conventional system and NXDN Trunking system.

Table 2-7 Individual ID List

Configuration	Description
ID	A Unit ID can be configured in the range between 1 and 65519 (decimal).
ID Name	The caller's ID Name is configured. A maximum of 14 characters can be configured for the ID Name. If the ID Name of the transmitting transceiver is registered in the Individual ID List, the ID Name appears when the transceiver receives a call. After that, the received Unit ID Name appears upon receipt of the Unit ID Name by Over-the-Air Alias while receiving a call. If the transceiver cannot receive the Unit ID Name, the stored ID Name appears if the ID Name is stored for the Unit ID stored in the transceiver. The Unit ID number appears if the above conditions are not satisfied.
Type	The permission or inhibition of transmission of the receiving party can be configured. An ID for which "RX Only" is configured for Type does not appear on the ID selection display in Individual Call Mode, and a user cannot select the ID in Individual Call Mode. If the transceiver receives a call from an ID for which "RX Only" is configured for ID Mode, the caller's ID Name appears. In this case, a user cannot initiate a call to the party even if the user attempts to respond by pressing the PTT switch.
Alert Tone (Individual Call)	The type of tone sounding from the transceiver can be configured for an Individual Call from the Unit IDs registered in the Individual ID List.
Alert LED (Individual Call)	The color of flashing LED can be configured for an Individual Call from the Unit IDs configured in the Individual ID List.
Alert Tone (Individual Call (Incoming))	If Automatic Response is disabled, the type of tone sounding from the transceiver can be configured for an Individual Call (Individual Call Acknowledge Request) from the Unit IDs registered in the Individual ID List.
Alert LED (Individual Call (Incoming))	If Automatic Response is disabled, the color of flashing LED on the transceiver can be configured for an Individual Call (Individual Call Acknowledge Request) from the Unit IDs registered in the Individual ID List.
Alert Tone (Paging Call)	The type of tone sounding from the transceiver can be configured for a Paging Call from the Unit IDs configured in the Individual ID List.
Alert LED (Paging Call)	The color of flashing LED can be configured for a Paging Call from the Unit IDs configured in the Individual ID List.

Note

- To use each function of Alert LED, **Selective Call Alert LED** needs to be enabled.

Configuration using KPG-D3/ D3N

Configuring **Individual ID List** ( See Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Individual ID > NXDN Individual ID List)

Restricting IDs for Which the Transceiver Can Initiate a Call (Encodable Unit ID Range)

Encodable Unit ID Range is the range of the Unit ID used by the transceiver to initiate a call.

A Unit ID with which a user is allowed to initiate a call can be restricted using KPG-D3/ D3N. A user can initiate a call to a Unit ID configured in the Individual ID List even if it is outside the range of **Encodable Unit ID Range**. However, if making Individual Calls using **Manual Dialing**, the transceiver cannot call the Unit ID by entering the Unit ID outside the range of **Encode Unit ID Range**.

The transceiver for which **Encodable Unit ID Range** is not configured can initiate a call to all transceivers.

The transceiver unmutes the speaker and emits received audio when the transceiver receives the Unit ID satisfying the receiving conditions. In this case, the Unit ID of the transmitting transceiver appears on the receiving transceiver. If the Unit ID of the transmitting transceiver is in the range of the **Encodable Unit ID Range** or has been registered in the Individual ID List, the receiving transceiver can respond to the transmitting transceiver by pressing the **PTT** switch. If the Unit ID of the transmitting transceiver is outside the range of the **Encodable Unit ID Range** and also has not been registered in the Individual ID List, the receiving transceiver cannot respond to the transmitting transceiver.

Configuration using KPG-D3/ D3N

Configuring **Encodable Unit ID Range**

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > TX Options)

( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > TX Options)

Sending the Received Unit ID from the Communication Port (Unit ID (Serial Output))

Unit ID (Serial Output) can be used to send the received Unit ID from the transceiver's communication port.

With the **Unit ID (Serial Output)** enabled, the dispatcher can monitor and control in real time transceivers that are transmitting. Also, the Unit ID sent from the communication port can also be used for management of the call log.

Note

- To use **Unit ID (Serial Output)**, "Data", "Data + GPS Data Output", or "Data + Location Data Output" needs to be assigned to the communication port of the transceiver.
- For an NXDN system, the same Unit ID may be sent multiple times for one transmission depending on the reception conditions of the receiving party.
- If the transceiver receives a Group Call from a telephone, the transceiver will send an ID dedicated to the telephone (U65521 (0xFFFF1)) from the communication port.

Configuration using KPG-D3/ D3N

- Configuring **Unit ID (Serial Output)** ( **See** Radio Configuration > Protocol Options > NXDN > General > Common Options > Serial Output)
- Assigning functions to **COM port** ( **See** Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1,Bluetooth)

2.6

Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Individual Call Acknowledge Request)

Individual Call Acknowledge Request is the function that allows a user to distinguish whether or not the receiving transceiver is available to communicate so as to initiate an Individual Call in an NXDN Conventional system.

To start with the **Individual Call Acknowledge Request**, an acknowledgment message must be received from the receiving transceiver. (Receiving an Individual Call from the receiving transceiver also allows the communication to start.)

The transmitting transceiver sends a message requesting an acknowledgment when initiating an Individual Call. Upon receipt of the message requesting an acknowledgment, the receiving transceiver sends to the transmitting transceiver an acknowledgment message to notify that the receiving transceiver is available for the call. The transmitting transceiver becomes enabled for the communication upon receipt of the acknowledgment message from the receiving transceiver.

To use this function, **Individual Call Acknowledge Request** must be enabled on the transmitting transceiver by using KPG-D3/ D3N. Also, using KPG-D3/ D3N, the parameters of the following various functions to be used with **Individual Call Acknowledge Request** can be configured.

- Call Request Tone
- Call Processing Tone
- Call Processing Tone Delay Time
- Call in Progress Tone
- Automatic Response
- Incoming Reset Time
- Initiating Reset Time



Note

- **Individual Call Acknowledge Request** cannot be used while the transceiver is placed in Emergency Mode. A normal Individual Call, which does not require the sending of a message requesting an acknowledgment, can only be used.
- For an Individual Call (Individual Call Acknowledge Request), the following functions used for a normal Individual Call are available. (Refer to [Making an Individual Call](#).)
 - Individual ID List
 - Encodable Unit ID Range
 - Unit ID (Serial Output)

Configuration using KPG-D3/ D3N

Configuring **Individual Call Acknowledge Request** to be enabled or disabled

(**See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Individual Call Acknowledge Request)

(**See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Individual Call Acknowledge Request)

Initiating an Individual Call (Individual Call Acknowledge Request)

An Individual Call (Individual Call Acknowledge Request) can be activated by one of the following methods.

● Individual Call Mode

Selecting a Unit ID configured in the Individual ID List or directly entering a Unit ID while the transceiver is in Individual Call Mode, and then pressing the **PTT** switch or **Menu** () button sends a message requesting an acknowledgment. Pressing the **Individual**, **Individual + Status**, or **Individual + Short Message** button places the transceiver in Individual Call Mode.

The transceiver also enters Individual Call Mode by selecting “Individual”, “Individual + Status”, or “Individual + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

If “Individual”, “Individual + Status”, or “Individual + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad also places the transceiver in Individual Call Mode. The transceiver enters Unit ID Shortcut Entry Mode or will be on hold as the first digit of the Unit ID is entered. (Refer to Common Function Part [Keypad Operation](#).)

● Stack Mode

Selecting the receive record in Stack Mode and then pressing the **PTT** switch sends a message requesting an acknowledgment. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

● Selcall on PTT

Selecting the channel where the target Unit ID for **Selcall on PTT** is configured and then pressing the **PTT** switch sends a message requesting an acknowledgment. The Unit ID of the target transceiver can be configured by selecting one Unit ID from the Individual ID List by using KPG-D3/ D3N.

● Call button

Pressing one of the **Call 1** to the **Call 6** buttons sends a message requesting an acknowledgment for the Unit ID allocated to the button pressed.

For Mobile, a message requesting an acknowledgment is sent to the Unit ID which corresponds to the active port when any of the “Call 1” to “Call 6” ports allocated to the AUX Input port becomes active.

● PC command

A message requesting an acknowledgment is sent when the PC command is received from the communication port.

Operating the transceiver

1 Follow one of the methods mentioned above to initiate an Individual Call (Individual Call Acknowledge Request).

A message requesting an acknowledgment is sent.



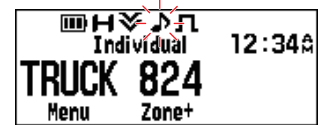
When the receiving transceiver is inside the communication range, “Holding” appears on the display, and the transceiver waits to receive an acknowledgment message from the receiving transceiver.



2 Receive an acknowledgment message from the receiving transceiver.

The “” icon blinks, and the transceiver enters a state allowing transmission of an Individual Call.

Receiving an acknowledgment message while the **PTT** switch is being pressed initiates an Individual Call.



3 Press the **PTT** switch.

The Individual Call is initiated.

Note

- If the **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call request for an Individual Call (Individual Call Acknowledge Request) is initiated. Also, if the **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives an acknowledgment message from the receiving transceiver after the call request for an Individual Call (Individual Call Acknowledge Request) is sent. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#), [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for transmissions with Individual Call.
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- While the transceiver is on standby to receive an acknowledgment message from the receiving transceiver, canceling the call is possible by pressing the **Clear** button.
- The transmitting transceiver sends a message requesting another acknowledgment when the time configured for **Maximum ACK Wait Time** elapses without receiving an automatic response message for a message requesting an acknowledgment from the receiving transceiver. The transmitting transceiver can send a message requesting an acknowledgment up to the number of times configured for Number of Retries until the transceiver receives a response message. (Refer to [Maximum ACK Wait Time](#), [Number of Retries](#).)
- The transceiver cancels the call processing for the following. At that time, “No Reply” appears on the display for 1 sec.
 - If the transceiver cannot receive an automatic response message from the receiving transceiver even if a message requesting an acknowledgment has been sent for the number of times configured in the Number of Retries. (Refer to [Number of Retries](#).)
 - If the time configured for the Initiating Reset Time elapses before the transceiver receives an acknowledgment message from the receiving transceiver. (Refer to [Configuring the Maximum Length of Time to Wait to Receive an Acknowledgment Message \(Initiate/Incoming Reset Time\)](#).)
- If a notification message for cancellation is received from the receiving transceiver while an acknowledgment message from the receiving transceiver is being waited for, “Call Deny” appears for one second, a Call Deny Tone (3 beeps) sounds from the transceiver, and the channel display is restored.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port ( [See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)
- Configuring **Selcall on PTT**
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > NXDN > Selcall on PTT)
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > NXDN > Selcall on PTT)
- Configuring a Unit ID corresponding to the **Call 1** to **Call 6** buttons or ports ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call > Call 1~Call 6)

Receiving an Individual Call (Individual Call Acknowledge Request)

The transceiver being operated in an NXDN Conventional system can be on standby to receive an Individual Call on the channel if “NXDN ID” has been configured as the receiving Optional Signaling type.

The transceiver can receive an Individual Call if the received Unit ID matches the Unit ID preconfigured for the transceiver.

To receive an Individual Call (Individual Call Acknowledge Request), the receiving transceiver must receive a message requesting an acknowledgment from the transmitting transceiver. Then, when the receiving transceiver transmits an acknowledgment message and the transmitting transceiver receives it, communications become possible.

Operating the transceiver

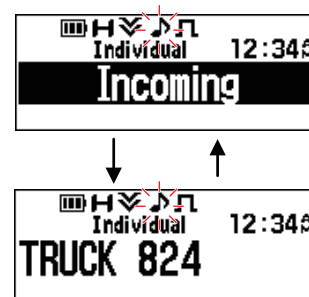
The transceiver’s behavior varies depending on the configuration for Automatic Response.

● If Automatic Response is disabled:

1 Receive a message requesting an acknowledgment.

The “” icon blinks and then “Incoming” appears for 1 sec and the ID Name of the transmitting transceiver appears for 2 sec alternately.

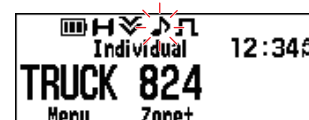
The transceiver sends an automatic response message to the transmitting transceiver to notify that the transceiver has received the message requesting an acknowledgment.



2 Press the **PTT** switch or the **Call Response** button.

Pressing the **PTT** switch initiates an Individual Call to the transmitting transceiver.

If the **Call Response** button is pressed, a Button Beep A (1 beep) sounds from the transceiver and an acknowledgment is sent.



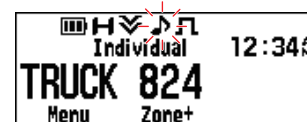
Note

- If a response to the received Individual Call is not sent and the status below is initiated, “Missed Call” appears on the display.
 - When the time configured with **Incoming Reset Time** elapses
 - When the transmitting transceiver cancels call
 - When an Individual Call is received from an opponent having the **Type** configured as “RX Only” with the Individual ID List, pressing the **PTT** switch causes the transceiver to generate Warning Tone A (continuous beep) and does not allow response. However, also in this case, an acknowledgment message can be sent by pressing the **Call Response** button.
 - For Mobile, if **Off-hook Connect** is enabled, an Individual Call can be initiated to the transmitting receiver by placing the microphone into the off-hook state after reception of a message requesting an acknowledgment.
 - Reception can be canceled by pressing the **Clear** button while the transceiver is in the state in Step 1.
 - If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving an Individual Call \(Individual Call Acknowledge Request\)](#).)
 - If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [Transceiver behavior when receiving an Individual Call \(Individual Call Acknowledge Request\)](#).)
- **If Automatic Response is enabled:**

1 Receive a message requesting an acknowledgment.

The “” icon blinks, and the ID Name of the transmitting transceiver appears.

An acknowledgment message is automatically sent to the transmitting transceiver.

**2 Press the PTT switch after transmission of an acknowledgment.**

The transceiver initiates an Individual Call to the transmitting transceiver.

Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving an Individual Call \(Individual Call Acknowledge Request\)](#).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [Transceiver behavior when receiving an Individual Call \(Individual Call Acknowledge Request\)](#).)

Transceiver behavior when receiving an Individual Call (Individual Call Acknowledge Request)

● Alert Tone

If Automatic Response is disabled:

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration for **Alert Tone (Individual Call (Incoming))** of the corresponding Unit ID.

However, if "Protocol Common" is configured in **Alert Tone (Individual Call (Incoming))** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to NXDN Conventional.

If Automatic Response is enabled:

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration for **Alert Tone (Individual Call)** of the corresponding Unit ID.

However, if "Protocol Common" is configured in **Alert Tone (Individual Call)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to NXDN Conventional.

● Selective Call Alert LED

If Automatic Response is disabled:

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration for **Alert LED (Individual Call (Incoming))** of the corresponding Unit ID.

However, if "Protocol Common" is configured in **Alert LED (Individual Call (Incoming))** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration in **LED Color** common to NXDN Conventional.

If Automatic Response is enabled:

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration for **Alert LED (Individual Call)** of the corresponding Unit ID.

However, if "Protocol Common" is configured in **Alert LED (Individual Call)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration in **LED Color** common to NXDN Conventional.

● Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration in **Selective Call Alert LED**.

Also, if the buttons on the transceiver are pressed while the LED flashes according to the configuration of **Selective Call Alert LED**, and if the matching state of the Optional Signaling continues, the LED flashes yellow.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **Alert Tone (Individual Call (Incoming))**/ **Alert Tone (Individual Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Individual ID > NXDN Individual ID List)
- Configuring **Alert LED (Individual Call (Incoming))**/ **Alert Tone (Individual Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Individual ID > NXDN Individual ID List)
- Configuring **Tone Number** common to NXDN Conventional ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **LED Color** common to NXDN Conventional ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)

Notifying the User with a Tone That a Call Request Has Been Initiated (Call Request Tone)

The **Call Request Tone** is the function to sound a Call Request Tone (1 beep) from the transceiver when a call request for an Individual Call (Individual Call Acknowledge Request) is initiated.

The Call Request Tone (1 beep) from the transceiver notifies the user that a call request for an Individual Call (Individual Call Acknowledge Request) has been initiated. The user can initiate the communication after the call request has been established.

Configuration using KPG-D3/ D3N

Configuring **Call Request Tone** to be enabled or disabled

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Individual Call Acknowledge Request)

( See) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Individual Call Acknowledge Request)

Notifying the User with a Tone That a Call Request Is in Progress (Call Processing Tone)

The **Call Processing Tone** is the function to sound a Call Processing Tone (2 beeps) from the transceiver until the transceiver receives an acknowledgment message from the receiving transceiver, after the call request for an Individual Call (Individual Call Acknowledge Request) is initiated in an NXDN Conventional system.

The Call Processing Tone (2 beeps) from the transceiver notifies a user that the call request for an Individual Call (Individual Call Acknowledge Request) is in progress. A Call Processing Tone stops when the call request is established, and the user can initiate the communication.

After the call request for an Individual Call (Individual Call Acknowledge Request) is initiated, a Call Processing Tone (2 beeps) sounds from the transceiver upon the elapse of the time configured for **Call Processing Tone Delay Time**.

Configuration using KPG-D3/ D3N

Configuring **Call Processing Tone** and **Call Processing Tone Delay Time**

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Individual Call Acknowledge Request)

( See) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Individual Call Acknowledge Request)

Sending an Acknowledgment Automatically (Automatic Response)

Automatic Response is the function to automatically send an acknowledgment message upon receipt of a message requesting an acknowledgment of an Individual Call.

If this function is enabled, the transceiver automatically sends an acknowledgment message upon receipt of a message requesting an acknowledgment of an Individual Call.

If this function is disabled, the transceiver automatically sends no acknowledgment message even if the transceiver has received a message requesting an acknowledgment of an Individual Call. In this case, an acknowledgment message can be sent manually by operating the transceiver. For operation methods, refer to “[If Automatic Response is disabled:](#)” of “[Receiving an Individual Call \(Individual Call Acknowledge Request\)](#)”.

Configuration using KPG-D3/ D3N

Configuring **Automatic Response** to be enabled or disabled

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Individual Call Acknowledge Request)

( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Individual Call Acknowledge Request)

Configuring the Maximum Length of Time to Wait to Receive an Acknowledgment Message (Initiate/Incoming Reset Time)

Initiating Reset Time is the maximum length of time for which the transmitting transceiver is on standby to receive an acknowledgment message from the receiving transceiver after sending a message requesting an acknowledgment of an Individual Call. If the time configured for **Initiating Reset Time** elapses, the transceiver resets the standby state, and the display reverts to the channel display.

Incoming Reset Time is the maximum length of time that allows the transceiver to send an acknowledgment message by operating the transceiver after receiving a message requesting an acknowledgment of an Individual Call, when **Automatic Response** has been disabled. If the time configured for Incoming Reset Time elapses, the transceiver resets the standby state, and the display reverts to the channel display.

Configuration using KPG-D3/ D3N

Configuring **Incoming Reset Time/ Initiating Reset Time**

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Individual Call Acknowledge Request)

( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Individual Call Acknowledge Request)

2.7 Making a Group Call

Group Call can be used to engage in 2-way group voice calls by initiating a call to a group.

The transceiver can initiate a call to the transceivers having the same Group ID by specifying the Group ID. The transceiver can also initiate a call to all transceivers by specifying the Group ID for which "ALL" is configured.

Initiating a Group Call

Group Call can be started by one of the following methods:

● Group Call Mode

While the transceiver is in Group Call Mode, the transceiver can initiate a Group Call by a user selecting a Group ID configured in the Group ID List and then pressing the **PTT** switch. (Refer to [Group ID List](#).)

Pressing the **Group**, **Group + Status**, or **Group + Short Message** button places the transceiver in Group Call Mode.

The transceiver also enters Group Call Mode by selecting "Group", "Group + Status", or "Group + Short Message" after the transceiver enters Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

If "Group", "Group + Status", or "Group + Short Message" is configured in **Keypad Operation**, pressing the [0] to [9] buttons on the keypad also places the transceiver in Group Call Mode. The transceiver enters Group ID Shortcut Entry Mode or will be on hold as the first digit of the Group ID is entered. (Refer to Common Function Part [Keypad Operation](#).)

● Selcall on PTT

The transceiver initiates a Group Call when the **PTT** switch is pressed on a channel where "Group Call" is configured for **Selcall on PTT**. The Group ID of the target transceiver can be configured by selecting one Group ID from the Group ID List by using KPG-D3/ D3N.

● PC Command

The transceiver starts a Group Call upon the receipt of a PC command from the communication port.

The following describes how to initiate a Group Call in Group Call Mode.

Operating the transceiver

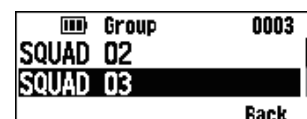
1 Press the **Group**, **Group + Status**, or **Group + Short Message** button.

The transceiver enters Group Call Mode and the Group ID List selection display appears.

The following operations are identical even if the transceiver enters Group Call Mode by a user pressing the **Menu** button or using the keypad.

2 Press the [▲] or [▼] button to select a Group ID from the Group ID List.

Refer to Common Function Part "[Selecting or Clearing Data from a List](#)" for selection methods.



3 Press the **PTT** switch.

The transceiver initiates a Group Call.

If Group Call Mode has been entered with “Group + Status” or “Group + Short Message”, Status Mode or Short Message Mode is entered by pressing the **[▶]** button.

Note

- The selection screen for the Group ID List closes at the same time as pressing the **PTT** switch. If selecting an ID and sending a Group Call again, reexecute the operations from step 1.
- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- The transceiver starts a Group Call only by a user pressing the **PTT** switch if the transceiver transmits on a channel with “Group Call” configured for **Selcall on PTT**. In this case, a Group ID does not need to be selected by using the transceiver.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Selcall on PTT**
([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > NXDN > Selcall on PTT)
([See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > NXDN > Selcall on PTT)

Receiving a Group Call

If the received Group ID matches the Group ID configured for the transceiver, the transceiver can receive the Group Call.

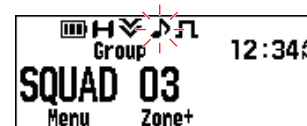
Note

- To receive a Group Call in an NXDN Conventional system, “NXDN ID” needs to be configured for Optional Signaling to be used on the channel. (Refer to [Using the Optional Signaling](#).)

Transceiver behavior

1 The transceiver receives a Group Call.

The “**🔊**” icon blinks and a received Group ID appears. According to the configuration of **Group Call Display Type**, any of the received Group ID, the Unit ID of the transmitting transceiver, or both appears. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)



2 Press the **PTT** switch.

The transceiver can respond to the received Group ID. When a button other than the **PTT** switch is pressed, the configured function will be activated.

 Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving a Group Call](#).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [Transceiver behavior when receiving a Group Call](#).)
- The transceiver can record the receipt of a Group Call. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)
- When the transceiver receives the Group ID for which “ALL” is configured, the transceiver can respond using the Group ID if the received Group ID is configured in the Group ID List. If no Group ID is configured in the ID List, the receiving transceiver can receive a call but the receiving transceiver cannot respond to the call. In this case, the ID Name of the transmitting transceiver does not appear even if Over-the-Air Alias is enabled. (Refer to [Over-the-Air Alias](#).)
- The transceiver can send the ID of the transmitting transceiver from the communication port on the transceiver when receiving a Group Call.
- If **Group ID Scan** is enabled, the transceiver is on standby to receive a Group Call from all Group IDs configured for the Group ID List in an NXDN Conventional system. (Refer to [Group ID Scan](#).)

Transceiver behavior when receiving a Group Call

● Alert Tone

If the received Group ID is configured in the Group ID List, an Alert Tone sounds from the transceiver according to the configuration for Alert Tone of the corresponding Group ID.

However, if “Protocol Common” is configured in **Alert Tone** of the Group ID List, or if the received Group ID is not configured in the Group ID List, an Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to NXDN Conventional.

● Selective Call Alert LED

If the received Group ID is configured in the Group ID List, the LED blinks according to the configuration for **Alert LED Color** of the corresponding Group ID.

However, if “Protocol Common” is configured in **Alert LED Color** of the Group ID List, or if the received Group ID is not configured in the Group ID List, the LED flashes according to the configuration in **LED Color** common to NXDN Conventional.

● Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration in **Selective Call Alert LED**.

Also, if the buttons on the transceiver are pressed while the LED flashes according to the configuration of **Selective Call Alert LED**, and if the matching state of the Optional Signaling continues, the LED flashes yellow.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **Alert Tone/ Alert LED Color (Group ID List)** ( [See](#) Radio Configuration > System Properties > ID List/ Status List > ID List/Status List > NXDN Group ID > NXDN Group ID List)
- Configuring **Tone Number** common to NXDN Conventional ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **LED Color** common to NXDN Conventional ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)

Group ID List

The transceiver uses a Group ID configured in the Group ID List to initiate a Group Call in an NXDN Conventional system. The desired Group IDs must be preconfigured using KPG-D3/ D3N for the transceiver to initiate a Group Call. A maximum of 1,500 Group IDs can be configured in the Group ID List.

Table 2-8 Group ID List

Configuration	Description
ID	A Group ID can be configured in the range between 1 and 65519 (decimal), or in the range of ALL. ALL allows initiation of a call to all IDs.
ID Name	The caller's ID Name is configured. A maximum of 14 characters can be configured for the ID Name. If the ID Name of the group is configured in the Group ID List, the ID Name appears when the transceiver receives a call. If the ID Name is not configured in the Group ID List, the Group ID List number appears.
Type	The permission or inhibition of transmission of the receiving party can be configured. An ID for which "RX Only" is configured for ID Mode does not appear on the ID selection display in Group Call Mode, and a user cannot select the ID in Group Call Mode. If the transceiver receives a call from an ID for which "RX Only" is configured for ID Mode , the caller's ID Name appears. In this case, a user cannot initiate a call to the party even if the user attempts to respond by pressing the PTT switch.
Alert Tone	The tone type sounding from the transceiver can be configured for a Group Call from the Group IDs registered in the Group ID List.
Alert LED Color	The color of flashing LED can be configured for a Group Call from the Group IDs registered in the Group ID List.  Note To use Alert LED Color, Selective Call Alert LED needs to be enabled.

Configuration using KPG-D3/ D3N

Configuring **Group ID List** ( See Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Group ID > NXDN Group ID List)

Display When the Transceiver Receives a Group Call (Group Call Display Type)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Group Call Display Type is the function to display the received information on the display when the transceiver receives a Group Call.

Table 2-9 Group Call Display Type

Configuration	Description
Group ID	The Group ID of the received Group Call appears. If the ID Name is not configured in the Group ID List, the Group ID List number appears.
Calling Transceiver ID	The Unit ID of the transmitting transceiver appears. If the ID Name is stored in the Unit ID stored in the stack memory of the transceiver, the stored ID Name appears. If the ID Name is not stored in the Unit ID stored in the stack memory of the transceiver, and if the ID Name of the received Unit ID is configured in the Unit ID List, the ID Name in the Unit ID List appears. The Unit ID List number appears if the above conditions are not satisfied. If the transceiver receives the Unit ID Name, the received Unit ID Name appears after 500 ms elapses upon the appearance of the Unit ID.
Calling Transceiver ID/Group ID	The Group ID of the received Group Call and the Unit ID of the transmitting transceiver appear for 2 sec alternately.

 Note

- If the transceiver receives Status Message or Short Message in Group Call, the Unit ID of the transmitting transceiver and the received message appear regardless of the configuration in **Group Call Display Type**.

Configuration using KPG-D3/ D3N

Configuring **Group Call Display Type** ( **See** Radio Configuration > Protocol Options > NXDN > General > Common Options)

Group ID Scan

Group ID Scan (NXDN) is the function to be on standby to receive a Group Call from all Group IDs configured in the Group ID List in an NXDN Conventional system.

If this function is enabled, the transceiver is on standby to receive a Group Call from all Group IDs configured for Group ID List.

If this function is disabled, the transceiver is on standby to receive only the Group Calls from the Group IDs configured for **Selcall on PTT** or for **Persistent Group ID (NXDN)**.

Configuration using KPG-D3/ D3N

- Configuring **Group ID Scan (NXDN)** to be enabled or disabled
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > NXDN)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > NXDN)
- Configuring **Selcall on PTT**
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > NXDN > Selcall on PTT)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > NXDN > Selcall on PTT)
- Configuring **Persistent Group ID (NXDN)**
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > RX Options > Persistent Group ID)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > RX Options > Persistent Group ID)

Preventing the Functions Working with Group Call Reception from Activating (Group Call Alert Inhibit)

Group Call Alert Inhibit is the function that disables the Alert Tone, Selective Call Alert LED, Horn Alert and Caller ID Stack functions when the transceiver receives a Group Call.

Use of this function prevents specific functions from activating as follows even if these functions are enabled or configured to be enabled when the transceiver receives a Group Call.

- **Alert Tone**

The Alert Tones do not sound from the transceiver even if the transceiver receives a Group Call.

- **Selective Call Alert LED**

A Selective Call Alert LED does not blink even if the transceiver receives a Group Call.

- **Horn Alert (Mobile only)**

The headlights or the horn of a vehicle being connected to the Horn Alert port does not light or sound even if the transceiver receives a Group Call.

- **Caller ID Stack**

The Caller ID will not be stored in the transceiver stack memory even if the transceiver receives a Group Call.

Configuration using KPG-D3/ D3N

Configuring **Group Call Alert Inhibit** to be enabled or disabled ( See Radio Configuration > Protocol Options > NXDN > General > Common Options)

Preventing Reception of a Group Call While the Transceiver Is Receiving an Individual Call (Ignore Group Call during Individual Call)

Ignore Group Call during Individual Call is the function that prevents receipt of a Group Call if receiving an Individual Call.

This function is used to prioritize the receipt of Individual Calls.

If this function is enabled, the transceiver cannot receive a Group Call (including data communications) while receiving an Individual Call and the Auto Reset Timer is counting down.

 Note

- If this function is enabled in the NXDN Conventional system, call by RAN only also cannot be received while an Individual Call is being received.
- Even if this function is enabled, the following Group Calls can be received.
 - A Group Call using All Group ID
 - A Group Call for Emergency

Configuration using KPG-D3/ D3N

Configuring **Ignore Group Call during Individual Call** to be enabled or disabled ( See Radio Configuration > Protocol Options > NXDN > General > Common Options)

2.8 Common Functions for Data Communications

The following functions are used in common for data communications such as Status Call or Short Data Call, Long Data Call data transmission.

- Number of Retries
- Transmit Busy Wait Time
- Maximum ACK Wait Time
- GTC Count
- ACK Delay Time
- Transmit Delay Time (Receive Capture)
- Data Transmit Modulation Delay Time
- Random Access (Contention)
- Preamble Length

Number of Retries

If the transceiver does not receive the acknowledgment after the transceiver sends data and the time configured for **Maximum ACK Wait Time** elapses, the transceiver resends data. **Number of Retries** is the number of times for the transceiver to resend data. A smaller number can be configured if there is good communicating conditions, and a larger number can be configured if there are inferior communicating conditions.

Configuration using KPG-D3/ D3N

Configuring **Number of Retries**

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Data Communications > Parameters)

Transmit Busy Wait Time

The transceiver confirms that the traffic channel is available before sending data and then starts sending data when the channel is available. **Transmit Busy Wait Time** is the duration to wait for the traffic channel to become available.

A transmission is canceled when the channel is busy and the Transmit Busy Wait Time elapses.

Configuration using KPG-D3/ D3N

Configuring **Transmit Busy Wait Time**

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Data Communications > Parameters)

Maximum ACK Wait Time

Maximum ACK Wait Time is the length of time that the transceiver stands by to receive the acknowledgment after the transceiver sends data. If the transceiver does not receive the acknowledgment within the time configured for **Maximum ACK Wait Time**, the transceiver resends data.

Note

- This period can also be used for waiting on a data channel, after migrating to the data channel using the GTC.
- A Long Data Message transmits data divided over multiple times. The receiving transceiver stands by to receive the next data for the time configured for **Maximum ACK Wait Time** after receiving the previous data. The transceiver exits Long Data Message Receive Mode if the transceiver does not receive any data during the period.

Configuration using KPG-D3/ D3N

Configuring **Maximum ACK Wait Time**

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Data Communications > Parameters)

GTC Count

GTC Count is the number of GTC message transmissions by the transmitting transceiver through a single GTC transmission. GTC (Go To Channel) is a message that allows the transmitting transceiver to induce the receiving transceiver to the data channel.

The transmitting transceiver will migrate to the data channel after transmitting the GTC if the Status, Short or Long Message on Data System-personality is configured. When the receiving transceiver receives the GTC, it automatically migrates to the data channel and stands by to receive the data.

Note

- The receiving transceiver waits to receive the Status, Short or Long Message after the receiving transceiver migrates to the data channel. The transceiver restores the voice channel if the transceiver does not receive the acknowledgment within the time configured for **Maximum ACK Wait Time**.
- The transmitting transceiver sends the Status, Short, or Long Message and waits to receive the acknowledgment after the transmitting transceiver migrates to the data channel. The transceiver restores the voice channel if the transceiver does not receive the acknowledgment within the time configured for **Maximum ACK Wait Time**.

Configuration using KPG-D3/ D3N

Configuring **GTC Count**

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Parameters)

( See) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Data Communications > Parameters)

ACK Delay Time

ACK Delay Time is the length of time from when the transceiver receives data until the transceiver sends the acknowledgment.

ACK Delay Time must be shorter than **Maximum ACK Wait Time** configured for the transmitting transceiver.

Configuration using KPG-D3/ D3N

Configuring **ACK Delay Time**

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Parameters)

( See) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Data Communications > Parameters)

Transmit Delay Time (Receive Capture)

Transmit Delay Time is a short period of time to transmit a HEAD_DLY message prior to transmitting the introductory part of data.

When the transmitting transceiver transmits a HEAD_DLY message, the receiving transceiver temporarily pauses scanning to receive the data. Using this function, the data can reliably be sent even if the receiving transceiver is scanning or using the Battery Saver.

Configuration using KPG-D3/ D3N

Configuring **Transmit Delay Time (Receive Capture)**

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Data Communications > Parameters)

Data Transmit Modulation Delay Time

Data Transmit Modulation Delay Time is the duration from when the transceiver starts transmitting until the transceiver starts being modulated by the data frame.

Data Transmit Modulation Delay Time is the duration from when the transceiver starts transmitting until the transceiver starts being modulated by the data frame. However, it may be difficult to establish data communications when the transmit and receive frequencies are widely separated or the transceiver is always used in extremely cold areas. In such cases, **Data Transmit Modulation Delay Time** must be extended in order to improve the reliability of data communications.

Configuration using KPG-D3/ D3N

Configuring **Data Transmit Modulation Delay Time**

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Data Communications > Parameters)

Random Access (Contention)

Random Access allows the transceiver to randomize the transmission start time for each transceiver to send data when the channel becomes available.

If a large number of transceivers begin transmitting immediately after the channel becomes available, transmission contention may occur. This function prevents this contention.

Note

- The length of time for Random Access varies depending on the configuration for the Channel Spacing (Narrow or Very Narrow). (Refer to Common Function Part [Channel Spacing](#).)

Configuration using KPG-D3/ D3N

Configuring **Random Access (Contention)**

( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Parameters)

( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Data Communications > Parameters)

Preamble Length

Preamble Length is the function to extend time for sending a preamble when the NXDN frame is sent.

Extending the time for sending a preamble at the beginning of transmission makes the receiving transceiver easier to receive a call and reduces missing of the beginning of the audio during the scan.

The extended time of a preamble is determined by using the following equation.

Very Narrow:

$$\text{Time [sec]} = 1/2400 \times 4 \times \text{Configuration value for Preamble Length}$$

Narrow:

$$\text{Time [sec]} = 1/4800 \times 8 \times \text{Configuration value for Preamble Length}$$

Configuration using KPG-D3/ D3N

Configuring **Preamble Length**

( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > NXDN Parameters)

( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > NXDN Parameters)

2.9 Sending and Receiving a Status Message (Status Call)

Status Call is a simple messaging system that allows a user to send and receive a status (Status Message). Since the message is replaced by status, communications can take place quickly and communication traffic can be reduced.

The following methods are available to send a Status Message.

Note

- This section describes information for both an NXDN Conventional system and NXDN Trunking system. For each operation description, the display of the NXDN Conventional system is used.

Table 2-10 Sending Status Messages

Status Message	Description
Status Mode	The transceiver enters Status Mode by a user pressing a PF button or a button on the keypad, and then the transceiver will send a Status Message. (Refer to Sending a Status Message .)
Call button	Pressing one of the “Call 1” to “Call 6” buttons allocated to the PF buttons of the transceiver causes the transceiver to send the preconfigured Status Message. For Mobile, the Status Message preconfigured in the transceiver is sent when any of the “Call 1” to “Call 6” ports allocated to the AUX Input port becomes active. “Call 1” to “Call 6” can be assigned to the PF buttons or AUX Input ports using KPG-D3/ D3N and the Status Message corresponding to each button can be selected from the Status List in NXDN. In this case, a Status Message is always sent to the preconfigured Base ID.
Turning the transceiver ON/ OFF	The transceiver sends the Status Message configured in the transceiver when the transceiver is turned ON or OFF. (Refer to Power-on Status , Power-off Status .) In this case, a Status Message is always sent to the preconfigured Base ID.
AUX Input Status Message (Mobile Only)	The specified Status Message is sent when the AUX Input port goes high level to low level or goes low level to high level. (Refer to AUX Input Status Message .)
PC Command	The transceiver will send a Status Message when the transceiver receives a PC command from the communication port.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port ( [See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)
- Configuring a Status Message corresponding to **Call 1** to **Call 6** ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call > Call 1~Call 6)

Sending a Status Message

This section describes how to send a Status Message in Status Mode.

The transceiver enters Status Mode with one of the following operations, and then the transceiver will send a Status Message.

- **Status, Individual + Status, or Group + Status button**

Pressing the **Status** button places the transceiver in Status Mode. In this case, a Status Message is addressed to a Base ID.

Or, pressing the **Individual + Status** or **Group + Status** button places the transceiver in Individual Call Mode or Group Call Mode. The transceiver enters Status Mode by pressing the **[▶]** button, or pressing and holding the **Menu ([□])** button or **[*]** button after selecting the target Unit ID or Group ID.

- **Menu Button**

Pressing the **Menu** button to enter Menu Mode and then selecting “Status” places the transceiver in Status Mode. In this case, a Status Message is addressed to a Base ID.

Or, if “Individual + Status” or “Group + Status” is selected after entering Menu Mode by pressing the **Menu** button, the transceiver enters Individual Call Mode or Group Call Mode. The transceiver enters Status Mode by pressing the **[▶]** button, or pressing and holding the **Menu ([□])** button or **[*]** button after selecting the target Unit ID or Group ID. (Refer to Common Function Part [Using Menu Mode.](#))

- **Keypad entry**

If “Status” is configured for **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the transceiver keypad places the transceiver in Status Mode. In this case, a Status Message is addressed to a Base ID.

If “Individual + Status” or “Group + Status” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad also places the transceiver in Individual Call Mode or Group Call Mode. The transceiver enters Status Mode by pressing the **[▶]** button, or pressing and holding the **Menu ([□])** button or **[*]** button after selecting the target Unit ID or Group ID. (Refer to Common Function Part [Keypad Operation.](#))



Note

- For operating in Individual Call Mode or Group Call Mode, refer to the information on the various call types of an NXDN.

Operating the transceiver

- **Sending a Status Message by list selection**

1

Select one of the following operations to place the transceiver in Status Mode.

- **Press the Status button.**

The transceiver enters Status Mode. In this case, a Status Message is addressed to a Base ID.

- **Press the Individual + Status button.**

Pressing the **[▶]** button after selecting the Unit ID of the target transceiver causes Status Mode to be entered.

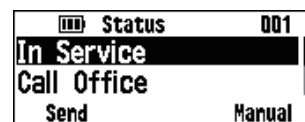
- **Press the Group + Status button. (NXDN Conventional system)**

Pressing the **[▶]** button after selecting the Group ID of the target transceiver causes Status Mode to be entered.

- **Press the Group + Status button after selecting the Group ID configured for the channel. (NXDN Trunking system)**

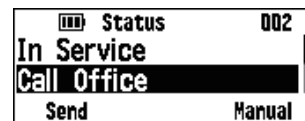
The transceiver enters Status Mode.

Or, the transceiver enters Status Mode by pressing the **Menu** button or using a keypad. In this case, the following operations are identical.



2 Press the [▲] button or [▼] button and then select the target data from the Status List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the PTT switch or the Menu ([□]) button.

The transceiver sends the Status Message.



If the Status Message is properly sent to the target transceiver, “Complete” appears.



Note

- The selection screen for the Status List closes at the same time as pressing the PTT switch or the Menu ([□]) button. If selecting an ID and sending a Status Call again, reexecute the operations from step 1.

● Sending a Status Message using Manual Dialing

To send a Status Message using Manual Dialing, **Manual Dialing** must be enabled using KPG-D3/ D3N.

1 Select one of the following operations to place the transceiver in Status Mode.

● Press the Status button.

The transceiver enters Status Mode. In this case, a Status Message is addressed to a Base ID.

● Press the Individual + Status button.

Pressing the [▶] button after selecting the Unit ID of the target transceiver causes Status Mode to be entered.

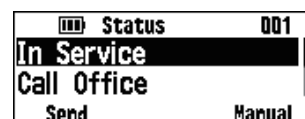
● Press the Group + Status button. (NXDN Conventional system)

Pressing the [▶] button after selecting the Group ID of the target transceiver causes Status Mode to be entered.

● Press the Group + Status button after selecting the Group ID configured for the channel. (NXDN Trunking system)

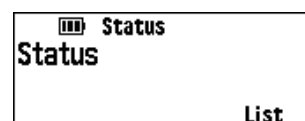
The transceiver enters Status Mode.

Or, the transceiver enters Status Mode by pressing the Menu button or using a keypad. In this case, the following operations are identical.



2 Press the Back ([↩]) button.

The status entry display appears.



3 Enter a status.

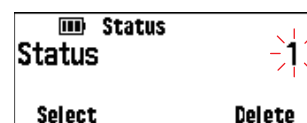
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

- **If using the keypad:**

A code can be entered by pressing the [0] to [9] buttons.

- **Using the PF buttons**

Press the [▲] or [▼] button to select the number and press the **Menu** ([□]) or [*] button to confirm the selected number.



4 Press the PTT switch or the Menu ([□]) button.

The transceiver sends the Status Message.



If the Status Message is properly sent to the target transceiver, “Complete” appears.



Note

- The entry screen for status closes at the same time as pressing the **PTT** switch or the **Menu** ([□]) button. If entering status and sending a Status Call again, reexecute the operations from step 1.

Note

- Transmission can be canceled by pressing the **Clear** button while a Status Message is being transmitted.
- For NXDN Conventional, “No Reply” appears on the display and transmission of a Status Message is terminated if no response is received from the target transceiver. If transmission fails because of busy status, “Busy” appears on the display and transmission of a Status Message is terminated.
- For details on the information displayed on the display during transmission in an NXDN Trunking system, refer to “[Transceiver behavior during transmitting](#)”.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the **Keypad Operation** on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring **Manual Dialing** to be enabled or disabled
([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > TX Options)
([See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > TX Options)
- Configuring **Base ID Type** and **Base ID** in NXDN Conventional ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications)
- Configuring **Base ID Type** and **Base ID** in NXDN Trunking ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Data Communications)

Receiving a Status Message

Upon receiving a Status Message, the received Status Message appears on the display, and the transceiver can send the Status Message to an external device from the communication ports.

Note

- To use serial communications, a user needs to prepare NXDN compatible software or external devices.
- A received Status Message can be left as a record. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Transceiver behavior

1 The transceiver starts receiving a Status Message.

“Receive Data” appears.



2 A Status Message is received.

The “✉” icon blinks and “Complete” appears.



The Status Message appears.



If the status is not configured for Status List or the Status Name is not configured, a status No. appears.



If any Emergency status or Horn Alert status (Mobile only) is received, the display shows as below.

Table 2-11 Status reception

Status	Display
Reception of Emergency Status	Emergency
Reception of Man-down Status	Man Down
Reception of Lone Worker Status	Emg Lone-Work
Reception of Stationary Status	Emg Stationary
Reception of Motion Status	Emg Motion
Reception of Horn Alert Status (Mobile only)	Horn Alert

 Note

- If the transceiver receives a Status Message by a Group Call, the Unit ID of the transmitting transceiver and the received message appear regardless of the configuration in **Group Call Display Type**. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)
- If the received status number is configured in the Status List, an Alert Tone sounds from the transceiver according to the configuration of the corresponding Status List. If “Protocol Common” is configured in **Alert Tone** of the Status List, or if the received status number is not configured in the Status List, an Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to NXDN.

Configuration using KPG-D3/ D3N

- Configuring **Alert Tone** (Status List) ( [See](#) Radio Configuration > System Personalities > ID/Status List > ID/Status List > NXDN Status > NXDN Status List)
- Configuring **Tone Number** common to NXDN Conventional ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **Tone Number** common to NXDN Trunking ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)

Status List

To use a Status Message, the status to be sent must be preconfigured in the transceiver by using KPG-D3/ D3N prior to the transmission. A maximum of 208 statuses can be configured in the Status List.

Table 2-12 Status List

Configuration	Description
Status	The status number can be configured. It can be configured in the range from 1 to 207 and 226.
Status Name	The status number can be configured. It is not easy to recognize the meaning of a status only by viewing a status number. In this case, a user can link the status number to a short message; hence, it can be easily understood. A maximum of 16 characters can be configured. If the status number is configured in the Status List, the Status Name appears when the transceiver receives a Status Message. If the transceiver receives a status that is not configured in the Status List, the status number appears on the transceiver display.
Transmit Inhibit	The permission or inhibition of transmission of status can be configured. Status for which Transmit Inhibit has been enabled does not appear on the Status selection display in Status Mode. In this case, a user cannot select status for which Transmit Inhibit has been enabled, in Status Mode.
Alert Tone	The type of tone sounding from the transceiver can be configured for a received status number from the status numbers registered in the Status List.
Voice Announcement	Voice guidance of when the transceiver receives a status can be configured for each status. If the transceiver receives a status for which voice guidance is configured, the voice guidance is executed. If Alert Tone is enabled, voice guidance is executed after an Alert Tone is emitted. To configure voice guidance for Voice Announcement, "User Programmable" needs to be configured in Voice Announcement Type .

Configuration using KPG-D3/ D3N

- Configuring **Status List** ( See Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Status > NXDN Status List)
- Configuring **Voice Announcement Type** ( See Radio Configuration > Special Settings > Customization > Voice Announcement)

Special Status Encode

Special Status Encode is a function used to prevent a user from sending status number 226 erroneously by operating buttons on the transceiver.

Status 226 is a status to disable Emergency Mode.

Configuration using KPG-D3/ D3N

- Configuring **Special Status Encode** in NXDN Conventional
( See Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > TX Options)
( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > TX Options)
- Configuring **Special Status Encode** in NXDN Trunking ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)

Status Message Stack

Status Message Stack is the function to store a Status Message in the stack memory. A maximum of 250 Status Messages and Caller IDs can be stored in the stack memory.

If a message is stored in the transceiver, the “✉” icon blinks as notification. In this case, a user can read the stored Status Message if the transceiver enters Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Status Message Stack** ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Common Options > Stack > Message)

Status Message on Data System-personality

Status Message on Data System-personality is the function that allows the transceiver to automatically change the channel to the **Data System-personality** to send a Status Message in an NXDN Conventional system.

The channel in an NXDN Conventional system is automatically changed to the channel configured for **Data System-personality** to send a Status Message. When the transmission ends, the transceiver restores the Zone-channel which was used before sending the Status Message. **Status Message on Data System-personality** can be used to send data using a specific dedicated channel.

Note

- This function can be only used in an NXDN Conventional system.

Configuration using KPG-D3/ D3N

- Configuring **Status Message on Data System-personality** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Data System-personality)
- Configuring **Data System-personality** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Data System-personality)

Sending the Received Status Message from the Communication Port (Status Message (Serial Output))

Status Message (Serial Output) allows the transceiver to send the Status and the Unit ID of the transmitting transceiver from its communication port when the transceiver receives a Status Message.

Using **Status Message (Serial Output)**, the dispatcher can monitor the received Status Message in real time.

Note

- To use **Status Message (Serial Output)**, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Status Message (Serial Output)** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Common Options > Serial Output)
- Assigning functions to **COM port** ( [See](#) Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1,Bluetooth)

Power-on Status

Power-on Status allows the transceiver to send the selected Status Message when the transceiver is turned ON.

Using the **Power-on Status**, the base station can recognize that the transceiver has been turned ON. The transceiver sends the message to the Base ID of the system to which the channel selected when the transceiver is turned ON belongs.

Note

- In an NXDN Trunking system, the transceiver ends a transmission without sending the **Power-on Status** again if the transceiver fails to send the **Power-on Status**.
- If Transceiver Password is used, a **Power-on Status** is sent while the transceiver migrates from Transceiver Password Mode to user mode when the transceiver is turned ON.

Configuration using KPG-D3/ D3N

Configuring **Power-on Status** ( See Radio Configuration > Protocol Options > NXDN > Status)

Power-off Status

Power-off Status allows the transceiver to send the selected Status Message when the transceiver is turned OFF.

Using the **Power-off Status**, the base station can recognize that the transceiver has been turned OFF. The transceiver sends the message to the Base ID of the system to which the channel selected when the transceiver is turned OFF belongs.

Note

- In an NXDN Trunking system, the transceiver ends a transmission without sending the **Power-off Status** again if the transceiver fails to send the **Power-off Status**.
- In an NXDN Trunking system, the transceiver does not transmit the **Power-off Status** if the transceiver cannot acquire the control channel when the transceiver is turned OFF.

Configuration using KPG-D3/ D3N

Configuring **Power-off Status** ( See Radio Configuration > Protocol Options > NXDN > Status)

Base ID

Base ID is the target transceiver's ID used to send GPS data or Transparent data and the following Status Messages and Short Messages.

- AUX Input Status Message (Mobile Only)
- Power-on Status
- Power-off Status
- A Status Message that is sent by selecting a status number or directly entering a status number after the transceiver enters Status Mode by pressing the **Status** button or the **[0]** to **[9]** buttons on the keypad
- A Status Message that is sent by selecting a status number or directly entering a status number after the transceiver enters Status Mode by a user selecting "Status" from Menu Mode
- A Status Message that is sent by pressing any of the **PF** buttons having "Call 1" to "Call 6" allocated
- A Status Message that is sent when any of the AUX Input ports having "Call 1" to "Call 6" allocated becomes active (Mobile only)
- A Short Message that is sent by entering a text string after the transceiver enters Short Message Mode by pressing the **Short Message** button or the **[0]** to **[9]** buttons on the keypad
- A Short Message that is sent by entering a text string after the transceiver enters Short Message Mode by a user selecting "Short Message" from Menu Mode

Base ID can be configured using KPG-D3/ D3N. Either Unit ID or Group ID can be configured. ID of the base station that manages operations is normally configured for Base ID.

Configuration using KPG-D3/ D3N

- Configuring **Base ID Type** and **Base ID** in NXDN Conventional ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications)
- Configuring **Base ID Type** and **Base ID** in NXDN Trunking ( **See** Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Data Communications)

Emergency Status Response

Emergency Status Response is the function to emit an Alert Tone when the transceiver receives an Emergency Status (Status 224, Status 225, Status 227, Status 228, Status 229).

The transceiver behaves as follows according to the configuration using KPG-D3/ D3N.

Table 2-13 Emergency Status Response

Configuration	Description
Alert Tone	The Alert Tone configured for Tone Number sounds from the transceiver when receiving an Emergency Status.
Horn Alert (Mobile only)	If receiving an Emergency Status, the Alert Tone configured for Tone Number sounds from the transceiver and the Horn Alert port is activated.
Voice Announcement	If the transceiver receives an Emergency Status for which voice guidance is configured, the voice guidance is executed. If Alert Tone is enabled, voice guidance is executed after an Alert Tone is emitted. To configure voice guidance for Voice Announcement, “User Programmable” needs to be configured in Voice Announcement Type.

Configuration using KPG-D3/ D3N

- Configuring **Emergency Status Response (Alert Tone/ Horn Alert/ Voice Announcement)** ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Common Options > Emergency Status Response)
- Configuring **Tone Number** in NXDN Conventional ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **Tone Number** in NXDN Trunking ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)

AUX Input Status Message

Supported Models: Mobile

AUX Input Status Message can be used to send the specified Status Message when the AUX Input port goes high level to low level or goes low level to high level.

The transceiver can send a Status Message when a sensor is attached to the AUX Input port and the status of the AUX Input port changes. The target ID is the ID configured for the **Base ID**. (Refer to [Base ID](#).)

To use this function, **AUX Input Status Message** must be assigned to one of AUX Input ports.

Configuration using KPG-D3/ D3N

- Configuring **AUX Input Status Message** ( [See](#) Radio Configuration > Protocol Options > NXDN > Status > AUX Port Status Function)
- Assigning functions to the AUX Input port ( [See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)

AUX Output Status Message

Supported Models: Mobile

AUX Output Status Message is the function to switch the status of the AUX Output port from high to low or from low to high when the transceiver receives the specified Status Message. This function can be used to remotely turn the external device ON or OFF.

To use this function, **AUX Output Status Message** must be assigned to one of AUX Output ports.

Configuration using KPG-D3/ D3N

- Configuring **AUX Output Status Message** ( [See](#) Radio Configuration > Protocol Options > NXDN > Status > AUX Port Status Function)
- Assigning functions to the AUX Output port ( [See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)

Storing the Selected or Sent Status (Status Hold)

Status Hold is the function to store in the transceiver the status selected from the Status List in Status Mode and the status transmitted.

When the transceiver receives a status request message, the status stored in the transceiver will automatically be transmitted. Also, the status stored in the transceiver will automatically be stored in GPS data and transmitted.

Table 2-14 Status Hold

Configuration	Description
Selected	The transceiver stores the status selected from the Status List in Status Mode.
Selected + Transmit	The transceiver stores a status selected from the Status List in Status Mode and a status transmitted by one of the following method. • The status transmitted when one of the AUX Input Status Message 1 to AUX Input Status Message 3 ports change (Mobile only) • The status transmitted when the transceiver is turned ON (Power-on Status) • The status transmitted by pressing any of the PF buttons having “Call 1” to “Call 6” allocated • The status transmitted when any of the AUX Input ports having “Call 1” to “Call 6” allocated becomes active (Mobile only) • The status transmitted by using a PC command

Configuration using KPG-D3/ D3N

Configuring **Status Hold** ( [See](#) Radio Configuration > Protocol Options > NXDN > Status)

2.10 Sending and Receiving a Short Message (Short Data Call)

Short Data Call can be used to send and receive a maximum of 100 characters (Short Message).

Using this function, a dispatcher can reliably send text messages to the target party.



- This section describes information for both an NXDN Conventional system and NXDN Trunking system. For each operation description, the display of the NXDN Conventional system is used.

Sending a Short Message

This section describes how to send a Short Message.

The transceiver sends a Short Message by one of the following operations.

Short Message Mode

The transceiver enters Short Message Mode and sends a Short Message by one of the following operations.

● Short Message, Individual + Short Message, or Group + Short Message button

Pressing the **Short Message** button places the transceiver in Short Message Mode. In this case, a Short Message is addressed to a Base ID.

Pressing the **Individual + Short Message** button places the transceiver in Individual Call Mode. The transceiver enters Short Message Mode by pressing the **▶** button, or pressing and holding the **Menu** (**[□]**) button or **[*]** button after selecting the target Unit ID.

The transceiver's behavior when the **Group + Short Message** button is pressed varies depending on the system.

For an NXDN Conventional system:

The transceiver enters Group Call Mode. The transceiver enters Short Message Mode by pressing the **▶** button, or pressing and holding the **Menu** (**[□]**) button or **[*]** button after selecting the target Group ID.

For an NXDN Trunking system:

The transceiver enters Short Message Mode. The Group ID configured for the channel must be selected before entering Short Message Mode.

● Menu Button

Pressing the **Menu** button to enter Menu Mode and then selecting "Short Message" places the transceiver in Short Message Mode. In this case, a Short Message is addressed to a Base ID.

Pressing the **Menu** button to enter Menu Mode and then selecting "Individual + Short Message" places the transceiver in Individual Call Mode. The transceiver enters Short Message Mode by pressing the **▶** button, or pressing and holding the **Menu** (**[□]**) button or **[*]** button after selecting the target Unit ID.

The transceiver's behavior varies depending on the system when the **Menu** button is pressed to enter Menu Mode and then selecting "Group + Short Message".

For an NXDN Conventional system:

The transceiver enters Group Call Mode. The transceiver enters Short Message Mode by pressing the **▶** button, or pressing and holding the **Menu** (**[□]**) button or **[*]** button after selecting the target Group ID.

For an NXDN Trunking system:

The transceiver enters Short Message Mode. The Group ID configured for the channel must be selected before entering Short Message Mode.

Refer to Common Function Part "Using Menu Mode" for operations in Menu Mode.

● Keypad entry

If “Short Message” is configured for **Keypad Operation**, pressing the [0] to [9] buttons on the transceiver keypad places the transceiver in Short Message Mode. The transceiver will be on hold as the first digit of the Short Message is entered. In this case, a Short Message is addressed to a Base ID.

If “Individual + Short Message” is configured in **Keypad Operation**, pressing the [0] to [9] buttons on the keypad also places the transceiver in Individual Call Mode. The transceiver enters Short Message Mode by pressing the **[▶]** button, or pressing and holding the **Menu** (**[□]**) button or **[*]** button after selecting the target Unit ID.

The transceiver’s behavior varies depending on the system while “Group + Short Message” is configured for **Keypad Operation**.

For an NXDN Conventional system:

Pressing the [0] to [9] buttons on the transceiver keypad places the transceiver in Group Call Mode. The transceiver enters Short Message Mode by pressing the **[▶]** button, or pressing and holding the **Menu** (**[□]**) button or **[*]** button after selecting the target Group ID.

For an NXDN Trunking system:

Pressing the [0] to [9] buttons on the transceiver keypad places the transceiver in Short Message Mode. The Group ID configured for the channel must be selected before entering Short Message Mode.

Refer to Common Function Part “[Keypad Operation](#)” for **Keypad Operation**.

● PC command

“Data”, “Data + GPS Data Output”, or “Data + Location Data Output” is assigned to a communication port 0 to 2 or the Bluetooth of the transceiver. The transceiver will send a Short Message when a PC sends a command to the transceiver communication port specifying to send a Short Message. (Refer to Common Function Part [Available Functions for COM Port](#).)

The following describes how to send a Short Message in Short Message Mode.

Note

- For operating in Individual Call Mode or Group Call Mode, refer to the information on the various call types of an NXDN.

Operating the transceiver

1

Select one of the following operations to place the transceiver in Short Message Mode.

- **Press the Short Message button.**

The transceiver enters Short Message Mode. In this case, a Short Message is addressed to a Base ID.

- **Press the Individual + Short Message button.**

Pressing the **[▶]** button after selecting the Unit ID of the target transceiver causes Short Message Mode to be entered.

- **Press the Group + Short Message button. (NXDN Conventional system)**

Pressing the **[▶]** button after selecting the Group ID of the target transceiver causes Short Message Mode to be entered.

- **Press the Group + Short Message button after selecting the Group ID configured for the channel. (NXDN Trunking system)**

The transceiver enters Short Message Mode.

Or, the transceiver enters Short Message Mode by pressing the **Menu** button or using a keypad. In this case, the following operations are identical.



2 Enter a Short Message.

A maximum of 100 characters can be entered. Refer to Common Function Part “[Entering or Deleting Characters](#)” for entry method.



3 Press the **PTT** switch or the **Menu** ([]) button.

The transceiver sends the Short Message.



“Complete” appears if the Short Message is properly sent to the target transceiver.



Note

- The entry screen for messages closes at the same time as pressing the **PTT** switch or the **Menu** ([]) button. If entering a message and sending a Short Data Call again, reexecute the operations from step 1.
- For NXDN Conventional, “No Reply” appears on the display and transmission of a Short Message is terminated if no response is received from the target transceiver. If the target transceiver is busy, “Busy” appears on the display and transmission of a Short Message is terminated.
- For details on the information displayed on the display during transmission in an NXDN Trunking system, refer to “[Transceiver behavior during transmitting](#)”.

Receiving a Short Message

Upon receiving a Short Message, the received Status Message appears on the display, and the transceiver can send the Short Message to an external device from the communication ports.

Note

- To use serial communications, a user must prepare NXDN compatible software or external devices.
- A received Short Message can be left as a record. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Transceiver behavior

1 The transceiver starts receiving a Short Message.

“Receive Data” appears.



2 The transceiver receives a Short Message.

The “✉” icon blinks and “Complete” appears.



The initial portion (three lines) of the ID Name and Short Message of the transmitting transceiver appears for three seconds. Then, the display is scrolled line by line every two seconds until the last line is shown. After the last line is shown, the display scroll is repeated from the first line.



Note

- If the transceiver receives a Short Message by a Group Call, the Unit ID of the transmitting transceiver and the received message appear regardless of the configuration in **Group Call Display Type**. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)
- If **Alert Tone (Tone Number)** is configured to sound when receiving, an Alert Tone will sound.

Configuration using KPG-D3/ D3N

- Configuring **Alert Tone (Tone Number)** in NXDN Conventional ([See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **Alert Tone (Tone Number)** in NXDN Trunking ([See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)

Short Message Stack

Short Message Stack is used to store a Short Message in the stack memory. A maximum of 128 Short Messages can be stored in the stack memory.

If a message is stored in the transceiver, the “✉” icon blinks as notification. In this case, a user can read the stored Short Message when the transceiver enters Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Note

- The maximum number of Short Message data that can be stored in the transceiver stack memory varies as follows depending on the configuration of **Short Message Stack** in each communication protocol.

Table 2-15 The Maximum Number of Short Messages That Can Be Stored (NXDN/ FleetSync)

Configuration of Short Message Stack		The maximum number of data that can be stored
NXDN	FleetSync	
Disabled	Disabled	0
Disabled	Enabled	128
Enabled	Disabled	128/ 48 ^{*1}
Enabled	Enabled	128/ 48 ^{*1}

- ^{*1} Up to 128 if **Extended Short Message** is disabled.
Up to 48 if **Extended Short Message** is enabled.

Configuration using KPG-D3/ D3N

Configuring **Short Message Stack** ([See](#) Radio Configuration > Protocol Options > NXDN > General > Common Options > Stack > Message)

Short Message on Data System-personality

Short Message on Data System-personality is the function that allows the transceiver to automatically change the channel to the **Data System-personality** to send a Short Message in an NXDN Conventional system.

The channel in an NXDN Conventional system is automatically changed to the channel configured for **Data System-personality** to send a Short Message. When the transmission ends, the transceiver restores the Zone-channel which was used before sending the Short Message. **Short Message on Data System-personality** can be used to send data using a specific dedicated channel.

Note

- This function can be only used in an NXDN Conventional system.

Configuration using KPG-D3/ D3N

- Configuring **Short Message on Data System-personality** ( See Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Data System-personality)
- Configuring **Data System-personality** ( See Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Data System-personality)

Sending the Received Short Message from the Communication Port (Short Message (Serial Output))

Short Message (Serial Output) allows the transceiver to send a Short Message and the Unit ID of the transmitting transceiver from the transceiver's communication port when the transceiver receives a Short Message.

Using **Short Message (Serial Output)**, the dispatcher can monitor received Short Messages in real time.

Note

- To use **Short Message (Serial Output)**, "Data", "Data + GPS Data Output", or "Data + Location Data Output" needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Short Message (Serial Output)** to be enabled or disabled ( See Radio Configuration > Protocol Options > NXDN > General > Common Options > Serial Output)
- Assigning functions to **COM port** ( See Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1,Bluetooth)

Sending and Receiving a Short Message (Short Data Call (Extended))

Short Data Call (Extended) is the function to extend a transmission and reception message (Short Message) by up to a maximum of 314 characters. To use this function, **Extended Short Message** needs to be enabled.

Table 2-16 Extended Short Message

Configuration	Status	Description
Enabled	Transmission	A maximum of 314 characters can be sent in Short Message Mode or by a PC command.
	Reception	When the transceiver receives a Short Message of 101 characters to 314 characters, the content of the message appears. - If Short Message Stack is enabled, the received Short Message is stored in the stack memory of the transceiver. - If Short Message Serial Output is configured, the transceiver sends the received message from a communication port.
Disabled	Transmission	A maximum of 100 characters can be sent in Short Message Mode or by a PC command.
	Reception	Even when the transceiver receives a Short Message of 101 characters to 314 characters, the content of the message appears. - If Short Message Stack is enabled, the first 100 characters of the received Short Message are stored in the stack memory of the transceiver. - If Short Message Serial Output is configured, the transceiver sends the first 100 characters of the received message from a communication port.

If **Extended Short Message** is enabled, the number of Short Messages that can be stored in the stack memory of the transceiver differs. Refer to “Table 2-15 The Maximum Number of Short Messages That Can Be Stored (NXDN/ FleetSync)”. (Refer to [Short Message Stack](#).)

If the number of characters in a message is 100 characters or less, the transceiver behaves in the same manner as the behavior for a Short Data Call regardless of the configuration in **Extended Short Message**.

The transceiver operation for a **Short Data Call (Extended)** is the same as the operation for a Short Data Call.

Note

- The Data Zone-Channel behaves according to the configuration in **Short Message on Data Zone-Channel**.
- The Data System-personality behaves according to the configuration in **Short Message on Data System-personality**.
- In an NXDN Trunking system, the transceiver sends a Short Message of 101 characters or more on a traffic channel. For this reason, after the transmission from the transceiver ends, communication is not possible on the traffic channel for 3 sec or more.

Configuration using KPG-D3/ D3N

Configuring **Extended Short Message** to be enabled or disabled ( **See** Radio Configuration > Protocol Options > NXDN > General > Common Options)

2.11 Sending and Receiving a Long Message (Long Data Call)

Long Data Call can be used to send and receive a maximum of 4,096 characters (Long Message).

Using this function, information can reliably be sent to the target party.

Note

- To send a Long Message, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to a communication port 0 to 2 or the Bluetooth of the transceiver. (Refer to Common Function Part [Available Functions for COM Port.](#))
- This section describes information for both an NXDN Conventional system and NXDN Trunking system. For each operation description, the display of the NXDN Conventional system is used.

Sending a Long Message

A Long Message is sent via a PC. A Long Message cannot be sent from the transceiver.

Transceiver behavior

A PC sends the PC command to the transceiver to request transmission of a Long Message.

The transceiver starts sending the Long Message.



If the Long Message is properly sent to the receiving transceiver, “Complete” appears.



Note

- For NXDN Conventional, “No Reply” appears on the display and transmission of a Long Message is terminated if no response is received from the target transceiver. If the target transceiver is busy, “Busy” appears on the display and transmission of a Long Message is terminated.
- For details on the information displayed on the display during transmission in an NXDN Trunking system, refer to [“Transceiver behavior during transmitting”](#).

Receiving a Long Message

The received Long Message data can be transferred via a PC or external device.

Note

- To use serial communications, a user needs to prepare NXDN compatible software or external devices.

Transceiver behavior

1 The transceiver starts receiving a Long Message.

“Receive Data” appears.



2 The transceiver receives a Long Message.

“Complete” appears.



3 The transceiver restores the previous display.

The received Long Message is transferred to an external device such as a PC with the serial output.

Long Message on Data System-personality

Long Message on Data System-personality is the function that allows the transceiver to automatically change the channel to the **Data System-personality** to send a Long Message in an NXDN Conventional system.

The channel in an NXDN Conventional system is automatically changed to the channel configured for **Data System-personality** to send a Long Message. When the transmission ends, the transceiver restores the Zone-channel which was used before sending the Long Message.

Before moving to the Data System-personality, the transmitting transceiver sends a GTC message to guide the receiving transceiver to the Data System-personality. After receiving a Long Message, the receiving transceiver returns to the zone channel used before the reception of the Long Message.

Long Message on Data System-personality can be used to send data using a specific dedicated channel.

Note

- This function can be only used in an NXDN Conventional system.

Configuration using KPG-D3/ D3N

- Configuring **Long Message on Data System-personality** (See Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Data System-personality)
- Configuring **Data System-personality** (See Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Data System-personality)

2.12 Using 2-tone to Initiate an Individual Call

2-tone signaling uses a pair of 2 different tone frequencies in series for an individual call.

2-tone is a signaling system that can receive a signal with squelch disabled only when 2 tone signals in series sent from the transmitting transceiver match the tone signals preconfigured for the receiving transceiver.

2-tone consists of 2 tone signals in series with 2 different frequencies within the frequency range between 281.25 Hz and 3093.75 Hz in an NXDN Conventional system. These 2 tone signals are sent in series with the carrier wave.

The following are the methods for sending the 2-tone code:

- 2-tone encoding list selection
- **Call** button

Note

- For the 800 MHz/ 900 MHz model, the 800 MHz model, and the 900 MHz model, the 2-tone function cannot be used.

Selecting and Sending the 2-tone Code from a List

The transceiver can send a 2-tone code by initiating transmission after selecting a 2-tone code configured in the 2-tone encoding list. (Refer to [2-tone encoding list](#).)

An encoding tone configured in the 2-tone encoding list can be selected by pressing the **2-tone** button.

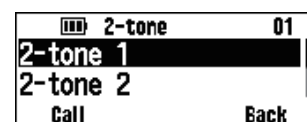
An encoding tone configured in the 2-tone encoding list can also be selected by selecting “2-tone” after entering Menu Mode by pressing the **Menu** button.

Operating the transceiver

1 Press the **2-tone** button.

The transceiver enters 2-tone Mode, and the 2-tone encoding list appears.

The following operations are the same even if the transceiver enters 2-tone Mode by pressing the **Menu** button.



Note

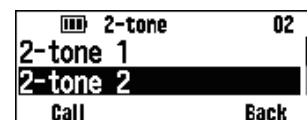
- If the transceiver enters 2-tone Mode on a channel with “Mixed” configured in **Channel Type**, the 2-tone encoding list for analog or the 2-tone encoding list for NXDN appears according to the configuration in **Transmit Mode**.

2 Press the [▲] / [▼] button and select the 2-tone code.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

Note

- A fixed text string (“List No.”) and the list number appear for a 2-tone code for which **2-tone Name** is not configured in the 2-tone encoding list.



3 Press the **PTT** switch.

The display returns to the channel display, and the selected 2-tone code is sent. Even after the 2-tone code is sent, the transmission continues while the **PTT** switch is pressed and held.

If the transceiver transmits by pressing the **Menu** () or **[*]** button, the transceiver reverts to receive mode immediately after transmitting a 2-tone code.

Note

- If “RAN and Optional Signaling” is configured in **Audio Control**, the Optional Signaling is in the matching state if transmission is on a channel with “2-tone 1” to “2-tone 4” configured in **Optional Signaling**. In this case, the “” icon appears, and the LED flashes yellow if Optional Signaling LED is enabled. (Refer to [Unmuting the Speaker \(Audio Control\)](#).)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Using the Call Button to Send the 2-tone Code

Pressing one of the **Call 1** to **Call 6** buttons causes the transceiver to transmit the preconfigured tone.

Call 1 to **Call 6** can be assigned to the **PF** buttons by using KPG-D3/ D3N and the tone corresponding to each button can be configured by selecting from the 2-tone encoding list of 2-tone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring the tones corresponding to the **Call 1** to **Call 6** buttons ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call > Call 1~Call 6)

Using the PC Command to Send the 2-tone Code

The transceiver sends a 2-tone code when a transmission command for a 2-tone code is sent from a PC to the communication port of the transceiver.

To send a 2-tone code by using a PC command, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common Function Part [Available Functions for COM Port](#).)

Functions Related to 2-tone Code Encoding

Functions related to 2-tone code encoding are shown below:

- Duration of 1st Tone
- Duration of 2nd Tone
- Duration of Single Tone
- Gap Time
- First Tone Delay Time
- Sidetone
- 2-tone encoding list

Duration of 1st Tone

Duration of 1st Tone is the 1st Tone Encode duration for transmitting the 2-tone code (1st Tone and 2nd Tone) configured in the 2-tone encoding list.

Duration of 1st Tone is configured using KPG-D3/ D3N. Usually, 1 sec is configured for this function.

Duration of 2nd Tone

Duration of 2nd Tone is the 2nd Tone Encode duration for transmitting the 2-tone code (1st Tone and 2nd Tone) configured in the 2-tone encoding list.

Duration of 2nd Tone is configured using KPG-D3/ D3N. Usually, 3 sec is configured for this function.

Duration of Single Tone

Duration of Single Tone is the Single Tone Encode duration for transmitting the Single Tone configured in the 2-tone encoding list.

Duration of Single Tone is configured using KPG-D3/ D3N. Usually, 5 sec is configured for this function.

Gap Time

Gap Time is the unmodulated duration between the 1st Tone and the 2nd Tone when sending the 2-tone code (1st Tone and 2nd Tone) configured in the 2-tone encoding list.

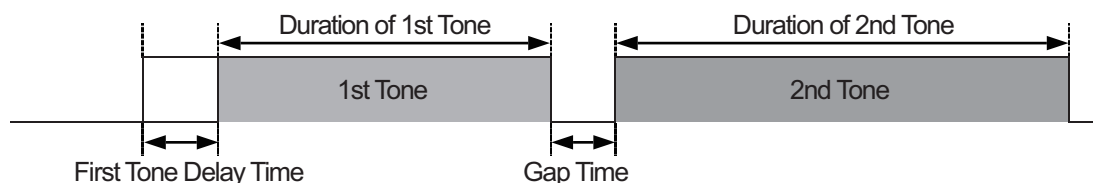
Gap Time is configured using KPG-D3/ D3N. Usually, 0 ms is configured for this function.

First Tone Delay Time

First Tone Delay Time is the length of time from when the transceiver starts transmission until the transceiver actually starts transmitting a tone when the transceiver sends a 2-tone code.

The transceiver transmits an unmodulated signal until the length of time configured in **First Tone Delay Time** elapses.

● 2-tone Encode



● Single Tone Encode

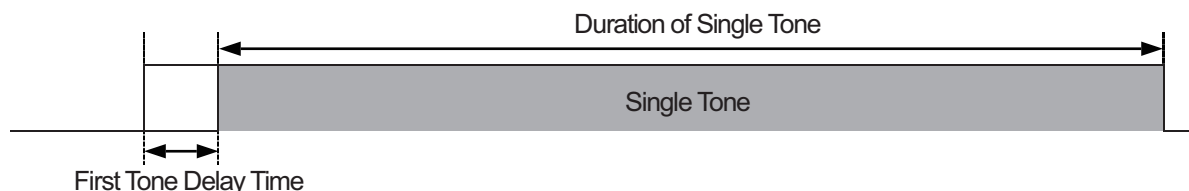


Figure 2-6 Duration of Single Tone/ Gap Time/ First Tone Delay Time

Sidetone

Sidetone is the function to emit the tone of the 2-tone code from the speaker while the transceiver transmits the 2-tone code.

2-tone encoding list

2-tone encoding list is the code list used for transmitting a 2-tone code. By selecting a code configured in this list, the transceiver can transmit a 2-tone code.

The following items can be configured in the 2-tone encoding list:

Table 2-17 2-tone Encoding List Configuration

Configuration	Description
Single Tone	Whether the code to be sent for each list number is used as a Single Tone is configured. 2nd Tone cannot be configured if the code is configured to be used as a Single Tone.
2-tone Name	2-tone Name can be used to assign a name to each list number. A maximum of 14 characters can be configured.
1st Tone	The 1st Tone frequency is configured. The frequency can be configured in the range between 281.25 Hz and 3093.75 Hz inclusive.
2nd Tone	The 2nd Tone frequency is configured. The frequency can be configured in the range between 281.25 Hz and 3093.75 Hz inclusive. 2nd Tone cannot be configured if Single Tone is configured.

Configuration using KPG-D3/ D3N

- Configuring **Duration of 1st Tone** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Encode > Encode)
- Configuring **Duration of 2nd Tone** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Encode > Encode)
- Configuring **Duration of Single Tone** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Encode > Encode)
- Configuring **Gap Time** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Encode > Encode)
- Configuring **First Tone Delay Time** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Encode > Encode)
- Configuring **Sidetone** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Encode > Encode)
- Configuring the 2-tone encoding list ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Encode > Encode > No. 1~32)

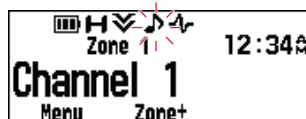
Decoding the 2-tone Code

The transceiver can wait for a 2-tone code on a channel with “2-tone 1”, “2-tone 2”, “2-tone 3”, or “2-tone 4” configured in **Optional Signaling**. (Refer to [Using the Optional Signaling](#).)

Transceiver behavior

The transceiver receives the 2-tone code corresponding to the **Call Format** preconfigured for the transceiver.

The “🔊” icon blinks and the transceiver emits the received audio according to the configuration in **Audio Control (NXDN)** if the received 2-tone code matches the 2-tone code preconfigured for the transceiver. (Refer to [Unmuting the Speaker \(Audio Control\)](#).)



Note

- If **Busy LED** is enabled, the LED lights green. (Refer to Common Function Part [Busy LED](#).)
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving. The flashing LED color varies according to the configuration in **Alert LED** of **Call Format**.
- If Optional Signaling LED is enabled, the LED flashes yellow when the transceiver is receiving.
- If anything other than “Off” is configured in **Alert Tone** of **Call Format**, an Alert Tone sounds from the transceiver. Also, if **Transpond** of **Call Format** is enabled, the transceiver transmits a multiplexed Transpond tone.
- After the length of time configured in **Auto Reset Timer** elapses, the matching state of the 2-tone code is reset.

Functions Related to 2-tone Code Decoding

The following functions associated with 2-tone code decoding can be configured for each of 2-tone 1, 2-tone 2, 2-tone 3, and 2-tone 4:

- Decoder 1 to Decoder 4
- A Tone/ B Tone/ C Tone/ D Tone
- Auto Reset Timer
- Clear to Transpond
- Selective Call Alert LED

Standby code (Decoder 1 to Decoder 4)

Four types of Decoders can be configured for 2-tone 1, 2-tone 2, 2-tone 3, and 2-tone 4 respectively. The transceiver can wait to receive the 2-tone codes configured in Decoder 1 to Decoder 4 at the same time.

The following items can be configured for each Decoder.

● Call Format

Call Format is the combination of A Tone, B Tone, C Tone, and D Tone the transceiver waits to receive. The following combinations are available.

Table 2-18 List of Call Format Combinations

Combination	Description
A and B	The transceiver waits to receive A Tone and B Tone.
A and C	The transceiver waits to receive A Tone and C Tone.
A and D	The transceiver waits to receive A Tone and D Tone.
B and A	The transceiver waits to receive B Tone and A Tone.
B and C	The transceiver waits to receive B Tone and C Tone.
B and D	The transceiver waits to receive B Tone and D Tone.
C and A	The transceiver waits to receive C Tone and A Tone.
C and B	The transceiver waits to receive C Tone and B Tone.
C and D	The transceiver waits to receive C Tone and D Tone.
D and A	The transceiver waits to receive D Tone and A Tone.
D and B	The transceiver waits to receive D Tone and B Tone.
D and C	The transceiver waits to receive D Tone and C Tone.
Long A	The transceiver waits to receive A Tone.
Long B	The transceiver waits to receive B Tone.
Long C	The transceiver waits to receive C Tone.
Long D	The transceiver waits to receive D Tone.

Note

- If anything other than “Long A”, “Long B”, “Long C”, or “Long D” is configured in **Call Format**, the transceiver waits to receive the first tone for 1 sec and the second tone for 3 sec. If “Long A”, “Long B”, “Long C”, or “Long D” is configured in **Call Format**, the transceiver waits to receive the corresponding tone for 5 or more sec.

● Transpond/ Alert Tone

Transpond and **Alert Tone** are functions that allow the transceiver to transmit a multiplexed Transpond tone, or that allow an Alert Tone to sound from the transceiver when the transceiver is called with 2-tone signaling.

Table 2-19 Transpond/ Alert

Transpond	Alert	Description
No	Off	The transceiver does not respond at all.
Yes	Off	The transceiver transmits a Transpond tone.
No	Anything other than Off	An Alert Tone sounds from the transceiver.
Yes	Anything other than Off	An Alert Tone sounds from the transceiver after transmitting a Transpond tone.

The Alert Tone to be emitted when the transceiver is called with 2-tone signaling is selected from 8 types of tones configured in **Special Alert Tone**. (Refer to Common Function Part [Configuring the Alert Tone \(Special Alert Tone\)](#).)

● Alert LED

When the 2-tone code matches, the LED flashes according the configuration in **Alert LED**.

Table 2-20 Alert LED Color

Configuration	Description
Off	The LED does not flash.
Red	The LED flashes red.
Blue	The LED flashes blue.
Green	The LED flashes green.
Yellow	The LED flashes yellow.
Light Blue	The LED flashes light blue.
Purple	The LED flashes purple.
White	The LED flashes white.

Frequencies for standby code (A Tone/ B Tone/ C Tone/ D Tone)

A Tone, **B Tone**, **C Tone**, and **D Tone** are the frequencies of the tone signals the receiving transceiver waits to receive. The frequency can be configured between 281.25 Hz and 3093.75 Hz inclusive.

Auto Reset Timer

Auto Reset Timer is the length of time from when the received 2-tone code matches the 2-tone code preconfigured for the transceiver until the matching state is automatically reset.

Auto Reset Timer is configured using KPG-D3/ D3N. Also, how the transceiver behaves after the length of time configured in **Auto Reset Timer** elapses can be configured.

Table 2-21 Auto Reset Timer

Configuration		Description
Auto Reset Timer	Off	Auto Reset Timer does not function.
	0 sec to 300 sec	After the configured time elapses, the matching state of the 2-tone code is automatically reset.
LED		If LED is enabled, the flashing LED for the Selective Call Alert LED turns off when the length of time configured in Auto Reset Timer elapses.
Alert		If Alert is enabled, the intermittently emitted Alert Tone stops when the length of time configured in Auto Reset Timer elapses.
Monitor		If Monitor is enabled, the matching state of the 2-tone code is reset when the length of time configured in Auto Reset Timer elapses.

Clear to Transpond

Clear to Transpond is the function that allows the transceiver to wait to initiate the Transpond until the channel becomes available if the channel is occupied by other users when the transceiver attempts to initiate the Transpond.

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a 2-tone code. A user can notice by the flashing LED that the transceiver is receiving a call.



- The matching state of 2-tone code is reset on the following conditions. Also, the Transpond is reset on the following conditions. The Transpond is suspended if transmission is disabled by **Clear to Transpond**.

Table 2-22 Conditions to Reset the 2-tone Code

Conditions	Description
Pressing the button	When the following buttons are pressed • Channel Up button • Channel Recall button • Channel Down button • Clear button • Direct Channel 1 to Direct Channel 5 buttons • Direct Channel 1 Select to Direct Channel 5 Select buttons • Emergency button • Home Channel button • Home Channel Select button • Monitor button • Monitor Momentary button • Scan button • Scan Normal button • Scan Program button • Front Panel Programming button • Squelch Off button • Squelch Off Momentary button • Transceiver Password button • Zone Up button • Zone Down button • Zone Up/Down button • Zone Select button • Channel Up/Down button • Channel Select button
Hook (Mobile only)	When the microphone is in the on-hook state (However, the 2-tone code is not reset while the audio sounds from the transceiver.)
Expiration of the Auto Reset Timer	When the length of time configured in Auto Reset Timer elapses (This condition is the condition to reset 2-tone.)
Transmission	When transmission is made using the following (This condition is the condition to reset the Transpond.) • PTT switch • External PTT (Voice) port (Mobile only) • External PTT (Data) port (Mobile only)

Configuration using KPG-D3/ D3N

- Configuring **Call Format** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Decode (2-tone 1 to 4))
- Configuring **Transpond** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Decode (2-tone 1 to 4))
- Configuring **Alert Tone** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Decode (2-tone 1 to 4))
- Configuring **Alert LED** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Decode (2-tone 1 to 4))
- Configuring **A Tone/ B Tone/ C Tone/ D Tone** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Decode (2-tone 1 to 4))
- Configuring **Auto Reset Timer** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Decode (2-tone 1 to 4) > Auto Reset)
- Configuring **Clear to Transpond** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Decode (2-tone 1 to 4))
- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > 2-tone > Digital Decode (2-tone 1 to 4))

2.13 Using DTMF to Initiate a Selective Call

DTMF (Dual Tone Multi-frequency) is the signaling type that uses 2 different frequency tones simultaneously. DTMF is used for operations such as making an individual call and placing the transceiver in the Stun state by remote control.

DTMF signaling uses 2 different frequencies combined (one lower and one higher frequency) and consists of the 0 to 9, A to D, * and # tones.

Table 2-23 DTMF Tone Frequency List

DTMF Code	Frequency	
	Low Frequency	High Frequency
0	941 Hz	1336 Hz
1	697 Hz	1209 Hz
2	697 Hz	1336 Hz
3	697 Hz	1477 Hz
4	770 Hz	1209 Hz
5	770 Hz	1336 Hz
6	770 Hz	1477 Hz
7	852 Hz	1209 Hz
8	852 Hz	1336 Hz
9	852 Hz	1477 Hz
A	697 Hz	1633 Hz
B	770 Hz	1633 Hz
C	852 Hz	1633 Hz
D	941 Hz	1633 Hz
*	941 Hz	1209 Hz
#	941 Hz	1477 Hz

Various functions of DTMF Encode and DTMF Decode can be used in an NXDN Conventional system.

Also, to decode a DTMF code in an NXDN Conventional system, "DTMF" needs to be configured as the Optional Signaling to be used on the channel. (Refer to [Using the Optional Signaling.](#))

The following are the methods for sending a DTMF code:

- Manual Dialing
- Keypad Auto PTT
- Store and Send
- Autodial List selection
- **Call** button
- Redial

Sending the DTMF Code While Transmitting (Manual Dialing)

The DTMF code corresponding to a particular button on the keypad can be sent when pressing the button while transmitting by pressing the **PTT** switch.

Operating the transceiver

- 1** Press the **PTT** switch.
- 2** Press the button corresponding to the DTMF code to be sent.

The transceiver sends the DTMF code.

- 3** Repeat Step 2 as necessary.

Configuration using KPG-D3/ D3N

Configuring **Manual Dialing** to be enabled or disabled ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)

Sending the DTMF Code by Pressing a Button on the Keypad without Using the PTT Switch (Keypad Auto PTT)

Pressing a button on the keypad allows the transceiver to start transmitting immediately and can send the DTMF code corresponding to the button. This function can be used to send the DTMF code just by pressing the buttons on the keypad without pressing the **PTT** switch.

Note

- To use this function, **Manual Dialing** needs to be enabled.

Operating the transceiver

- 1** Press the button corresponding to the DTMF code to be sent.

The transceiver sends the DTMF code.

- 2** Repeat Step 1 as necessary.

Configuration using KPG-D3/ D3N

- Assigning functions to **Keypad Operation** on the transceiver ( See Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring **Manual Dialing** to be enabled or disabled ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)

Sending Entered DTMF Codes All at Once (Store and Send)

The DTMF codes to be sent can be temporarily entered beforehand using the keypad, then sent all at once. A maximum of 34 digits can be transmitted in a single operation.

To use this function, **Store and Send** needs to be enabled using KPG-D3/ D3N.

The transceiver can enter Autodial Mode and the DTMF code can be entered using one of the following operations:

● **Autodial Button**

Pressing the **Autodial** button places the transceiver in Autodial Mode.

● **Menu Button**

Pressing the **Menu** button to enter Menu Mode and then selecting “Autodial” places the transceiver in Autodial Mode. (Refer to Common Function Part [Using Menu Mode.](#))

● **Keypad entry**

If “Autodial” is configured in **Keypad Operation**, pressing a button on the keypad causes the transceiver to enter Autodial Mode. The transceiver will be on hold as the first digit of the DTMF code is entered. (Refer to Common Function Part [Keypad Operation.](#))

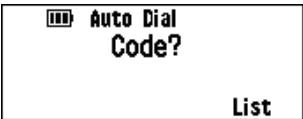
Operating the transceiver

● **If using the keypad:**

1 Press the [Autodial](#) button.

The transceiver enters Autodial Mode and the DTMF code entry display appears.

The following operations are identical even if the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.



2 Enter using the keypad the DTMF code to be sent.

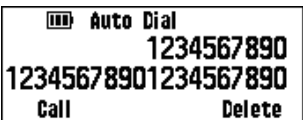
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.



- To enter the DTMF “A” code, press and hold the [*] button and then press the [2] button.
- To enter the DTMF “B” code, press and hold the [*] button and then press the [5] button.
- To enter the DTMF “C” code, press and hold the [*] button and then press the [8] button.
- To enter the DTMF “D” code, press and hold the [*] button and then press the [0] button.
- To enter the DTMF “*” code, press the [*] button and then press the [*] button.
- To enter the DTMF “#” code, press the [*] button and then press the [#] button.
- If “Direct Entry” is configured in * and # Buttons, pressing the [*] or [#] button directly enters the “*” or “#” tone. In this case, the above operations are unavailable.



3 Enter the DTMF code by repeating step 2.



4 Press the **PTT** switch or the **Menu** ([) button.

The transceiver sends the DTMF code.

● Without using the keypad

1 Press the **Autodial** button.

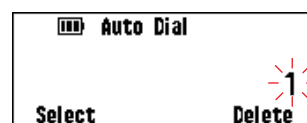
The transceiver enters Autodial Mode and the DTMF code entry display appears.

The following operations are the same even if the transceiver enters Autodial Mode by pressing the **Menu** button.



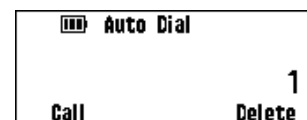
2 Enter the DTMF code to be sent by pressing the [] or [] button.

Characters are entered from the right end, and the character being entered blinks. Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.



3 Confirm the entered DTMF code by pressing the **Menu** ([) button.

An entered digit stops blinking and remains lighted.



4 Enter the DTMF code by repeating step 2 and 3.



5 Press the **PTT** switch or the **Menu** ([) button.

The transceiver sends the DTMF code.

Configuration using KPG-D3/ D3N

- Configuring **Store and Send** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)
- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to **Keypad Operation** on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring *** and # Buttons** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

Sending a DTMF Code by Selecting from a List (Autodial List)

The DTMF code configured in **Autodial List** can be selected and sent.

To use this function, **Store and Send** needs to be disabled using KPG-D3/ D3N.

The transceiver can enter Autodial Mode and the DTMF codes can be selected using one of the following operations:

● Autodial Button

Pressing the **Autodial** button places the transceiver in Autodial Mode.

● Menu Button

Pressing the **Menu** button to enter Menu Mode and then selecting “Autodial” places the transceiver in Autodial Mode. (Refer to Common Function Part [Using Menu Mode.](#))

● Keypad entry

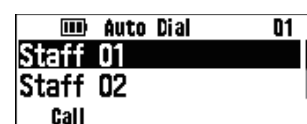
If “Autodial” is configured in **Keypad Operation**, pressing a button on the keypad causes the transceiver to enter Shortcut Entry Mode for Autodial Mode. (Refer to Common Function Part [Keypad Operation.](#))

Operating the transceiver

1 Press the **Autodial** button.

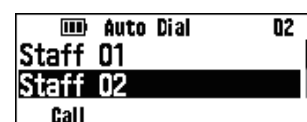
The transceiver enters Autodial Mode and then the **Autodial List** selection display appears.

The following operations are identical even if the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.



2 Press the [▲] or [▼] button to select the DTMF code to be sent from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **PTT** switch or the **Menu** ([□]) button.

The transceiver sends the DTMF code.

Configuration using KPG-D3/ D3N

- Configuring **Store and Send** to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)
- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to **Keypad Operation** on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

Sending the DTMF Code with a Single Touch (Call 1 to Call 6 Buttons)

Pressing one of the **Call 1** to **Call 6** buttons causes the transceiver to send the preconfigured DTMF code.

“Call 1” to “Call 6” can be assigned to the **PF** buttons using KPG-D3/ D3N and the DTMF code corresponding to each button can be selected from the **Autodial List**.

Note

- For Mobile, if one of the AUX Input ports to which “Call 1” to “Call 6” are assigned becomes active, the DTMF code preconfigured for the transceiver can be sent. (Refer to Common Function Part [Available Functions for AUX Input Ports](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring DTMF code corresponding to the **Call 1** to **Call 6** buttons ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call > Call 1~Call 6)

Redialing

A previously sent DTMF code can be sent again.

Operating the transceiver

- 1 Press the **Autodial** button while the transceiver is in standby mode.

The transceiver enters Autodial Mode.

- 2 Press the **[*]** button and then press the **[0]** button.

The DTMF code last sent appears.

- 3 Press the **PTT** switch or the **Menu** () button.

The transceiver sends the DTMF code.

Disabling the Transceiver Capability by Remote Control (Stun)

The transceiver capability can be disabled by wireless remote control. This function allows a system administrator to remotely disable the transceiver, for instance, if the transceiver is lost.

The transceiver which has been disabled by this function can be enabled to be usable again by remote control from an external device using radio communication.

When the transceiver receives a Stun code, the transceiver multiplexes a Stun-on Tone and initiates the Transpond. After that, the transceiver enters the Stun state according to the configuration in **Stun Code Response**.

The Stun state cannot be reset by **Auto Reset Timer** or by the user's operation. The transceiver transmits a Stun-off Tone and then resets the Stun state when the transceiver receives a Revive Code (Stun Code + "#").

Stun Code and **Stun Code Response** can be configured using KPG-D3/ D3N.

Table 2-24 Stun

Configuration	Description
Stun Code	Stun Code is a standby code for Stun.
Stun Code Response	In Stun Code Response, how the transceiver responds when the received DTMF code matches the DTMF code configured in Stun Code can be configured as below: Transmit Inhibit: Transmit capability is disabled. User operations of the transceiver are also inhibited. Automatic transmission, such as Transpond, is still available. Transceiver Inhibit: Transmit and receive capabilities are disabled. User operations of the transceiver are also inhibited.

Note

- The transceiver cannot enter Emergency Mode while the transceiver is in the Stun state.

Configuration using KPG-D3/ D3N

- Configuring **Stun Code** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode > Stun)
- Configuring **Stun Code Response** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode > Stun)

Functions Related to DTMF Code Encoding

Functions related to DTMF code encoding are shown below.

- DTMF Speed
- First Digit Delay Time
- First Digit Time
- * and # Digit Time
- DTMF Hold Time
- D Code Assignment
- Sidetone

DTMF Speed

DTMF Speed is the speed to send out the DTMF codes. Transmission speed of the DTMF code can be configured by entering the number of digits to be sent per second. The transceiver sends the DTMF code at the configured speed. The number of digits of the DTMF code to be sent per second can be selected from 6, 8, 10, or 15 by using KPG-D3/ D3N. The following are durations for Digit Time (transmission duration) and Gap Time (silent duration) depending on the selected value.

Table 2-25 DTMF Speed

Range	Digit Time (Transmission Duration)	Gap Time (Silent Duration)
6 digits/sec	84 ms	84 ms
8 digits/sec	62 ms	62 ms
10 digits/sec	50 ms	50 ms
15 digits/sec	34 ms	34 ms

Configuration using KPG-D3/ D3N

Configuring **DTMF Speed** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

First Digit Delay Time

First Digit Delay Time is the length of time from when the transceiver starts transmitting until the transceiver starts sending the first digit of the DTMF code.

The transceiver transmits an unmodulated signal until the length of time configured in **First Digit Delay Time** elapses.

Configuration using KPG-D3/ D3N

Configuring **First Digit Delay Time** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

First Digit Time

First Digit Time is the function to extend the length of time to send the first digit of the DTMF code when the transceiver starts sending the DTMF code.

Extending the transmission time of the first digit of the DTMF code helps the receiving transceiver easily recognize the incoming DTMF code in order to avoid failure in receiving the DTMF code while the transceiver is in the battery saver mode or scanning.

The length of time to send the first digit of the DTMF code is the sum of the transmission time configured in **DTMF Speed** and the **First Digit Time**.

Transmission time for the 1st digit of DTMF = value configured in DTMF Speed (Digit Time) + value configured in First Digit Time

Example: First Digit Time: 100 ms, Encode Code: 123

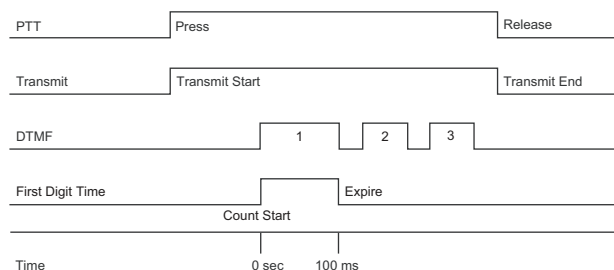


Figure 2-7 First Digit Time

Configuration using KPG-D3/ D3N

Configuring **First Digit Time** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

* and # Digit Time

*** and # Digit Time** is the function to extend the transmission time for the * tone and # tone of when the DTMF code is sent out.

Since * tone and # tone are more frequently used for special tasks than 0 to 9 tones, this function is used for the receiving transceiver to easily recognize the incoming DTMF code.

The length of time to transmit the * tone and # tone is the sum of the transmission time configured in **DTMF Speed** and the *** and # Digit Time**.

Transmission time for the * tone and # tone of DTMF = value configured in DTMF Speed (Digit Time) + value configured in * and # Digit Time

Example: * and # Digit Time: 100 ms, Encode Code: *01

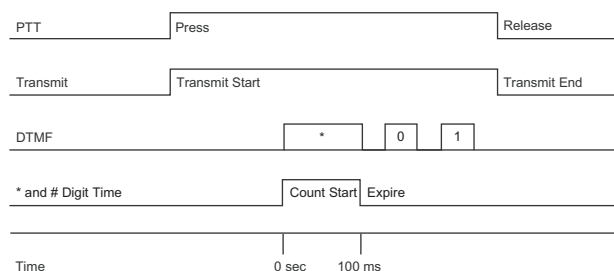


Figure 2-8 * and # Digit Time

Note

- If the first digit of the DTMF code is the * tone or # tone, the transceiver compares the extension time configured in **First Digit Time** with the extension time configured in *** and # Digit Time**, and uses the longer extension time to send the first digit.

Configuration using KPG-D3/ D3N

Configuring *** and # Digit Time** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

DTMF Hold Time

DTMF Hold Time is the length of time from when the keypad is disabled until the transceiver restores the receive mode while sending the DTMF code by using **Keypad Auto PTT** or **Manual Dialing**.

The DTMF signal received until its transmission is interrupted may be treated as one string of code depending on the devices on the receiving side. Therefore, the transceiver holds the transmission not to interrupt the digit sequence when transmitting a continuous DTMF signal.

Configuration using KPG-D3/ D3N

Configuring **DTMF Hold Time** ( **See** Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

D Code Assignment

D Code Assignment is the function to select whether the D Code is used for the D tone of DTMF or a dialing pause (unmodulated transmission).

Configuration using KPG-D3/ D3N

Configuring **D Code Assignment** ( **See** Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

Emitting the DTMF code tone (Sidetone)

Sidetone is the function to emit a DTMF code tone from the speaker while the transceiver transmits the DTMF code.

Note

- If “Silent” is configured in **Emergency Mode Type**, the transceiver does not emit a **DTMF Sidetone**. (Refer to [Emergency Mode Type](#).)
- If the transceiver sends the DTMF code while **PTT Proceed Tone** is enabled, the transceiver does not emit a **Proceed Tone**.
(Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Sidetone** to be enabled or disabled ( **See** Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)

Functions Related to DTMF Code Decoding

Functions related to DTMF code decoding are shown below.

- Code
- Transpond
- Alert Tone
- Alert LED
- Selective Call Alert LED
- Auto Reset Timer
- Clear to Transpond

Note

- To decode a DTMF code in an NXDN Conventional system, “DTMF” needs to be configured in **Optional Signaling** to be used on the channel. (Refer to [Using the Optional Signaling](#).)

Standby code

Two DTMF codes for standby can be configured for the transceiver. The transceiver can wait to receive the DTMF codes configured in **No.1** and **No.2** at the same time.

The following items can be configured in each of **No.1** and **No.2**:

● Transpond/ Alert Tone

Transpond and **Alert Tone** are functions that allow the transceiver to transmit a multiplexed Transpond tone, or that allow an Alert Tone to sound from the transceiver when the transceiver is called with DTMF.

Table 2-26 Transpond/ Alert

Transpond	Alert	Description
No	Off	The transceiver does not respond at all.
Yes	Off	The transceiver transmits a Transpond tone.
No	Anything other than Off	An Alert Tone sounds from the transceiver.
Yes	Anything other than Off	An Alert Tone sounds from the transceiver after transmitting a Transpond tone.

The Alert Tone to be emitted when the transceiver is called with DTMF is selected from 8 types of tones configured in **Special Alert Tone**. (Refer to Common Function Part [Configuring the Alert Tone \(Special Alert Tone\)](#).)

● Alert LED

When the DTMF code matches, the LED flashes according the configuration in **Alert LED**.

Table 2-27 Alert LED Color

Configuration	Description
Off	The LED does not flash.
Red	The LED flashes red.
Blue	The LED flashes blue.
Green	The LED flashes green.
Yellow	The LED flashes yellow.
Light Blue	The LED flashes light blue.
Purple	The LED flashes purple.
White	The LED flashes white.

Auto Reset Timer

Auto Reset Timer is the length of time from when the received DTMF code matches the DTMF code preconfigured for the transceiver until the matching state is automatically reset.

Auto Reset Timer is configured using KPG-D3/ D3N. Also, how the transceiver behaves after the length of time configured in **Auto Reset Timer** elapses can be configured.

Table 2-28 Auto Reset Timer

Configuration		Description
Auto Reset Timer	Off	Auto Reset Timer does not function.
	0 sec to 300 sec	After the configured time elapses, the matching state of the DTMF code is automatically reset.
LED		If this function is enabled, the flashing LED for the Selective Call Alert LED turns off when the length of time configured in Auto Reset Timer elapses.
Alert Tone		If this function is enabled, the intermittently emitted Alert Tone stops when the length of time configured in Auto Reset Timer elapses.
Monitor		If this function is enabled, the matching state of the DTMF code is reset if the length of time configured in Auto Reset Timer elapses.

Clear to Transpond

Clear to Transpond is the function that allows the transceiver to wait to initiate the Transpond until the channel becomes available if the channel is occupied by other users when the transceiver attempts to initiate the Transpond.

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a DTMF code.

A user can notice by the flashing LED that the transceiver is receiving a call.



- The matching state of the DTMF codes is reset on the following conditions. Also, the Transpond is reset on the following conditions. The Transpond is suspended if transmission is disabled by **Clear to Transpond**.

Optional Signaling LED

Optional Signaling LED is the function that causes the LED to flash in yellow when the Optional Signaling received matches that of the transceiver.

A user can notice by the LED that the transceiver is receiving a call.

If the matching state of Optional Signaling is disabled when the buttons on the transceiver are pressed, or when the time configured in **Auto Reset Timer** elapses, the LED is turned OFF.

However, if **Selective Call Alert LED** is enabled even if **Optional Signaling LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

Table 2-29 Conditions to Reset the DTMF Code

Conditions	Description
Pressing the button	When the following buttons are pressed • Channel Up button • Channel Recall button • Channel Down button • Clear button • Direct Channel 1 to Direct Channel 5 buttons • Direct Channel 1 Select to Direct Channel 5 Select buttons • Emergency button • Home Channel button • Home Channel Select button • Monitor button • Monitor Momentary button • Scan button • Scan Normal button • Scan Program button • Front Panel Programming button • Squelch Off button • Squelch Off Momentary button • Transceiver Password button • Zone Up button • Zone Down button • Zone Up/Down button • Zone Select button • Channel Up/Down button • Channel Select button
Hook (Mobile only)	When the microphone is in the on-hook state (However, the DTMF code is not reset while the audio sounds from the transceiver.)
Expiration of the Auto Reset Timer	When the length of time configured in Auto Reset Timer elapses (This condition is the condition to reset the DTMF code.)
Receiving a code	When a "Code + #" code is received
Transmission	When transmission is made using the following (This condition is the condition to reset the Transpond.) • PTT switch • External PTT (Voice) port (Mobile only) • External PTT (Data) port (Mobile only)

Configuration using KPG-D3/ D3N

- Configuring **Transpond** ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode)
- Configuring **Alert Tone** ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode)
- Configuring **Alert LED** ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode)
- Configuring **Auto Reset Timer** ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode > Auto Reset)
- Configuring **Clear to Transpond** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode)
- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode)
- Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > RX Options)

Using Autodial List

Autodial List is the list in which the DTMF code used for Autodial Mode is configured.
Autodial List can be configured by using KPG-D3/ D3N.

Table 2-30 Autodial List Configuration

Configuration	Description
DTMF Name	A name can be assigned to the DTMF code. A maximum of 14 characters can be configured.
Code	The DTMF code to be sent can be configured. A maximum of 34 numeric digits can be configured.

Configuration using KPG-D3/ D3N

Configuring **Autodial List** ( See Radio Configuration > Protocol Options > DTMF > Autodial List)

Editing the Autodial List with the Transceiver (Autodial Programming)

In Autodial Programming Mode, data configured in **Autodial List** can be added, changed, or deleted by operating the transceiver.
Pressing the **Autodial Programming** button places the transceiver in Autodial Programming Mode.
Or, the transceiver enters Autodial Programming Mode if “Autodial Programming” is selected after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode.](#))

Note

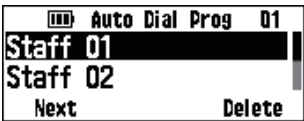
- If “Direct Entry” is configured in *** and # Buttons**, pressing the **[*]** or **[#]** button in Autodial Programming Mode directly enters the “*” or “#” tone. In this case, A to D tones cannot be entered by pressing the **[*]** button, and the characters entered by pressing the **[#]** button cannot be cleared.

Operating the transceiver

- Changing or adding data in the Autodial List

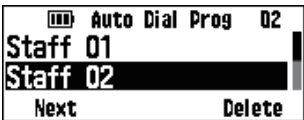
1 Press the **Autodial Programming** button.

The transceiver enters Autodial Programming Mode.
The following operations are the same even if the transceiver enters Autodial Programming Mode by pressing the **Menu** button.

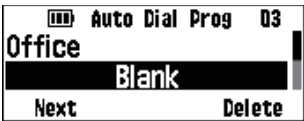


2 Press the **[▲]** or **[▼]** button and then select the target data from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for the selection methods.



If data is newly added to the **Autodial List**, “Blank” needs to be selected. Although the following procedure describes the operation with the displays that appear when changing the existing data in the **Autodial List**, the operation is identical.



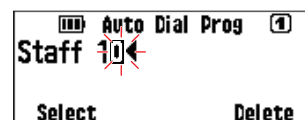
3 Press the **Menu** ([**□**]) or [*****] button.

The DTMF name edit display for the selected data appears.



4 Enter a DTMF name.

Refer to Common Function Part “[Entering or Deleting Characters](#)” for the entry method.



5 Press the **Menu** ([**□**]) or [*****] button after entering the DTMF name.

The DTMF code edit display appears.

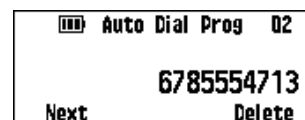


6 Enter a DTMF code.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for the entry method.



- A DTMF code can be entered with a maximum of 34 digits.



7 Press the **Menu** ([**□**]) or [*****] button after entering the DTMF code.

The writing completion message display appears.

“Over Write?” appears if the existing data in the **Autodial List** is changed.

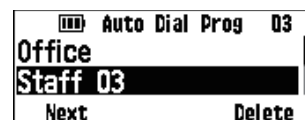


“Store?” appears if new data is added in the **Autodial List**.



8 Press the **Menu** ([**□**]) or [*****] button.

The data is written in the transceiver memory, and the **Autodial List** selection display appears.

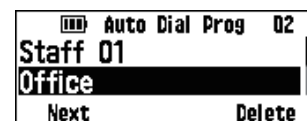


● Deleting data from the Autodial List

1 Press the **Autodial Programming** button.

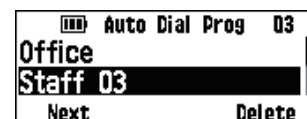
The transceiver enters Autodial Programming Mode.

The following operations are the same even if the transceiver enters Autodial Programming Mode by pressing the **Menu** button.



2 Press the **[▲]** or **[▼]** button and then select the target data from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for the selection methods.



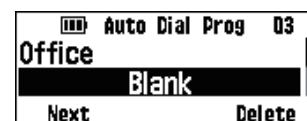
3 Press the **Back** (**[↩]**) or **[#]** button.

“Delete?” appears.



4 Press the **Menu** (**[□]**) or **[*]** button.

The selected data will be cleared.



Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring *** and # Buttons** to be enabled or disabled ([See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

2.14 Communicating with a Telephone (Telephone Call)

Telephone Call in an NXDN Conventional system makes a voice call by a SIP Phone via the repeater.

Voice calls by a SIP Phone are a Group Call (an incoming call only) and an Individual Call, and the mechanisms of **Individual Call Acknowledge Request** apply to an incoming call of Individual Call. Therefore, the transceiver of when an Individual Call (Telephone Call) is received behaves according to the configuration in **Automatic Response** of Individual Call Acknowledge Request.

Initiating a Telephone Call

A Telephone Call can be initiated by one of the following methods:

To make a Telephone Call, enable the configuration in **Autodial Telephone Interconnect**.

● Autodial Mode (Autodial button)

In Autodial Mode, a Telephone Call is initiated by selecting a DTMF code configured in the Autodial List, or directly entering a DTMF code and pressing the **PTT** switch. (Refer to [Sending a DTMF Code by Selecting from a List \(Autodial List\)](#).)

Pressing the **Autodial** button places the transceiver in Autodial Mode.

The transceiver can also be placed in Autodial Mode by executing “Autodial” after placing the transceiver in Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

● Keypad entry

If “Autodial” is configured in **Keypad Operation**, pressing a button on the keypad causes the transceiver to enter Autodial Mode. If the transceiver with **Store and Send** enabled is in Autodial Mode, the transceiver will be on hold as the first digit of the DTMF code is entered. A Telephone Call is initiated by entering a DTMF code and pressing the **PTT** switch.

● Call button

Pressing any of the buttons for **Call 1** to **Call 6**, or activating any of the ports for **Call 1** to **Call 6** (Mobile only) initiates a Telephone Call. A DTMF code of the target transceiver can be configured for the **Call 1** to **Call 6** buttons by selecting one DTMF code from the Autodial List by using KPG-D3/ D3N. (Refer to [Sending the DTMF Code with a Single Touch \(Call 1 to Call 6 Buttons\)](#).)

Note

- Telephone Call functions by using the Individual Call and Group Call functions. Therefore, for **Busy Channel Lockout**, configure the transceiver to be able to transmit even while unmuted. In addition, use Telephone Call after configuring the Encryption function to be disabled.
- The JVCKENWOOD repeater that can use Telephone Call is limited to NXR-1700/ NXR-1800.
- When a Telephone Call is received, “Phone Call” appears in Stack Mode because the transceiver executes the Stack behavior, but a DTMF code cannot be selected and sent from Stack Mode.
- The Unit IDs of a Group Call and an Individual Call by a SIP Phone are fixed to \$FFFE5.
- When a Group Call or Individual Call is received from a SIP Phone, **Auto Reset Timer** functions as “0 sec” regardless of the FPU configurations.

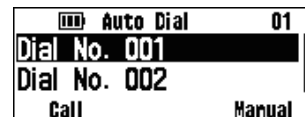
Operating the transceiver

● Initiating a Telephone Call by selecting a DTMF code from the Autodial List

1 Press the **Autodial** button on the channel of the system with Autodial Telephone Interconnect enabled.

The transceiver enters Autodial Mode and then the Autodial List selection display appears.

The following operations are identical when the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.

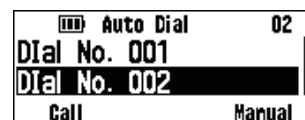


Note

- If **Store and Send** is enabled, the DTMF code entry display will appear. Pressing the **Back** ([↵]) button causes the transceiver to switch to the selection screen for the Autodial List.

2 Press the [▲] or [▼] button to select the DTMF code to be sent from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **PTT** switch, or **Menu** ([□]) button.

The connection request of a SIP Phone to the repeater is executed by Individual Call.

“Individual” and “Calling” appear.



4 Receive the response from the repeater.

The “📞” icon blinks and “Phone Call” appears.

The communication state of Individual Call is entered, and the selected DTMF code is sent.

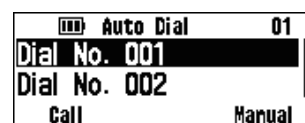


● Initiating a Telephone Call by directly entering a DTMF code

1 Press the **Autodial** button on the channel of the system with Autodial Telephone Interconnect enabled.

The transceiver enters Autodial Mode and then the Autodial List selection display appears.

The following operations are identical when the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.

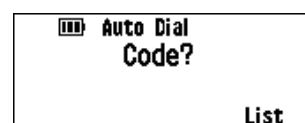


Note

- If **Store & Send** is enabled, the DTMF code entry display will appear.

2 Press the **Back** ([↶]) or **[#]** button.

The DTMF code entry display appears.



3 Enters a DTMF code.

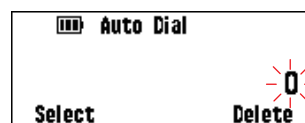
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

● Using the keypad

Press a button on the keypad to enter a DTMF code.

● Using the PF buttons

Enter a DTMF code by pressing the **[▲]** button or **[▼]** button and confirm the entered DTMF code by pressing the **Menu** (**[□]**) button.



Note

- To enter the DTMF “A” code, press and hold the **[*]** button and then press the **[2]** button.
- To enter the DTMF “B” code, press and hold the **[*]** button and then press the **[5]** button.
- To enter the DTMF “C” code, press and hold the **[*]** button and then press the **[8]** button.
- To enter the DTMF “D” code, press and hold the **[*]** button and then press the **[0]** button.
- To enter the DTMF “*” code, press the **[*]** button and then press the **[*]** button.
- To enter the DTMF “#” code, press the **[*]** button and then press the **[#]** button.
- If “Direct Entry” is configured in *** and # Buttons**, pressing the **[*]** button or **[#]** button directly enters the “*” or “#” tone.
In this case, the above operations are unavailable.

4 Press the **PTT** switch or the **Menu** ([) button.

The connection request of a SIP Phone to the repeater is executed by Individual Call.

“Individual” and “Calling” appear.



5 Receive the response from the repeater.

The “” icon blinks and “Phone Call” appears.

The communication state of Individual Call is entered, and the entered DTMF code is sent.

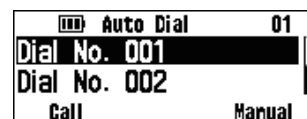


● Redialing

1 Press the **Autodial** button on the channel of the system with Autodial Telephone Interconnect enabled.

The transceiver enters Autodial Mode and then the Autodial List selection display appears.

The following operations are identical when the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.

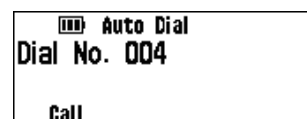


Note

- If **Store and Send** is enabled, the DTMF code entry display will appear. Pressing the **Back** ([) button causes the transceiver to switch to the selection screen for the Autodial List.

2 Press the [*****] button and then press the [**0**] button.

The name or DTMF code of the target transceiver of the last transmission appears.



3 Press the **PTT** switch or the **Menu** ([) button.

The connection request of a SIP Phone to the repeater is executed by Individual Call.

“Individual” and “Calling” appear.



4 Receive the response from the repeater.

The “📞” icon blinks and “Phone Call” appears.

The communication state of Individual Call is entered, and the selected DTMF code is sent.



Note

- If **Transmit LED** is enabled, the LED lights red during the transmission of a Telephone Call. (Refer to Common Function Part [Transmit LED](#).)
- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when the **PTT** switch is pressed to initiate the connection request of a SIP Phone. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver while the transceiver is waiting for a response from the repeater after the connection request of a SIP Phone is initiated. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for communications.
- If **Sidetone** of DTMF is enabled, the DTMF tone sounds from the speaker during the transmission of a DTMF code.
- Pressing the **Clear** button allows terminating the Telephone Call. For Mobile, if **On-hook Disconnect** is enabled, a Telephone Call terminates by placing the microphone in the on-hook state.
- For details on the information displayed on the display during transmission, refer to “[Transceiver behavior during transmitting](#)”.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Store and Send** to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)
- Configuring **Autodial Telephone Interconnect** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional (NXDN Site Roaming/ NXDN Site Roaming with RAN) > NXDN > Autodial Telephone Interconnect)
- Configuring **Call Request Tone** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional (NXDN Site Roaming/ NXDN Site Roaming with RAN) > NXDN > Autodial Telephone Interconnect)
- Configuring **Call Processing Tone** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional (NXDN Site Roaming/ NXDN Site Roaming with RAN) > NXDN > Autodial Telephone Interconnect)
- Configuring **Call in Progress Tone** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional (NXDN Site Roaming/ NXDN Site Roaming with RAN) > NXDN > Autodial Telephone Interconnect)
- Configuring the DTMF codes corresponding to the **Call 1** to **Call 6** buttons or ports ([See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call)
- Configuring **Sidetone** to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)
- Configuring **On-hook Disconnect** to be enabled or disabled ([See](#) Radio Configuration > Global Options > Basics > General > Control > Microphone-hook)

Receiving a Telephone Call

If a Telephone Call by Individual Call is received, the transceiver behaves according to Automatic Response in **Individual Call Acknowledge Request**.

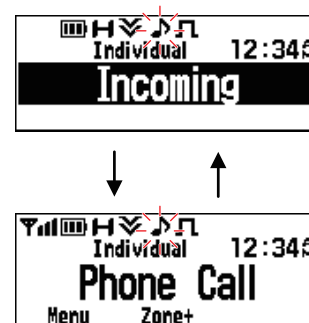
Operating the transceiver

● If Automatic Response is disabled

1 Receive a Telephone Call.

The “📞” icon blinks, and then “Incoming” appears for 1 sec and “Phone Call” appears for 2 sec alternately.

The transceiver sends an automatic response message to the repeater and notifies that the transceiver has received a message requesting an acknowledgment.



2 Press the **PTT** switch or the **Call Response** button.

By pressing the **PTT** switch, the transceiver responds to the repeater by an Individual Call.

If the **Call Response** button is pressed, a Button Beep A (1 beep) sounds from the transceiver, and an acknowledgment message to notify that the transceiver is available for the call is sent to the repeater.



Note

- For Mobile, when **Off-hook Connect** is enabled, the transceiver can respond to the transmitting telephone by placing the microphone in the off-hook state.

● If Automatic Response is enabled

1 Receive a Telephone Call.

The “📞” icon blinks, and “Individual” and “Phone Call” appear.

An acknowledgment message to notify that the transceiver is available for the call is automatically sent to the repeater.



2 Press the **PTT** switch.

The transceiver responds to the transmitting telephone.

Note

- Pressing the **Clear** button allows terminating the Telephone Call. For Mobile, if **On-hook Disconnect** is enabled, a Telephone Call terminates by placing the microphone in the on-hook state.

Configuration using KPG-D3/ D3N

- Configuring **Automatic Response** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional (NXDN Site Roaming/ NXDN Site Roaming with RAN) > NXDN > Individual Call Acknowledge Request)
- Configuring **Individual Call Acknowledge Request** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional (NXDN Site Roaming/ NXDN Site Roaming with RAN) > NXDN)
- Configuring **Off-hook Connect** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > General > Control > Microphone-hook)
- Configuring **On-hook Disconnect** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > General > Control > Microphone-hook)

2.15 Communicating using a CW Message

Continuous Wave (CW) is a radio emission type that is used to send and receive Morse code messages over the air.

CW Message is used to send Morse code messages preconfigured in the transceiver by using the **PF** buttons.

Pressing the **CW Message** button causes the transceiver to send the CW Message.

The transceiver can send a CW Message only on a channel where “Very Narrow” is configured for Channel Spacing in an NXDN Conventional system. The transceiver will switch to analog modulation mode when the transceiver sends a CW Message.

A maximum of 32 alphanumeric characters and symbols can be configured and sent.

The CW Message to be sent can be configured using KPG-D3/ D3N. The following functions are relevant to sending a CW Message.

- CW Speed
- CW Modulation Delay Time
- Audio Frequency
- CW Sidetone

Note

- CW specifications are compliant with articles in FCC 90.425 Station Identification and International Morse Code.

Configuration using KPG-D3/ D3N

- Configuring **CW Message** ( See Radio Configuration > Protocol Options > NXDN > CW Message)
- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

CW Speed

CW Speed refers to how fast the CW Message is sent by using Morse code.

Configuration using KPG-D3/ D3N

Configuring **CW Speed** ( See Radio Configuration > Protocol Options > NXDN > CW Message)

CW Modulation Delay Time

CW Modulation Delay Time is the amount of time from when the transceiver starts transmitting until the transceiver starts sending the CW Message.

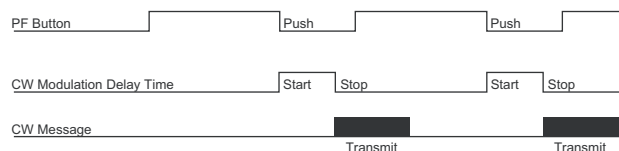


Figure 2-9 CW Modulation Delay Time

Note

- If “Off” is configured for **CW Modulation Delay Time**, the transceiver sends a CW Message immediately after the transceiver starts transmitting.

Configuration using KPG-D3/ D3N

Configuring **CW Modulation Delay Time** ( See Radio Configuration > Protocol Options > NXDN > CW Message)

Audio Frequency

Audio Frequency is the frequency used to send the CW Message.

Configuration using KPG-D3/ D3N

Configuring **Audio Frequency** ( See Radio Configuration > Protocol Options > NXDN > CW Message)

CW Sidetone

CW Sidetone is the function to emit tones from the speaker while the transceiver sends a CW Message.

Configuration using KPG-D3/ D3N

Configuring **CW Sidetone** to be enabled or disabled ( See Radio Configuration > Protocol Options > NXDN > CW Message)

2.16 Sending GPS Data

Global Positioning System (GPS) is the system to acquire the current location information of the own transceiver by receiving signals from the Global Positioning System satellites orbiting the earth.

The transceiver of the mobile station can send the acquired own location information (GPS data) to the base station. The base station can send received GPS data to the PC as serial commands.

A GPS receiver unit compatible with the NMEA-0183 standard is required for the communication port of the mobile station transceiver to send GPS data. The GPS receiver unit is built-in for Portable/ NX-3720G/ NX-3720HG/ NX-3820G/ NX-3820HG/ NX-3920G/ NX-3921G. The optional GPS receiver unit also can be connected with the transceiver.

Note

- To use the built-in GPS receiver unit, **Built-in GPS Receiver/Bluetooth** must be enabled when configuring data by using KPG-D3/ D3N. In this case, the configuration for the communication port is not required.
- To use the optional GPS receiver unit, "GPS" must be assigned to the communication port to which the GPS receiver unit is connected. For Mobile, an optional third-party GPS receiver unit is usable.
- This section describes information for both an NXDN Conventional system and NXDN Trunking system.

Transmission Method of GPS Data

The following are the methods to send GPS data:

- **Automatic GPS data transmission**
 - [Sending GPS Data Automatically at Certain Intervals \(GPS Report Mode\)](#)
 - [Sending GPS Data According to the Request from the Base Station \(GPS Report Mode\)](#)
- **Manual GPS data transmission**
 - [Sending GPS Data Manually by Using a Button \(Send the GPS Data\)](#)
- **GPS data transmission together with voice communications**
 - [Sending GPS Data Together With Voice Communications \(GPS Combination\)](#)
- **GPS data transmission together with Status Message**
 - [Sending GPS Data Together With Status Call \(GPS Combination\)](#)
- **GPS data transmission linked with an Emergency Call**
 - [Sending GPS Data Together With Emergency Call \(GPS Combination\)](#)
- **GPS data transmission during voice communications**
 - [Sending GPS Data during Voice Communications \(Data with Voice\)](#)
- **GPS data transmission linked with travel distance**
 - [Sending GPS Data Based On Travel Distance \(GPS Distance Change\)](#)

ID of the Target Transceiver (ID (GPS > Base Station))

ID (GPS > Base Station) is the ID of the target transceiver used for sending GPS data.

By using KPG-D3/ D3N, either Unit ID or Group ID can be configured as **ID (GPS > Base Station)**. The ID of the base station which is responsible for operation and administration of system is normally configured.

Note

- If **Base ID (GPS)** is not configured, GPS data is sent to the **Base ID** to which data such as a Status Message and Short Message is to be sent. (Refer to [Base ID](#).)

Configuration using KPG-D3/ D3N

- Configuring **ID Type (GPS > Base Station)** and **ID (GPS > Base Station)** in NXDN Conventional
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > Base Station)
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS > Base Station)
- Configuring **ID Type (GPS > Base Station)** and **ID (GPS > Base Station)** in NXDN Trunking ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS > Base Station)

Sending GPS Data Automatically at Certain Intervals (GPS Report Mode)

GPS data can be sent automatically at the intervals configured in **GPS Report Interval Time**.

This function is used for controlling or monitoring vehicles on a time basis by periodically sending location information to the base station.

To use this function, "Auto" must be configured for **GPS Report Mode** by using KPG-D3/ D3N.

Note

- The transceiver sends the GPS data upon receipt of the GPS data transmission request from the base station even if "Auto" is configured for **GPS Report Mode**.
- If the transceiver is under the following conditions, the automatic transmission of GPS data at certain intervals will be canceled. The transceiver does not suspend transmission using **Transmit Busy Wait Time** to avoid collisions with GPS data transmissions by other transceivers. (Refer to [Transmit Busy Wait Time](#).)
 - If the transceiver is transmitting*¹
 - While the transceiver is in busy state
 - While the transceiver unmutes the speaker
 - While the Public Address function is used (Mobile only)
 - When Transmit Frequency or Encode ID is not configured
 - While transmission is disabled by the Time-out Timer
 - While the transceiver is sending or receiving the NXDN data
 - While the transceiver is connected to the repeater
 - Transceiver Password Mode
 - Emergency Mode
 - While in the Failsoft Mode
 - When control channel does not exist
 - While the transceiver is outside the communication area
 - When the transceiver receives an Individual Call Acknowledge Request and Individual Call (Message Trunked (Enhanced)) and waits for a response

However, since Data with Voice is activated while the voice data is sent, the transmission of GPS data will not be canceled.

Configuration using KPG-D3/ D3N

- Configuring **GPS Report Mode** in NXDN Conventional
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS)
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS)
- Configuring **GPS Report Mode** in NXDN Trunking ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS)

Sending GPS Data According to the Request from the Base Station (GPS Report Mode)

The transceiver can send GPS data when a GPS data transmission request is received from the base station.

This function is used when the base station controls the timing to require GPS data. This function is also used to avoid transmit collisions if there are many transceivers.

To use this function, "Poll" must be configured for **GPS Report Mode** by using KPG-D3/ D3N.

Note

- The transceiver sends GPS data to the ID configured for **Base ID (GPS)** or **Base ID**, not to the ID that sent the data transmission request. However, if **Respond to Polling ID** is enabled, GPS data is sent to the ID that sent the data transmission request. (Refer to [Respond to Polling ID](#).)

Configuration using KPG-D3/ D3N

- Configuring **GPS Report Mode** in NXDN Conventional
( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS)
( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS)
- Configuring **GPS Report Mode** in NXDN Trunking ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS)

Sending GPS Data Manually by Using a Button (Send the GPS Data)

GPS data can be sent manually by a user pressing the **Send the GPS Data** button. Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the GPS data can be sent manually by selecting the "Send the GPS Data". (Refer to Common Function Part [Using Menu Mode](#).)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Sending GPS Data Together With Voice Communications (GPS Combination)

The transceiver can send GPS data by adding the GPS data to a signal while making voice calls.

To use this function, **Voice Call** for **GPS Combination** must be enabled by using KPG-D3/ D3N.

Note

- The GPS data added to a signal is sent to the ID configured for **Base ID (GPS)** or **Base ID**.
- For encrypted communications using KWD-AE30/ KWD-AE31/ KWD-DE31, only audio is encrypted.

Configuration using KPG-D3/ D3N

- Configuring **Voice Call** (GPS Combination) in NXDN Conventional
( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > GPS Combination)
( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS > GPS Combination)
- Configuring **Voice Call** (GPS Combination) in NXDN Trunking ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS > GPS Combination)

Sending GPS Data Together With Status Call (GPS Combination)

The transceiver can send GPS data by adding the GPS data to a Status Message using NXDN.

To use this function, Status for **GPS Combination** must be enabled by using KPG-D3/ D3N. The range of status numbers (**Combination Status Range**) to which GPS data can be added can be configured.

Note

- The GPS data added to a Status Message is sent to the ID configured for **Base ID (GPS)** or **Base ID**.
- For encrypted communications using AES/DES, only audio is encrypted.

Configuration using KPG-D3/ D3N

- Configuring **Status** (GPS Combination) in NXDN Conventional
( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > GPS Combination)
( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS > GPS Combination)
- Configuring **Combination Status Range** in NXDN Conventional
( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > GPS Combination)
( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS > GPS Combination)
- Configuring **Status** (GPS Combination) in NXDN Trunking ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS > GPS Combination)
- Configuring **Combination Status Range** in NXDN Trunking ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS > GPS Combination)

Sending GPS Data Together With Emergency Call (GPS Combination)

The transceiver can send GPS data by adding the GPS data to the Emergency Status (Status 224, Status 225, Status 227, Status 228, and Status 229). To use this function, **Emergency (Voice Call)** or **Emergency (Status) for GPS Combination** must be enabled by using KPG-D3/ D3N. **Emergency (Voice Call)** adds GPS data to the Emergency Status when the transceiver starts voice communication in Emergency Mode.

When the transceiver sends the Emergency Status only, **Emergency (Status)** adds GPS data before transmission. For **Emergency (Status)**, the statuses of Emergency Status and GPS data vary in each system.

● If Emergency Status On Control Channel is enabled in an NXDN Trunking system

The transceiver sends an Emergency Status on the control channel during automatic transmission. Then, the transceiver sends GPS data on the control channel.

● If “0” is configured in Transmit Duration in an NXDN Conventional system

The transceiver sends only an Emergency Status during automatic transmission. The transceiver sends GPS data after transmission of the Emergency Status.



Note

- The GPS data added to the Emergency Status is sent to the ID configured for **Base ID (GPS)** or **Base ID**. When an ID is configured in both **Base ID (GPS)** and **Base ID**, **Base ID (GPS)** has priority.
- For encrypted communications using AES/DES, only audio is encrypted.

Configuration using KPG-D3/ D3N

- Configuring **GPS Combination (Emergency (Voice Call))** in NXDN Conventional to be enabled or disabled (See Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > GPS Combination)
- Configuring **GPS Combination (Emergency (Status))** in NXDN Conventional to be enabled or disabled (See Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > GPS Combination)
- Configuring **GPS Combination (Emergency (Voice Call))** in NXDN Conventional to be enabled or disabled (See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS > GPS Combination)
- Configuring **GPS Combination (Emergency (Status))** in NXDN Conventional to be enabled or disabled (See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS > GPS Combination)
- Configuring **GPS Combination (Emergency (Voice Call))** in NXDN Trunking to be enabled or disabled (See Radio Configuration > System Properties > Systems > NXDN Trunking > GPS > GPS Combination)
- Configuring **GPS Combination (Emergency (Status))** in NXDN Trunking to be enabled or disabled (See Radio Configuration > System Properties > Systems > NXDN Trunking > GPS > GPS Combination)

Sending GPS Data during Voice Communications (Data with Voice)

The transceiver can multiplex GPS data on audio data and send the data during voice communications.

If the timing of automatic GPS data transmission configured for **GPS Report Internal Time** comes while the transceiver is sending audio data, the transceiver multiplexes GPS data on the audio data and sends the data.

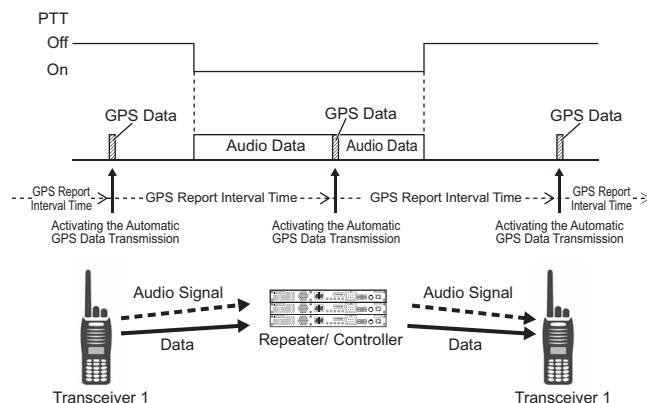


Figure 2-10 Data with Voice

Note

- If the transceiver is being used for voice communications and receives GPS data, LCD display, LED, and Alert Tone will function according to the configurations for voice calls.
- On a channel where "Very Narrow" is configured for **Channel Spacing**, note that the sound quality may be degraded if the amount of time configured for the **GPS Report Interval Time** is short.
- If the timing of GPS data transmission comes during audio data transmission by using the GPS receiver unit connected to the COM port for the Portable 2 Pin Connector model, the statuses will be as follows:
 - If the timing of automatic GPS data transmission configured for **GPS Report Internal Time** coincides, only the first GPS data is sent.
 - The second GPS data and later is not sent.

Sending GPS Data Based On Travel Distance (GPS Distance Change)

GPS data can be sent when the distance between the location of the previous GPS data transmission and the current location exceeds the value configured in **Distance**.

The transceiver calculates the distance between the position where the GPS data was sent and the current position at regular time intervals (3 sec) after the transceiver sent GPS data using the **GPS Combination** function (Voice Call, Status, or Emergency), **Send the GPS Data**, or **Send the Location Data**. The GPS data is sent if the calculated distance exceeds the value configured for **Distance**. If no GPS data is sent after the transceiver is turned ON, the transceiver regards the location information first received from the GPS unit as the previous transmission position and calculates the distance to the current position. The distance is calculated from the latitudinal and longitudinal values.

Note

- In a system that supports Indoor Location, **GPS Distance Change** does not function if one of the following conditions is satisfied:
 - When a beacon signal (whether RF System or Bluetooth System is configured in **Send Location via** does not matter) is received
 - During GPS Delay Time

Configuration using KPG-D3/ D3N

- Configuring **GPS Distance Change** in NXDN Conventional to be enabled or disabled
 ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > GPS)
- Configuring **Distance** in NXDN Conventional
 ( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS)
- Configuring **Distance** in NXDN Trunking ( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS)
- Configuring **GPS Distance Change** in NXDN Trunking to be enabled or disabled ( **See** Radio Configuration > System Properties > Systems > NXDN Trunking > GPS)
- Configuring **Distance** in NXDN Trunking ( **See** Radio Configuration > System Properties > Systems > NXDN Trunking > GPS)

Selecting the Transmission Method of GPS Data (GPS Report Channel)

GPS Report Channel is the function to lock analog mode or NXDN mode for the transmission method of GPS data regardless of the mode used for voice communications when the transceiver automatically sends GPS data by using the **GPS Report on Data System-personality** function.

GPS Report Channel is enabled when GPS data is automatically sent by receiving a Polling request, when GPS data is automatically and periodically sent at the time configured in FPU, and when GPS data linked with the travel distance of the transceiver is automatically sent (**GPS Distance Change**).

The transceiver behaves as follows according to the configuration in **GPS Report Channel**.

Table 2-31 GPS Report Channel

Configuration	Description
Selected	If "Analog" is configured in Transmit Mode of the selected channel, GPS data is automatically sent by Data System-personality (Analog). If "NXDN" is configured in Transmit Mode of the selected channel, GPS data is automatically sent by Data System-personality (NXDN).
Analog	GPS data is automatically sent by Data System-personality (Analog) regardless of the configuration in Transmit Mode of the selected channel.
NXDN	GPS data is automatically sent by Data System-personality (NXDN) regardless of the configuration in Transmit Mode of the selected channel.

Note

- This function is not applicable to GPS data sent by using the **Send the GPS Data** button or **GPS Combination** function.
- If anything other than “Selected” is configured in **GPS Report Channel**, **Respond to Polling ID** becomes disabled.
- If anything other than “Selected” is configured in **GPS Report Channel**, the GTC is not sent when GPS data is sent by using **GPS Report Channel** even if **GTC Count** is configured.
- In an LTR Trunking system, analog mode or NXDN mode cannot be locked for the transmission method of GPS data. In an LTR Trunking system, the transceiver always behaves by the configuration of “Selected”.
- Even if “Analog” or “NXDN” is configured in **GPS Report Channel**, the transceiver behaves by the configuration of “Selected” for the first transmission when the transceiver receives a Polling request and sends GPS data. If the transceiver is to subsequently continue GPS data transmission, **GPS Report Channel** is enabled for automatic transmission, and the transceiver behaves by the configuration of “Analog” or “NXDN”.

Configuration using KPG-D3/ D3N

Configuring **GPS Report Channel** ( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > Common > Data System-personality)

2.17 GPS Functions

The following functions are relevant to GPS data transmission.

- Number of Times
- GPS Report Interval Time
- GPS Time Mark
- GPS Message Type
- GPS Report on Data System-personality
- GPS Data Storage
- Respond to Polling ID
- GPS ACK Request

Number of Times

Number of Times allows the transceiver to automatically send GPS data for the configured number of times if “Poll” is configured for **GPS Report Mode**.

The transceiver sends GPS data for the number of times configured for **Number of Times** at the intervals configured for **GPS Report Interval Time**.

Configuration using KPG-D3/ D3N

- Configuring **Number of Times** in NXDN Conventional
( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > Poll)
( **See**) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS > Poll)
- Configuring **Number of Times** in NXDN Trunking ( **See**) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS > Poll)

GPS Report Interval Time

GPS Report Interval Time allows the transceiver to send GPS data at the configured intervals if “Auto” is configured for **GPS Report Mode**.

GPS Report Interval Time

GPS Report Interval Time is the interval to automatically send GPS data for Portable.

GPS Report Interval Time (Ignition On/ Ignition Off) (Mobile only)

GPS Report Interval Time (Ignition On) is the interval to send the GPS data while the vehicle's engine is running.

GPS Report Interval Time (Ignition Off) is the interval to send the GPS data while the vehicle's engine is stopped. Also, if the Ignition Sense function is not used (nothing is entered in the Ignition Sense port), GPS data is sent according to the configuration in **GPS Report Interval Time (Ignition Off)**. (Refer to Common Function Part [Turning the Transceiver ON or OFF According to the State of the Ignition Sense Port \(Ignition Sense\)](#).)

Note

- **GPS Report Interval Time** is used to configure the trigger cycle to start sending GPS data. The timing at which the receiving transceiver completes receiving GPS data may vary depending on the transmit conditions at the transmitting transceiver.
- The GPS data is multiplexed into audio data and sends both data without pausing voice communications, even if the transceiver automatically sends GPS data during the voice communications. However, if the amount of time configured using **GPS Report Interval Time** (Portable/Ignition On or Ignition Off) is short (less than 10 sec), note that sound quality may be degraded.

Configuration using KPG-D3/ D3N

- Configuring **GPS Report Interval Time** in NXDN Conventional
( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > Auto)
- ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS > Auto)
- Configuring **GPS Report Interval Time** in NXDN Trunking ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS > Auto)

GPS Time Mark

GPS Time Mark is the offset time from UTC (Coordinated Universal Time) to send GPS data.

This function is useful for avoiding a data collision if there are many transceivers that send GPS data.

Configuring a different timing for each transceiver allows each transceiver to send GPS data with different timing. Using this function can avoid a data collision.

Configuration using KPG-D3/ D3N

- Configuring **GPS Time Mark** in NXDN Conventional
( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > Auto)
- ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS > Auto)
- Configuring **GPS Time Mark** in NXDN Trunking ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS > Auto)

GPS Message Type

GPS Message Type allows the transceiver to change the length of the message to send GPS data.

Table 2-32 GPS Message Type

Configuration	Operation
Full	The message to be sent is the GPS data corresponding to \$GPGGA, \$GPRMC and \$GPGLL.
Short	The message to be sent is the GPS data corresponding to \$GPGLL. When the base station receives this GPS data, a part of the data is sent as blank data even if \$GPGGA and \$GPRMC are configured for PC serial output at Base Station Setting .

Configuration using KPG-D3/ D3N

- Configuring **GPS Message Type** in NXDN Conventional
( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > GPS)
( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS)
- Configuring **GPS Message Type** in NXDN Trunking ( **See** Radio Configuration > System Properties > Systems > NXDN Trunking > GPS)

GPS Report on Data System-personality

GPS Report on Data System-personality is the function that allows the transceiver to automatically change the channel to the **Data System-personality** to send GPS data in an NXDN Conventional system.

The transceiver automatically changes the channel to the Data System-personality to send GPS data. When the transmission ends, the transceiver restores the Zone-channel which was used before sending GPS data. **GPS Report on Data System-personality** can be used to send data by using a specific dedicated channel.

Note

- This function can be only used in an NXDN Conventional system.

Configuration using KPG-D3/ D3N

Configuring **GPS Report on Data System-personality** to be enabled or disabled ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > Data System-personality)

GPS Data Storage

GPS Data Storage is the function that allows GPS data to be stored in the internal memory.

The transceiver stores the GPS data at the intervals configured for **Interval**. The stored GPS data can be sent from the transceiver or can be read using a PC. (Refer to Common Function Part [Storing the GPS Data \(GPS Data Storage\)](#).)

Acquired GPS data is temporarily saved in the RAM in the transceiver. When the number of stored data items reaches 3, the GPS data is written on the internal memory. If the transceiver is turned OFF when the number of GPS data items temporarily saved in the RAM in the transceiver is 1 or 2, the GPS data is erased without being written on the internal memory.

The internal memory allows a maximum of 7,000 GPS data items to be written.

Configuration using KPG-D3/ D3N

- Configuring **GPS Data Storage** ( [See](#) Radio Configuration > Global Options > Basics > GPS/Bluetooth > GPS Data)
- Configuring **Interval** ( [See](#) Radio Configuration > Global Options > Basics > GPS/Bluetooth > GPS Data)

Respond to Polling ID

Respond to Polling ID is the function that enables the receiving transceiver to send the GPS data to the ID of the transceiver, which sends a GPS Polling Request, upon receipt of the following GPS Polling Requests:

- GPS Data Single Polling Request
- GPS Data Multiple Polling Request
- GPS Data Query Request

When the above-mentioned GPS Polling Request is received, the GPS data is sent to the ID of the transceiver which sends the GPS Polling Request, if this function is enabled.

If this function is disabled, the GPS data is sent to the ID configured in **Base ID** (GPS) or Base ID even when the above-mentioned GPS Polling Request is received.

Configuration using KPG-D3/ D3N

- Configuring **Respond to Polling ID** in NXDN Conventional to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS)
- Configuring **Respond to Polling ID** in NXDN Trunking to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS)

GPS ACK Request

GPS ACK Request is a function to place a request to send the acknowledgment with a mobile station transceiver when GPS data in the NXDN format is sent from the base station transceiver to the mobile station transceiver.

Table 2-33 GPS ACK Request

Configuration	Description
Enabled	The base station transceiver requests the mobile station transceiver to send the acknowledgment message when a request message to send GPS data in the NXDN format is sent by the base station transceiver. The mobile station transceiver sends an acknowledgment message and then GPS data upon receipt of a request message to send GPS data in the NXDN format.
Disabled	The base station transceiver does not request the mobile station transceiver to send an acknowledgment message when a request message to send GPS data in the NXDN format is placed by the base station transceiver. Upon receipt of a message which requests transmission of GPS data in the NXDN format, the mobile station transceiver sends GPS data without sending an acknowledgment message. Disable the sending and receiving of receipt an acknowledgment message to shorten transmission times and reduce transmission traffic.

Configuration using KPG-D3/ D3N

- Configuring **GPS ACK Request** in NXDN Conventional to be enabled or disabled
( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS)
- ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS)
- Configuring **GPS ACK Request** in NXDN Trunking to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS)

2.18 Receiving GPS Data

The base station receiving GPS data from the transceiver of a mobile station can send the GPS data to a PC as serial commands. If a PC installed with a mapping application is connected to the communication port of the base station transceiver, the location information of mobile station transceivers appears on a map on the PC display. This function is convenient for a dispatch control or traffic control system.

Also, if a mobile station transceiver connecting to a GPS receiver unit or having a built-in GPS receiver unit receives location information (GPS data) from a GPS satellite, the current location information of the own transceiver can be displayed on the LCD.

Note

- The GPS data acquired from the GPS satellite can be stored at certain intervals in the internal memory of the transceiver. (Refer to Common Function Part [Storing the GPS Data \(GPS Data Storage\)](#).)
- For a transceiver receiving GPS data, “Data + GPS Data Output” or “Data + Location Data Output” needs to be assigned to the communication port to which a PC with the mapping application installed is connected. (Refer to Common Function Part [Available Functions for COM Port](#).)
- This section describes information for both an NXDN Conventional system and NXDN Trunking system.

Map Header

Whether to send data to the mapping application when the base station transceiver receives the GPS data from the mobile station transceiver can be configured.

The following are the type of data that can be sent to the mapping application.

Table 2-34 Map Header

Data	Description
\$GPGGA (NMEA)	Upon receipt of the GPS data, the transceiver at the base station extracts the \$GPGGA data in the NMEA-183 format from the received GPS data and sends the extracted data from the communication port.
\$GPGLL (NMEA)	Upon receipt of the GPS data, the transceiver at the base station extracts the \$GPGLL data in the NMEA-183 format from the received GPS data and sends the extracted data from the communication port.
\$GPRMC (NMEA)	Upon receipt of the GPS data, the transceiver at the base station extracts the \$GPRMC data in the NMEA-183 format from the received GPS data and sends the extracted data from the communication port.
\$PKNDS (KW)	Upon receipt of the GPS data, the transceiver at the base station creates the \$PKNDS data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The \$PKNDS data contains the \$GPRMC data in the NMEA-0183 format, Unit ID, and the status information.
\$PKNID (KW)	Upon receipt of the GPS data, the transceiver at the base station creates the \$PKNID data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The transceiver at the base station extracts only Unit ID and the status information from the received GPS data and sends the extracted data from the communication port of the repeater. This sentence is recommended to be used along with \$GPGGA (NMEA), \$GPGLL (NMEA) or \$GPRMC (NMEA). For example, if \$GPGGA (NMEA) and \$PKNID are used simultaneously, the transceiver at the base station sends from the communication port of the repeater the \$GPGGA data in addition to the Unit ID and the status information extracted from the GPS data.
\$PKNSH (KW)	Upon receipt of the GPS data, the transceiver at the base station creates the \$PKNSH data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The \$PKNSH data contains the \$GPGLL data in the NMEA-0183 format and the Unit ID. In order to send GPS data in Emergency Mode or by pressing the PTT switch, this sentence is used.

Configuration using KPG-D3/ D3N

Configuring **Map Header** ( See Radio Configuration > Global Options > External Device > General > Serial Interface > GPS Base Station Settings)

GPS Position Display

GPS Position Display is the function to display the current location information of the own transceiver on the LCD.

Refer to Common Function Part “[USING THE GPS POSITION DISPLAY FUNCTION](#)” for the details of **GPS Position Display**.

2.19 Remote Operation by Radio Communication (Remote Control)

Remote Control is the function to remotely operate using radio communication the control of an individually specified transceiver.

An individually specified transceiver can be controlled by sending various Remote Control messages and by making the transceiver receive the messages.

Remote Control has the following functions:

Table 2-35 Remote Control Functions

Function	Description
Remote Stun	This is the function to disable the use of an individually specified transceiver (Stun state) by making the transceiver receive a Remote Stun message. If the transceiver receives the Remote Revive message, the Stun state will be reset. (Refer to Disabling the Transceiver Capability by Remote Control (Stun/ Kill).)
Remote Kill	This is the function to inhibit the use of an individually specified transceiver and disable all operations by making the transceiver receive a Remote Kill message. (Refer to Disabling the Transceiver Capability by Remote Control (Stun/ Kill).)
Remote Monitor	This is the function to make an individually specified transceiver transmit continuously by making the transceiver receive a Remote Monitor message. (Refer to Monitoring the Situation Around Another Transceiver by Remote Control (Remote Monitor).)
Radio Check	This is the function to check whether or not an individually specified transceiver is being operated by making the transceiver receive a Radio Check message. (Refer to Checking Whether Another Transceiver Is in Operation (Radio Check).)

An individually specified transceiver can be controlled by sending various Remote Control messages in Remote Control Mode and by making the transceiver receive the messages.

Pressing the **Remote Control** button places the transceiver in Remote Control Mode. Or, pressing the **Menu** button to enter Menu Mode and then selecting “Remote Control” places the transceiver in Remote Control Mode. (Refer to Common Function Part [Using Menu Mode.](#))

Also, various Remote Control messages can be sent by sending a transmission command of the various Remote Control messages from a PC to the transceiver. In this case, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to a communication port 0 to 2 or the Bluetooth of the transceiver.

Note

- This section describes information for both an NXDN Conventional system and NXDN Trunking system.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Sending a Remote Control Message in Remote Control Mode

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Various Remote Control messages can be sent in Remote Control Mode.

Operating the transceiver

● Sending a Remote Control Message by list selection

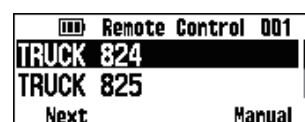
1 Press the **Remote Control** button.

The transceiver enters Remote Control Mode and then the Unit ID selection display will appear.

The following operations are identical even if the transceiver enters Remote Control Mode by pressing the **Menu** button.

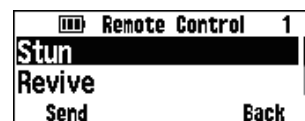
2 Press the **[▲]** or **[▼]** button to select a Unit ID from the Individual ID List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **Menu** (**[□]**) or **[*]** button.

The selection display of the options menu appears.



4 Press the **[▲]** or **[▼]** button to select the Remote Control message to send.

Stun: A Remote Stun message is sent.

Revive: A Remote Revive message is sent.

Kill: A Remote Kill message is sent.

Monitor: A Remote Monitor message is sent.

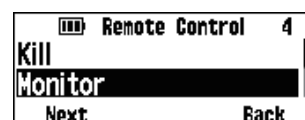
Radio Check: A Status Inquiry Message is sent.

- If anything other than “Monitor” is selected:

Proceed to step 5.

- If “Monitor” is selected:

Proceed to step 6.



5 Press the **PTT** switch, or the **Menu** (**[□]**) or **[*]** button.

The selected Remote Control message is sent.



6 Press the **Menu** ([) button or [*****] button.

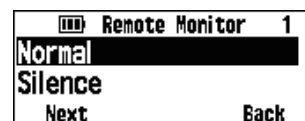
The transmission mode selection screen for the Remote Monitor appears. Select “Normal” or “Silence”.

- **Normal**

If the transceiver which received the Remote Monitor message enters the status of continuous transmission, “Remote TX” appears on the display and the Transmit LED lights.

- **Silence**

Even if the transceiver which received the Remote Monitor message enters the status of continuous transmission, the display does not change and the Transmit LED does not light.



7 Press the **Menu** ([) button or [*****] button.

The screen to configure the transmission time for the Remote Monitor appears.



- If the transmission time for the Remote Monitor previously used is stored in the transceiver, the time appears.



8 Enter the transmission time for the Remote Monitor.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

- **Using the keypad**

The transmission time can be entered by pressing the [0] to [9] buttons.

- **Using the PF buttons**

Press the [] or [] button to select the number and press the **Menu** ([) or [*****] button to confirm the selected number.



9 Press the **PTT** switch, or the **Menu** ([) or [*****] button.

A remote Monitor message is sent.



● Sending a Remote Control message by using Manual Dialing

To send a Remote Control message by directly entering a Unit ID, Manual Dialing needs to be enabled.

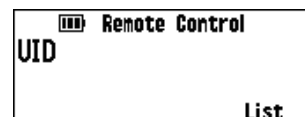
1 Press the **Remote Control** button.

The transceiver enters Remote Control Mode and then the Unit ID selection display will appear.

The following operations are identical even if the transceiver enters Remote Control Mode by pressing the **Menu** button.

2 Press the **Back** ([↩]) button.

The Unit ID entry display appears.



3 Enter a Unit ID.

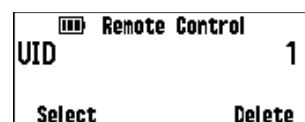
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

● Using the keypad

A Unit ID can be entered by pressing the [0] to [9] buttons.

● Using the PF buttons

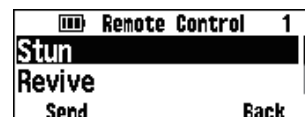
Press the [▲] or [▼] button to select the number and press the **Menu** ([□]) or [*] button to confirm the selected number.



4 Press the **Menu** ([□]) or [*] button.

The selection display of the options menu appears.

For the subsequent operations, refer to step 4 onwards in “[Sending a Remote Control Message by list selection](#)”.



Note

- If the Remote Control Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode by pressing the **Remote Control** button. A selection screen for the Individual ID List will appear by pressing the **Back** ([↩]) button.
- If no ID is registered in the Individual ID List, the transceiver enters Manual Dialing mode by pressing the **Remote Control** button if **Manual Dialing** is enabled. In this case, the transceiver cannot enter Remote Control Mode if **Manual Dialing** is disabled.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Manual Dialing** to be enabled or disabled
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > TX Options)
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > TX Options)
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)

Disabling the Transceiver Capability by Remote Control (Stun/ Kill)

The transceiver capability can be disabled by wireless remote control. This function allows a system administrator to remotely disable the transceiver, for instance, if the transceiver is lost.

The transceiver which has been disabled by this function can be enabled to be usable again by remote control from an external device using radio communication.

An individually specified transceiver can be controlled by sending a Remote Stun message, Remote Revive message, or Remote Kill message in Remote Control Mode and by making the transceiver receive the message.

(Refer to [Sending a Remote Control Message in Remote Control Mode.](#))

The following is the transceiver behavior when the transceiver receives a Remote Control message:

Table 2-36 Remote Control

Remote Control Message	Description
Remote Stun	The transceiver is disabled if the transceiver receives the Remote Stun message. Whether to accept a Remote Stun message when the transceiver receives the Remote Stun message can be configured using KPG-D3/ D3N.
Remote Revive	If the transceiver is in the Stun state when receiving a Remote Revive message, the Stun state is reset.
Remote Kill	If the transceiver receives the Remote Kill message, use of the transceiver is prohibited and all operations are disabled. All configuration data of the transceiver is cleared, hence the Kill state is not reset even if the transceiver receives the Remote Revive message. However, the configuration data can be written to the transceiver by using KPG-D3/ D3N. Also, whether to accept a Remote Kill message when the transceiver receives the Remote Kill message can be configured using KPG-D3/ D3N.

Note

- This function is applicable only when an individual call is initiated.
- To receive a Remote Stun message, Remote Revive message, and, Remote Kill message in an NXDN Conventional system, the received RAN code needs to match the RAN code preconfigured in the transceiver.
- The Stun state is identical to Stun for DTMF and FleetSync.
- The Stun state is reset by Remote Revive even if the transceiver entered the Stun state by receiving DTMF or FleetSync signaling.
- The Stun state is also reset by receiving the DTMF code (Stun Code + #) or FleetSync status (Status 92).
- Remote Control messages can be sent by sending a PC command from a PC to the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Remote Stun/Kill** to be enabled or disabled

( See Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > RX Options)

( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > RX Options)

( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > RX Options)

Monitoring the Situation Around Another Transceiver by Remote Control (Remote Monitor)

Remote Monitor is the function to remotely operate using radio communication an individually specified transceiver to transmit continuously.

Use of this function allows the base station to monitor the situation around the transceiver.

An individually specified transceiver can be controlled by sending a Remote Monitor message in Remote Control Mode and by making the transceiver receive the message. (Refer to [Sending a Remote Control Message in Remote Control Mode.](#))

The transceiver which has received the Remote Monitor message sends an acknowledgment to the transmitting transceiver, and then unmutes the speaker and initiates a continuous transmission using Individual Call. The duration for continuous transmission can be configured in Remote Control Mode.

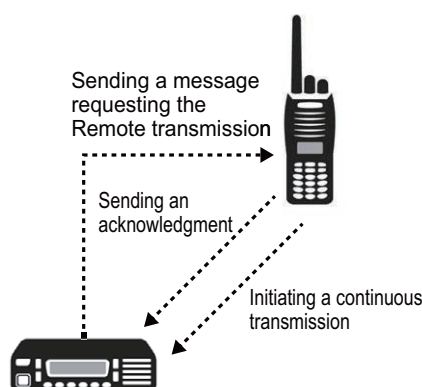


Figure 2-11 Remote Monitor

Remote Monitor has a Normal Mode and a Silence Mode: the former is a mode notifying a user of the transceiver's status of continuous transmission by an indication on the LCD and by lighting the Transmit LED, and the latter is a mode not notifying a user of the transceiver's status of continuous transmission. Which mode to use can be configured using Remote Control Mode or a PC command.

Note

- The transceiver initiates a continuous transmission only if the Remote Monitor message is received by an Individual Call. The transceiver does not initiate a continuous transmission even if the Remote Monitor message is received by using anything other than Individual Call.
- While the transceiver is in the status of continuous transmission due to **Remote Monitor**, **Time-out Timer** and **Busy Channel Lockout** are disabled. However, the **Time-out Timer** behaves depending on the system configuration in an NXDN Trunking system.
- To receive a Remote Monitor message in an NXDN Conventional system, the received RAN code needs to match the RAN code preconfigured in the transceiver.
- Remote Control messages can be sent by sending a PC command from a PC to the transceiver.

Checking Whether Another Transceiver is in Operation (Radio Check)

Radio Check can be used to check by using radio communication whether an individually specified transceiver is operated in the system.

If a PC sends the Radio Check transmission command to the transceiver, the transceiver will send a Status Inquiry Message by using Individual Call.

An individually specified transceiver can be controlled by sending a Radio Check message by using Individual Call in Remote Control Mode to make the transceiver receive the message. (Refer to [Sending a Remote Control Message in Remote Control Mode.](#))

Checking Whether Another Transceiver Is in Operation by Using a PC command (Radio Check)

To use the **Radio Check** function, "Data", "Data + GPS Data Output", or "Data + Location Data Output" needs to be assigned to a communication port 0 to 2 or the Bluetooth of the transceiver. (Refer to Common Function Part [Available Functions for COM Port.](#))

- The transceiver will send the Status Inquiry Message using Individual Call if a PC sends the Radio Check transmission command (Status Request Transmission command) to the transceiver.
- The transceiver that receives the Status Inquiry Message sends a Status Message. (Refer to [Sending a Status Message.](#))

The transceiver sends the status configured for **Default Status** if no status is selected yet when the transceiver is turned ON, for instance.

If status is selected in Status Mode, the transceiver sends the selected status.

The transceiver will send the status retained in the transceiver if the transceiver migrates to normal mode after selecting the status.

The transceiver sends the status configured for **Stun Response Status** while Stun is enabled (Transmit Inhibit or Transceiver Inhibit). If **Stun Response Status** is not configured, the transceiver transmits the status in the same manner as when the transceiver is in the normal state.

- If the transceiver which sent the Status Inquiry Message receives the sent status, the transceiver will receive the status in the same manner as receiving regular status messages. (Refer to [Receiving a Status Message.](#))

However, Horn Alert and AUX Output Status Message 1 to AUX Output Status Message 3 do not function even if the status sent from the transceiver is the same status as Horn Alert Status and AUX Output Status Message 1 to AUX Output Status Message 3.

Note

- In an NXDN Conventional system, the transceiver can receive a Status Inquiry Message if the received RAN code matches the RAN code preconfigured for the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Stun Response Status** ( [See](#) Radio Configuration > Protocol Options > NXDN > Status)

2.20 Migrating Automatically to the Site Providing Better Radio Environment (Site Roaming)

Site Roaming is the function to migrate automatically to the site (channel) providing better radio environment if the transceiver is operated in an NXDN Conventional system.

The transceiver receives a synchronization signal transmitted from the repeaters in multiple sites at regular time intervals, and detects the RSSI level. Therefore, the transceiver migrates automatically to the channel providing better radio environment.

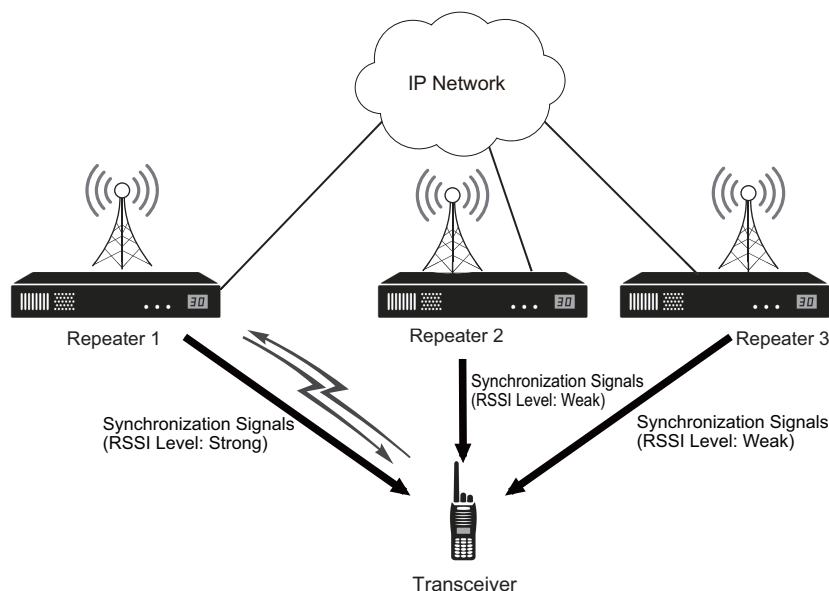


Figure 2-12 Image of Communications of Site Roaming

This function can be used by configuring NXDN Site Roaming or NXDN Site Roaming with RAN channels for each system by using KPG-D3/ D3N.

Site Roaming Behaviors

If a Zone-channel or System-Personality in a system with “NXDN Site Roaming” or “NXDN Site Roaming with RAN” configured is selected, Site Roaming is automatically initiated. The “” icon appears and then “Site Roaming” is displayed. If **Revert Channel Display** is enabled, Revert Channel is displayed. Also, for Portable, the LED flashes according to the configuration of **Site Roaming LED**.



If a channel to which a Personality is assigned in a system with “NXDN Site Roaming” or “NXDN Site Roaming with RAN” configured is selected, Site Roaming is initiated for the Personality in the same system. At this time, the Personality name appears.

When the transceiver transmits, the RAN code configured for the Personality to be the Revert Channel is multiplexed on a signal.

The Personality the transceiver received last time is retained even if the transceiver is turned OFF. When the transceiver is turned ON and transmits next time, the Personality is used as the Revert Channel. If no Revert Channel exists, the Personality configured for the selected channel is used as the Revert Channel. While the transceiver is receiving, or if the transceiver transmits while the **Dropout Delay Time** or **Dwell Time** is counting down, the transceiver transmits using the Revert Channel.

When the transceiver receives a synchronization signal from the repeater, the transceiver basically behaves as follows.

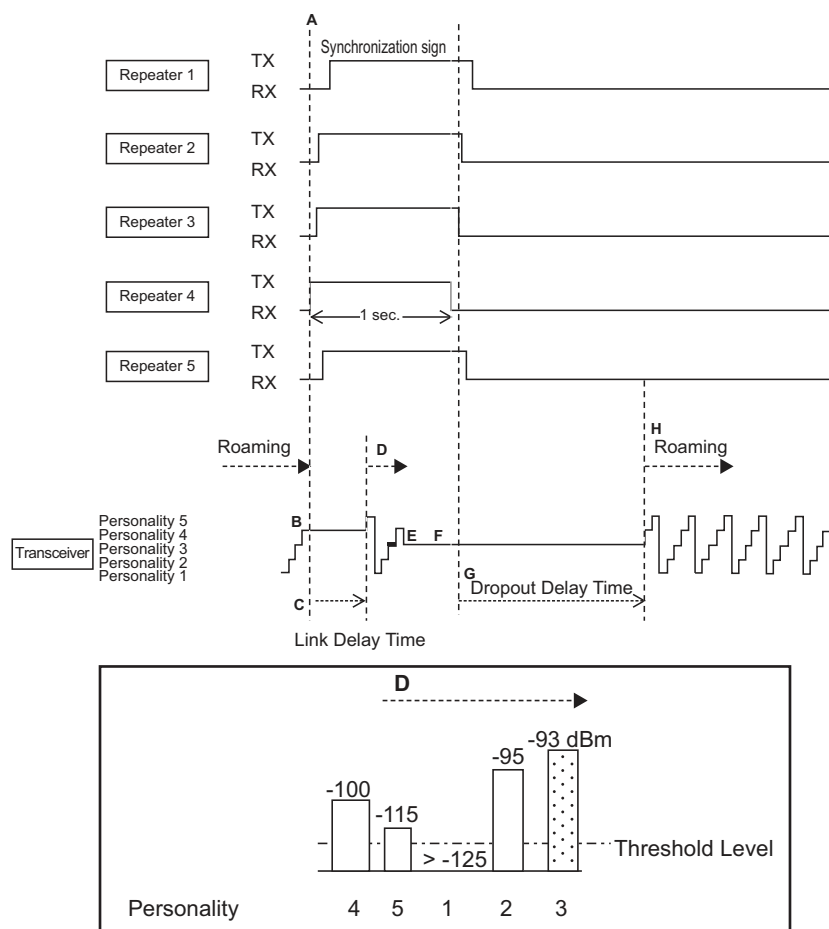


Figure 2-13 Basic Behaviors of Site Roaming

- A:** The repeater in an NXDN Conventional system transmits a synchronization signal at regular time intervals. Or, the repeater in an NXDN Conventional system transmits a call signal according to a transmission request from another transceiver.
- B:** For example, the transceiver in a system with “NXDN Site Roaming” or “NXDN Site Roaming with RAN” configured detects an adequate RSSI level on Personality 4.
- C:** The transceiver activates **Link Delay Time**.
- D:** Upon elapse of the length of time configured in **Link Delay Time**, the transceiver checks all Personalities in the same system and searches for the Personality having the strongest RSSI level.
- E:** After checking all the Personalities, the transceiver migrates to the Personality having the strongest RSSI level (for example, Personality 3) and checks whether the received RAN code matches the RAN code preconfigured for the Personality.
- **If “NXDN Site Roaming” is configured in Protocol:**
 - If the RAN code matches, the transceiver unmutes the speaker and changes the Revert Channel to Personality 3.
 - If the RAN code does not match, the transceiver changes the Revert Channel to Personality 3 without unmuting the speaker. Then, the transceiver migrates to the Personality having the second strongest RSSI level (for example, Personality 2) and checks whether the RAN code matches. If the RAN code matches in this step, the transceiver unmutes the speaker and changes the Revert Channel to Personality 2.
 - If the RAN code does not match in the Personality having the second strongest RSSI level or lower, the Revert Channel is not updated.
 - **If “NXDN Site Roaming with RAN” is configured in Protocol:**
 - If the RAN code matches, the transceiver unmutes the speaker and changes the Revert Channel to Personality 3.
 - If the RAN code does not match, the transceiver migrates to the Personality having the second strongest RSSI level (for example, Personality 2) and checks whether the RAN code matches. If the RAN code matches in this step, the transceiver unmutes the speaker and changes the Revert Channel to Personality 2.
- F:** While the RAN code matches, the transceiver remains on the Personality and does not resume Site Roaming.
- G:** If the received signals disappear or the RAN code does not match, **Dropout Delay Time** is activated.
- H:** After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Site Roaming.

 Note

- 2 or more and a maximum of 512 Personalities can be configured for a system with “NXDN Site Roaming” or “NXDN Site Roaming with RAN” configured.
- The following functions cannot be configured for a Personality with “NXDN Site Roaming” or “NXDN Site Roaming with RAN” configured:
 - Scan Add
 - Scan List Number
- A Personality with “NXDN Site Roaming” or “NXDN Site Roaming with RAN” configured cannot be configured for the following functions:
 - Home Channel
 - Scan List Members
 - Data System-personality (Analog)
 - Data System-personality (NXDN)
 - Emergency Zone-Channel
- The transceiver does not respond at all even if the following buttons are operated on a Personality with “NXDN Site Roaming” or “NXDN Site Roaming with RAN” configured:
 - **Home Channel** button
 - **Home Channel Select** button
 - **Scan** button

Link Delay Time

The length of time until the repeater in each site is activated may vary depending on the site. **Link Delay Time** is the function to configure the length of time to tolerate a variation in time of when each repeater is activated by delaying the time to start searching for a signal on other channels.

If the transceiver detects a signal on a Personality after Site Roaming is initiated, **Link Delay Time** is activated. Upon the elapse of the length of time configured in **Link Delay Time** after detecting a signal, the transceiver checks all Personalities in the same system or the other channels in the same zone to search for a signal. The transceiver checks all Personalities, migrates to the Personality having the strongest RSSI level, and checks whether the RAN code matches. If the RAN code does not match or if a RAN code is not configured for the Personality, the transceiver migrates to the Personality having the second strongest RSSI level and checks whether the RAN code matches.

Configuration using KPG-D3/ D3N

Configuring **Link Delay Time** ( **See** Radio Configuration > Global Options > Scan > NXDN Conventional > Site Roaming > Timer)

Dropout Delay Time

If the transceiver receives a synchronization signal or call from the repeater during Site Roaming, Site Roaming pauses. **Dropout Delay Time** is the length of time from when the transceiver finishes receiving signals until the transceiver resumes Site Roaming.

If the received signals disappear or the RAN code does not match, **Dropout Delay Time** is activated. After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Site Roaming.

Configuration using KPG-D3/ D3N

Configuring **Dropout Delay Time** ( **See** Radio Configuration > Global Options > Scan > NXDN Conventional > Site Roaming > Timer)

Dwell Time

When the transceiver starts transmitting by pressing the **PTT** switch during Site Roaming, Site Roaming pauses. **Dwell Time** is the length of time from when the transceiver terminates transmission until the transceiver resumes Site Roaming. After the transceiver terminates the transmission, **Dwell Time** is activated. After the length of time configured in **Dwell Time** elapses, the transceiver resumes Site Roaming.

Configuration using KPG-D3/ D3N

Configuring **Dwell Time** ( See Radio Configuration > Global Options > Scan > NXDN Conventional > Site Roaming > Timer)

Quick Site Roaming

Quick Site Roaming is the function to allow Site Roaming to behave faster when the transceiver is in an area with a strong signal.

If the transceiver receives a signal with a level higher than the value configured in **Quick Site Roaming** during Site Roaming, the channel becomes the Revert Channel. In this case, **Link Delay Time** becomes disabled, and if the RAN code matches, the transceiver unmutes the speaker.

If the transceiver receives a signal with a level equal to or higher than the value configured in **Quick Site Roaming** while **Link Delay Time** is counting down or while a Personality is being checked, the behavior is also the same.

However, if "Off" is configured in **Quick Site Roaming** and **Standard Site Roaming**, the transceiver initiates Site Roaming using the threshold value preconfigured in the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Quick Site Roaming** ( See Radio Configuration > Global Options > Scan > NXDN Conventional > Site Roaming > Roaming Level)

Standard Site Roaming

Standard Site Roaming is the function to allow Site Roaming to behave faster when the transceiver is in an area with a strong signal.

The transceiver searches for a signal with a level higher than the value configured in **Standard Site Roaming** during Site Roaming.

Since a Personality or channel having a signal with a level lower than the value configured in **Standard Site Roaming** is excluded from Site Roaming, the transceiver does not search the Personality or channel. If the transceiver receives a signal with a level higher than the value configured in **Standard Site Roaming** during Site Roaming, Site Roaming pauses and then **Link Delay Time** is activated. Then, if the RAN code matches, the transceiver unmutes the speaker.

However, if "Off" is configured in **Quick Site Roaming** and **Standard Site Roaming**, the transceiver initiates Site Roaming using the threshold value preconfigured in the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Standard Site Roaming** ( See Radio Configuration > Global Options > Scan > NXDN Conventional > Site Roaming > Roaming Level)

Site Roaming Resume

Site Roaming Resume is the threshold value of the RSSI level used for determining whether to resume Site Roaming according to the rise and fall of the RSSI level for the signal received by the transceiver.

If the RSSI level of the received signal is lower than the level configured in **Site Roaming Resume** while the transceiver remains on the channel synchronized by Site Roaming, **Dropout Delay Time** is activated.

After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Site Roaming. If the RSSI level of the received signal becomes higher than the level configured in **Site Roaming Resume** while the **Dropout Delay Time** is counting down, the **Dropout Delay Time** is automatically extended and the transceiver does not resume Site Roaming.

Also, if **Auto Reset Timer** is activated by receiving a call, Site Roaming does not resume if the receiving status continues even if the **Dropout Delay Time** elapses. After the reception ends and the length of time configured in **Auto Reset Timer** elapses, the transceiver resumes Site Roaming.

Configuration using KPG-D3/ D3N

Configuring **Site Roaming Resume** ( See Radio Configuration > Global Options > Scan > NXDN Conventional > Site Roaming > Roaming Level)

Off-hook Site Roaming

Supported Models: Mobile

Off-hook Site Roaming is the function to start Site Roaming depending on the status of microphone, either on-hook or off-hook. The transceiver behaves as follows according to the configuration in **Off-hook Site Roaming**.

Table 2-37 Off-hook Site Roaming

Configuration	Description
Enabled	The transceiver can start Site Roaming while the microphone is in either the on-hook state or off-hook state. Even if the microphone changes from the on-hook state to off-hook state during Site Roaming, Site Roaming does not pause.
Disabled	The transceiver can start Site Roaming if the microphone is in the on-hook state. The transceiver cannot start Site Roaming if the microphone is in the off-hook state. If the microphone changes from the on-hook state to off-hook state during Site Roaming, Site Roaming pauses on the Revert Channel. Even if the microphone changes from the on-hook state to off-hook state while Site Roaming pauses, the channel does not change. When the microphone goes to on-hook state, the transceiver resumes Site Roaming. However, if the microphone goes to on-hook state when the audio sounds, the transceiver continues the audio output status without resuming Site Roaming. Thereafter, the transceiver resumes Site Roaming when the signal disappears and the time configured in Dropout Delay Time elapses. If the Auto Reset Timer is also counting down at the same time, the transceiver resumes Site Roaming after the timer configured with the longer countdown ends.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Site Roaming** ( See Radio Configuration > Global Options > Scan > NXDN Conventional > Site Roaming)

2.21 Out of Range Indicator

Out of Range Indicator is the function to notify a user of being outside the service area if the transceiver is outside the service area.

If the transceiver cannot receive a Beacon or other NXDN signals periodically sent by the repeater within a certain period of time, **Out of Range Indicator** is activated and notification of being outside the service area is made.



If **Out of Range Indicator** is enabled, “Out of Range” appears on the display if a Beacon and other NXDN signals cannot be received within the time configured in **In-service Check Time**.

Out of Range Tone

Out of Range Tone is the function to notify by a tone (1 beep) of being outside the service area if the transceiver is outside the service area.

The transceiver emits an Out of Range Tone (1 beep) if a Beacon and other NXDN signals cannot be received within the time configured in **In-service Check Time**. The transceiver behaves as follows according to the configuration in **Out of Range Tone**:

Table 2-38 Out of Range Tone

Configuration	Description
Off	An Out of Range Tone (1 beep) does not sound from the transceiver.
One-shot	If a Beacon and other NXDN signals cannot be received within the time configured in In-service Check Time , the transceiver emits an Out of Range Tone (1 beep) only once. After that, an Out of Range Tone (1 beep) does not sound from the transceiver even if an available control channel has still not been found.
Cycle	The transceiver emits an Out of Range Tone (1 beep) at 30-sec intervals while the transceiver continuously fails to receive a Beacon and other NXDN signals.

In-service Check Time

In-service Check Time is the amount of time for **Out of Range Indicator** to initiate if the transceiver cannot receive a Beacon sent from the repeater within the amount of time configured in **In-service Check Time**.

In-service Check Time is configured to be longer than **Beacon Transmit Interval Time** of the repeater.

Note

- **Out of Range Indicator**, **Out of Range Tone**, and **In-service Check Time** stop counting down if the channel and zone are changed. If **Out of Range Indicator** and **Out of Range Tone** are enabled in the target system, **In-service Check Time** starts counting down.
- **Out of Range Indicator** does not stop and continues to function when the transceiver transmits. Also, **Out of Range Tone** does not sound.

Configuration using KPG-D3/ D3N

- Configuring **Out of Range Indicator** in NXDN Conventional to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Out of Range)
- Configuring **Out of Range Tone** in NXDN Conventional ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Out of Range)
- Configuring **In-service Check Time** in NXDN Conventional ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Out of Range)
- Configuring **Out of Range Indicator** in NXDN Site Roaming to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/ NXDN Site Roaming with RAN > NXDN > Out of Range)
- Configuring **Out of Range Tone** in NXDN Site Roaming ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/ NXDN Site Roaming with RAN > NXDN > Out of Range)
- Configuring **In-service Check Time** in NXDN Site Roaming ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/ NXDN Site Roaming with RAN > NXDN > Out of Range)

2.22 Indoor Location (NXDN)

Indoor Location is the function to manage the position of the transceiver by using Bluetooth.

After beacon data from each beacon transmitter is received by using the BLE Scan function, the transceiver managed by Indoor Location selects the data of the strongest signal strength level among the latest received signals, and sends the information of the beacon transmitter (hereafter referred to as BLE data) to the location server.

In an NXDN system, the Indoor Location function has the following functions related to sending and receiving BLE data:

- BLE Report on Data System-personality
- BLE Base ID
- Send the Location Data
- BLE Combination
- BLE Report Mode
- Data with Voice
- Number of Times
- BLE Report Interval Time
- BLE Time Mark
- Respond to Polling ID
- BLE ACK Request
- Map Header



Note

- Refer to Common Function Part “[INDOOR LOCATION](#)” for details about the Indoor Location function.
- This section describes information for both an NXDN Conventional system and NXDN Trunking system.

BLE Report on Data System-personality (Indoor Location)

Supported Models: Portable

BLE Report on Data System-personality is the function to send BLE data by Data System-personality.

BLE Report on Data System-personality is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method. This function is used when data communication needs to be performed on a specific dedicated channel.

GPS Report on Data System-personality and BLE Report on Data System-personality function with the same configuration.

By using this function, the transceiver automatically changes the channel to the Data System-personality to send BLE data. After transmission, the transceiver returns to the Zone-Channel which was used for reception before sending the BLE data.

If **Data System-personality** is not configured, the transceiver sends the BLE data on the Current Zone-Channel.

Before moving to the Data System-personality, the transmitting transceiver sends GTC (Go To Channel) to guide the communication target to the Data System-personality.



Note

- If both Analog and NXDN **Data System-personality** are configured, the NXDN Data System-personality is always used for sending the BLE data. The BLE does not have the configuration item equivalent to a GPS Report Channel, and the behavior is fixed to NXDN.

Configuration using KPG-D3/ D3N

Configuring **GPS/BLE Report on Data System-personality** in an NXDN Conventional system to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Data System-personality)

The ID of the Target Transceiver (BLE Base ID (Indoor Location))

Supported Models: Portable

BLE Base ID is the target ID for BLE data only.

BLE Base ID is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method. A configuration value is shared with GPS Base ID. GPS Base ID and BLE Base ID function with the same configuration.

ID of the base station that manages operations is normally configured for BLE Base ID.

The BLE data is sent to the BLE Base ID. This is used to separate the BLE data destination from the other data destinations.

The following configurations are available for the BLE Base ID:

- **ID Type**
Either a value for Unit ID or for Group ID can be configured in ID Type.
- **ID**
An ID can be configured in the range of 0 (All Group ID: only available when a Group ID is selected) and 1 to 65519.
For Blank, the BLE data is sent to the ID configured for the Base ID.

An ID having the number of 60001 or larger cannot be used in a NXDN Trunking system. The ID Type and ID configured for the current system are enabled.

Configuration using KPG-D3/ D3N

- Configuring **ID Type** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Base Station)
- Configuring **ID Type** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming > GPS/BLE > Base Station)
- Configuring **ID Type** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Base Station)
- Configuring **ID** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Base Station)
- Configuring **ID** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming > GPS/BLE > Base Station)
- Configuring **ID** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Base Station)

Sending BLE Data Manually by Using a Button (Send the Location Data (Indoor Location))

Supported Models: Portable

Send the Location Data is the function to send the location information of the own station by the user button operation. Either BLE data or GPS data is sent as location information. When a valid beacon signal is received, the BLE data is preferentially sent. **Send the Location Data** is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

Location information is sent to the Base ID or BLE Base ID (GPS Base ID) by using one of the following button operations:

- **Send the Location Data** button

By pressing the **Send the Location Data** button, the transceiver sends location information.

- **Menu** button

By pressing the **Menu** button to enter Menu Mode and then executing "Send the Location Data", the transceiver sends location information.

To use this function, the GPS function needs to be enabled to receive GPS data, or the Bluetooth function needs to be enabled to receive a valid beacon signal.

If both the GPS function and Bluetooth function are disabled, a Button-entry Error Tone (1 beep) sounds from the transceiver, and location information cannot be sent.

If neither GPS data nor a valid beacon signal is received, a Button-entry Error Tone (1 beep) sounds from the transceiver, and location information cannot be sent.

If a beacon signal (**Send Location via** configuration: "RF System") is received, the BLE data is sent. GPS data is not sent even if GPS data is received.

If a beacon signal (**Send Location via** configuration: "Bluetooth System") is received, a Button-entry Error Tone (1 beep) sounds from the transceiver, and location information cannot be sent. GPS data is not sent even if GPS data is received.

During GPS Delay Time, a Button-entry Error Tone (1 beep) sounds from the transceiver, and location information cannot be sent. GPS data is not sent even if GPS data is received.

When GPS data is received without receiving a beacon signal, GPS data is sent. Even if non-positioning data is received from the GPS receiver, GPS data is sent. Refer to "[Send the GPS Data](#)".

For a channel with no Indoor Location supported, and when BLE Scan is not functioning, the behavior is the same as when the **Send the GPS Data** button is pressed. ACK is not sent for location information transmission.

Transceiver behavior

● For location information transmission

By pressing the **Send the Location Data** button while GPS data or a valid beacon signal (**Send Location via** configuration: “RF System”) is received, the transceiver sends location information to the Base ID or BLE Base ID (GPS Base ID).



“Send Data” appears on the LCD while location information is being sent. The Transmit LED lights while location information is being sent.



When the location information transmission is complete, the transceiver emits the Complete Tone and displays “Complete” on the LCD for 1 second.



● If GPS data transmission is busy

If the transceiver cannot transmit because the transmission is busy, a Busy Tone 2 sounds from the transceiver, and “Busy” appears on the LCD for 1 second, and then the transceiver restores the standby display.



Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Bluetooth** to be enabled or disabled ([See](#) Radio Configuration > Global Options > Basics > GPS/Bluetooth > Preset Activation)
- Configuring **Built-In GPS Receiver** to be enabled or disabled ([See](#) Radio Configuration > Global Options > Basics > GPS/Bluetooth > Built-in Device Activation)
- Configuring **COM Port** ([See](#) Radio Configuration > Global Options > External Device > General > Serial Interface > COM Port 0, COM Port Bluetooth)
- Configuring BLE Base ID (**ID Type**, **ID**) in an NXDN Conventional system ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Base Station)
- Configuring BLE Base ID (**ID Type**, **ID**) in an NXDN Site Roaming system ([See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > Base Station)
- Configuring BLE Base ID (**ID Type**, **ID**) in an NXDN Trunking system ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Base Station)

Sending the BLE Data Linked With the Configured Mode (BLE Combination (Indoor Location))

Supported Models: Portable

BLE Combination is the function to configure the timing of BLE data transmission.

BLE Combination is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with GPS Combination. GPS Combination and BLE Combination function with the same configuration.

When a BLE Combination behavior trigger occurs, the following behaviors occur:

- If a beacon signal (**Send Location via** configuration: "RF System") is received, the BLE data is sent. GPS data is not sent even if GPS is received.
- If a beacon signal (**Send Location via** configuration: "Bluetooth System") is received, location information is not sent. GPS data is not sent even if GPS is received.

During GPS Delay Time, location information is not sent. GPS data is not sent even if GPS is received.

If the above conditions are not satisfied, GPS Combination functions. Refer to "[Sending GPS Data Together With Status Call \(GPS Combination\)](#)".

In the respective mode of Voice Call, Status, or Emergency, the BLE data can be added. The display follows each state.

Table 2-39 BLE Combination

Mode	Description
Voice Call	The transceiver transmits by adding the BLE data when a Voice Call is initiated.
Status	The transceiver transmits by adding the BLE data for a Status transmission.
Combination Status Range	The range of Statuses sent by adding the BLE data is configured in Status. Among the status numbers 1 to 207, the range of Status Messages to which the BLE data is added can be configured.
Emergency (Voice Call)	The transceiver transmits by adding the BLE data when a Voice Call for Emergency with the Emergency Status (Status 224, Status 225, Status 227, Status 228, or Status 229) added is initiated.
Emergency (Status)	The transceiver transmits by adding the BLE data when only the Emergency Status (Status 224, Status 225, Status 227, Status 228, or Status 229) is transmitted under the following conditions:

Table 2-40 BLE Combination

System	Description
NXDN Trunking	When Emergency Status On Control Channel is enabled, the transceiver sends the BLE data on a control channel after the Emergency Status is transmitted on the control channel at the timing of automatic transmission.
NXDN Conventional	When "0 (s)" is configured in Transmit Duration , the transceiver only transmits the Emergency Status at the timing of automatic transmission. The BLE data is sent after the transmission.

The added BLE data is sent to the target configured in Base ID Type and Base ID.

If a BLE Base ID is configured, the transmission occurs to the BLE Base ID as the target.

The Base ID and BLE Base ID configured for the current system are enabled.

Refer to "[Sending the BLE Data Linked With the Configured Mode \(BLE Combination \(Indoor Location\)\)](#)" for Combination Status Range.

In an NXDN Trunking system, the following behaviors occur according to the combination of the Voice Call, Status, or Emergency call destination and the BLE data transmission destination:

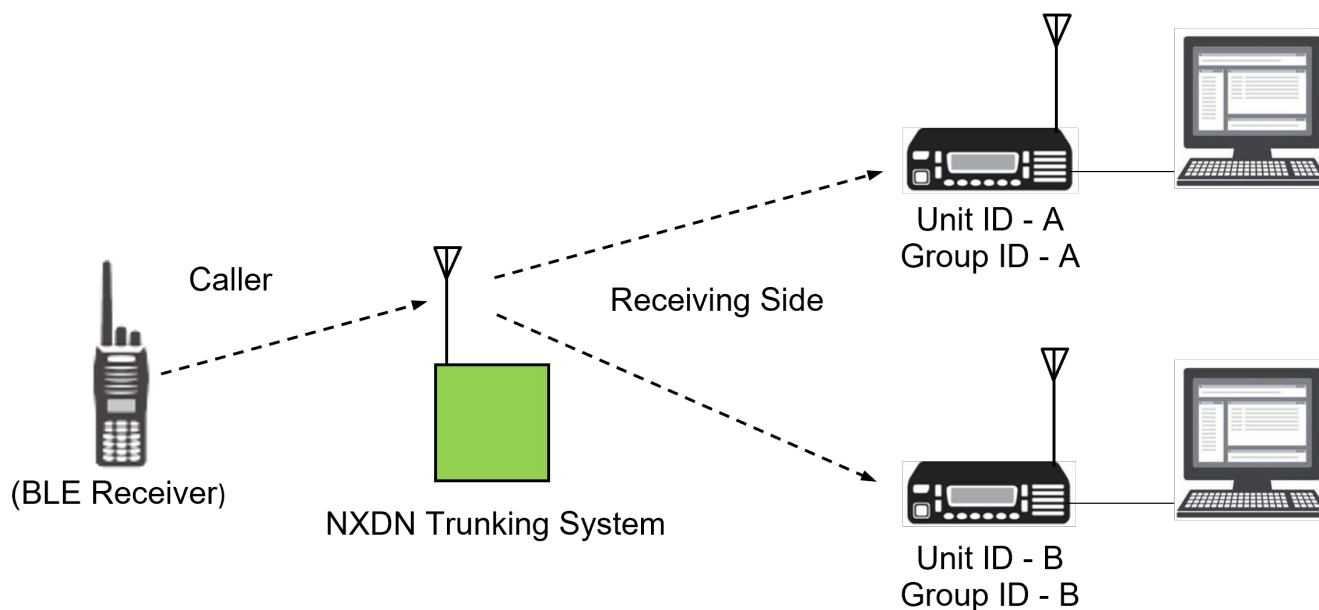


Figure 2-14 BLE Combination

Table 2-41 BLE Combination (Voice Call)

Caller		Receiving Side Behavior	
Voice Call Destination	BLE Data Transmission Destination	Voice Call	BLE Data
Group ID-A	Group ID-A	Yes	Yes
Group ID-B	Group ID-A	Yes	No
Unit ID-A	Group ID-A	Yes	Yes
Unit ID-B	Group ID-A	Yes	No
Group ID-A	Unit ID-A	Yes	Yes
Group ID-B	Unit ID-A	Yes	No
Unit ID-A	Unit ID-A	Yes	Yes
Unit ID-B	Unit ID-A	Yes	No

Yes: Reception available

No: Reception not available

Table 2-42 BLE Combination (Status)

Caller		Receiving Side Behavior	
Status Call Destination	BLE Data Transmission Destination	Status Data	BLE Data
Group ID-A	Group ID-A	Yes	Yes
Group ID-B	Group ID-A	Yes	Yes
Unit ID-A	Group ID-A	Yes	Yes
Unit ID-B	Group ID-A	Yes	Yes
Group ID-A	Unit ID-A	Yes	Yes
Group ID-B	Unit ID-A	Yes	Yes
Unit ID-A	Unit ID-A	Yes	Yes
Unit ID-B	Unit ID-A	Yes	Yes

Yes: Reception available

Table 2-43 BLE Combination (Emergency (Voice Call))

Caller		Receiving Side Behavior	
Emergency Call Destination	BLE Data Transmission Destination	Emergency	BLE Data
Group ID-A	Group ID-A	Yes	Yes
Group ID-B	Group ID-A	Yes	No
Unit ID-A	Group ID-A	Yes	Yes
Unit ID-B	Group ID-A	Yes	No
Group ID-A	Unit ID-A	Yes	Yes
Group ID-B	Unit ID-A	Yes	No
Unit ID-A	Unit ID-A	Yes	Yes
Unit ID-B	Unit ID-A	Yes	No

Yes: Reception available

No: Reception not available

Table 2-44 BLE Combination (Emergency (Status))

Caller		Receiving Side Behavior	
Status Call Destination	BLE Data Transmission Destination	Status Data	BLE Data
Group ID-A	Group ID-A	Yes	Yes
Group ID-B	Group ID-A	Yes	Yes
Unit ID-A	Group ID-A	Yes	Yes
Unit ID-B	Group ID-A	Yes	Yes
Group ID-A	Unit ID-A	Yes	Yes
Group ID-B	Unit ID-A	Yes	Yes
Unit ID-A	Unit ID-A	Yes	Yes
Unit ID-B	Unit ID-A	Yes	Yes

Yes: Reception available

Configuration using KPG-D3/ D3N

- Configuring **Voice Call** in an NXDN Conventional system ( See Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > GPS/BLE Combination)
- Configuring **Voice Call** in an NXDN Site Roaming system ( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > GPS/BLE Combination)
- Configuring **Voice Call** in an NXDN Trunking system ( See Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > GPS/BLE Combination)
- Configuring **Status** in an NXDN Conventional system ( See Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > GPS/BLE Combination)
- Configuring **Status** in an NXDN Site Roaming system ( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > GPS/BLE Combination)
- Configuring **Status** in an NXDN Trunking system ( See Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > GPS/BLE Combination)
- Configuring **Combination Status Range** in an NXDN Conventional system ( See Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > GPS/BLE Combination)
- Configuring **Combination Status Range** in an NXDN Site Roaming system ( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > GPS/BLE Combination)
- Configuring **Combination Status Range** in an NXDN Trunking system ( See Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > GPS/BLE Combination)

- Configuring **Emergency (Voice Call)** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > GPS/BLE Combination)
- Configuring **Emergency (Voice Call)** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > GPS/BLE Combination)
- Configuring **Emergency (Voice Call)** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > GPS/BLE Combination)
- Configuring **Emergency (Status)** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > GPS/BLE Combination)
- Configuring **Emergency (Status)** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > GPS/BLE Combination)
- Configuring **Emergency (Status)** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > GPS/BLE Combination)

Sending the BLE Data With the Timing of Automatic Transmission Configured (BLE Report Mode (Indoor Location))

Supported Models: Portable

BLE Report Mode is the function to configure whether to send BLE data automatically or after receiving a request.

BLE Report Mode is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method. A configuration value is shared with GPS Report Mode. GPS Report Mode and BLE Report Mode function with the same configuration.

ID of the base station that manages operations is normally configured for Base ID.

The following behaviors occur according to the configuration in **BLE Report Mode**:

Table 2-45 BLE Report Mode

Configuration	Description
Poll	The data transmission is performed at the timing of when a BLE data transmission request is received from the base station. This is used when the base station controls the timing to require location information. This is useful to avoid data collision with multiple mobile station transceivers.  Note Instead of sending the data to the ID that issued the request, the data is sent to the ID configured in Base ID. Therefore, the requestor does not necessarily match the data destination. However, if Respond to Polling ID is configured, the data is sent to the requestor.
Auto	The transceiver sends the BLE data at the time interval configured in BLE Report Interval Time. This configuration is useful for controlling or monitoring vehicles on a time basis by periodically sending location information. The data transmission is performed at the timing of when a BLE data transmission request is received from the base station. The first response when a BLE data transmission request from the base station is received behaves as follows: If a beacon signal (Send Location via configuration: “RF System”) is received, the BLE data is sent. If a beacon signal (Send Location via configuration: “Bluetooth System”) is received, neither the BLE data nor the GPS data is sent. During GPS Delay Time, neither the BLE data nor the GPS data is sent. When BLE data is received without receiving a beacon signal, GPS data is sent. Refer to “Sending GPS Data According to the Request from the Base Station (GPS Report Mode)” for the behavior in this case.

The following behaviors occur at the timing of the BLE Report transmission. The second and subsequent responses when a BLE data transmission request from the base station is received are also included in the following contents:

- If a beacon signal (**Send Location via** configuration: “RF System”) is received, the BLE data is sent. However, if synchronization information is not received from KAS-20E, the BLE data is not sent. Refer to “[BLE Time Mark \(Indoor Location\)](#)” for details.
- If a beacon signal (**Send Location via** configuration: “RF System”) is not received, the BLE data is not sent.

The following requests from the base station are for both GPS data and BLE data:

- GPS Data Auto Report Start Request
- GPS Data Auto Report Stop Request
- GPS Data Single Polling Request
- GPS Data Multiple Polling Request

BLE data transmission by the expiry of BLE Report Interval Time is canceled under the following states. In this case, display and tone behavior are not performed.

Also, the transceiver does not suspend transmission using **Transmit Busy Wait Time** to avoid collisions with BLE data transmissions from other mobile station transceivers.

- During transmission (However, the BLE data transmission during the audio transmission by the Data with Voice function is not canceled.)
- During the Busy state (Refer to “[Random Access \(Contention\)](#)”).
- While unmuted
- When Transmit Frequency or Encode ID is not configured
- While transmission is prohibited by TOT

- During NXDN data communications
- While waiting for Transpond transmission
- During Transceiver Password Mode
- During Emergency Mode
- While waiting for a response by an incoming Individual Call Acknowledge Request (while Incoming appears)
- While waiting for a response by an incoming Individual Call (Message Trunked (Enhanced)) (while Incoming appears)
- While a Trunking system is in Failsoft Mode
- While a Trunking system is operated on a mixed control channel
- Out of Range

ACK is not sent for BLE data transmission.

The Base ID and BLE Base ID configured for the current system are enabled. Refer to “[Base ID](#)” and “[The ID of the Target Transceiver \(BLE Base ID \(Indoor Location\)\)](#)” for details.

For location information transmission by Poll on a Mixed Channel, the first transmission at the timing of when a Polling request is received is the location information transmission by the signal that received the Polling request. If BLE data transmission continues thereafter, BLE data transmission according to the Transmit Mode configuration for the Mixed Channel is performed.

On an Analog Channel, GPS data is sent.

Transceiver behavior

Refer to “[Sending GPS Data Automatically at Certain Intervals \(GPS Report Mode\)](#)” for the behavior when BLE data is determined to be sent in the first response when a GPS data transmission request is received. If it is determined that GPS data and BLE data are not to be sent in the first response when a BLE data transmission request is received, or if it is determined that BLE data is not to be sent at the timing of the BLE Report transmission, no change occurs.

If it is determined that BLE data is to be sent in the first response when a BLE data transmission request is received, or if it is determined that BLE data is to be sent at the timing of the BLE Report transmission, the BLE data is sent.

“Send Data” appears while BLE data is being sent.

When the BLE data transmission is complete, “Complete” appears on the LCD of the transceiver.

The Transmit LED lights while BLE data is being sent.



BLE data transmission trigger occurs.



BLE data transmission completes.



When BLE data is being received from other transceivers, the transceiver behaves as follows:

The Busy LED lights while BLE data is being received.

“Receive Data” appears on the LCD of the transceiver while BLE data is being received.



When the BLE data reception is complete, “Complete” appears on the LCD of the transceiver.



Note

- To send BLE data, the behavior is based on the time information (hereafter, referred to as synchronization information) received from KAS-20E. Therefore, if the mobile station transceiver does not receive synchronization information from KAS-20E, the second and subsequent BLE data transmission for a Polling request from KAS-20E and the BLE data transmission by BLE Auto Report do not occur.

Configuration using KPG-D3/ D3N

- Configuring **GPS/BLE Report Mode** in an NXDN Conventional system (See Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE)
- Configuring **GPS/BLE Report Mode** in an NXDN Site Roaming system (See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE)
- Configuring **GPS/BLE Report Mode** in an NXDN Trunking system (See Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)

Sending BLE Data during Voice Communications (Data with Voice (Indoor Location))

Supported Models: Portable

Data with Voice is the function to simultaneously send BLE data during voice communication.

Data with Voice is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

If the timing of automatic BLE data transmission by BLE Report Interval Time comes while the transceiver is sending audio data, the transceiver multiplexes BLE data on the audio data and sends the data.

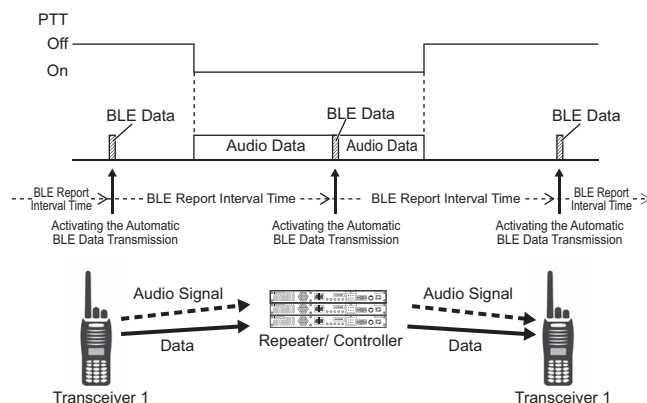


Figure 2-15 Data with Voice

The following behaviors occur at the timing of the BLE Report transmission.

If a beacon signal (**Send Location via** configuration: “RF System”) is received, the BLE data is multiplexed.

If a beacon signal (**Send Location via** configuration: “RF System”) is not received, the BLE data is not multiplexed.

For Very Narrow, BLE data can be sent with almost no sound quality degradation by temporarily switching the audio data to the data communication format during voice communication. For Narrow, because the BLE data is sent using free space other than audio data, the sound quality degradation does not occur.

If data is received while voice communication is in progress, the LCD display, LED, and Alert Tone behave according to the configurations during voice communication.

The multiplexed BLE data is sent to the target configured in Base ID Type and Base ID.

If a BLE Base ID is configured, the transmission to the BLE Base ID as the target occurs with higher priority than the transmission to a Base ID.

The Base ID and BLE Base ID configured for the current system are enabled.

Refer to “[Base ID](#)” and “[The ID of the Target Transceiver \(BLE Base ID \(Indoor Location\)\)](#)” for details.

During encrypted communications by AES/DES Advanced Encryption, only audio is encrypted. During encrypted communications by DES Encryption, only audio is encrypted.

Note

- For Very Narrow, the sound quality degradation may occur if the amount of time configured in BLE Report Interval Time is short.

Number of Times (Indoor Location)

Supported Models: Portable

Number of Times is the function to configure the number of times to send BLE data if “Poll” is configured in BLE Report Mode. **Number of Times** is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method. A configuration value is shared with Number of Times for GPS. Number of Times for GPS and Number of Times for BLE function with the same configuration.

If “Poll” is configured in BLE Report Mode and if a GPS data request is received using Air, BLE data is sent automatically for the number of times configured in Number of Times.

BLE data is sent for the number of times configured in **Number of Times** at the intervals configured in **BLE Report Interval Time** after the request is received.

If a beacon signal (**Send Location via** configuration: “RF System”) is not received at the timing of the BLE Report transmission, the BLE data is not sent.

The configuration range of **Number of Times** is from 1 to 60. BLE data and GPS data are sent for the configured number of times.

Configuration using KPG-D3/ D3N

- Configuring **Number of Times** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Indoor Location > RF System > Poll)
- Configuring **Number of Times** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Indoor Location > RF System > Poll)
- Configuring **Number of Times** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Indoor Location > RF System > Poll)

BLE Report Interval Time (Indoor Location)

Supported Models: Portable

BLE Report Interval Time is the function to configure the transmission interval of BLE data.

BLE Report Interval Time is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with GPS Report Interval Time. GPS Report Interval Time and BLE Report Interval Time function with the same configuration.

If “Auto” is configured in BLE Report Mode, the transceiver sends the BLE data at the time interval configured in **BLE Report Interval Time**.

The BLE Report Interval Time configuration ranges from 1 second to 3600 seconds, and the following behaviors occur:

- BLE data is sent at the configured time interval.
- BLE Report Interval Time can also be changed using the Air Command.
- Configuring a value that is divisible by 3600 is recommended.
- BLE Report Interval Time is used to configure the trigger cycle to start sending BLE data. The timing at which the receiving transceiver completes receiving BLE data may vary depending on the transmit conditions of the transmitting transceiver.

Note

- Automatic transmission of BLE data by BLE Report Interval Time is not performed during audio data communication.

Configuration using KPG-D3/ D3N

- Configuring **GPS/BLE Report Interval Time** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Auto)
- Configuring **GPS/BLE Report Interval Time** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > Auto)
- Configuring **GPS/BLE Report Interval Time** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Auto)

BLE Time Mark (Indoor Location)

Supported Models: Portable

BLE Time Mark is the function to configure the offset time until the transceiver actually sends BLE data based on the time information (hereafter, referred to as synchronization information) received from KAS-20E. By configuring the offset time, data collisions can be avoided when many transceivers sending BLE data exist.

BLE Time Mark is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method. A configuration value is shared with GPS Time Mark. GPS Time Mark and BLE Time Mark function with the same configuration.

Configuring a different timing for the transceivers in the same area allows the transceivers to send BLE data with different timing. This prevents data collisions due to transmissions at the same timing.

The configuration range of **BLE Time Mark** is from 0 second to 3599 seconds.

The timing of transmission is delayed by the time configured in **BLE Time Mark**. However, the value equal to or higher than BLE Report Interval cannot be configured.

KAS-20E periodically notifies synchronization information to the All Group ID.

- When receiving synchronization information, the mobile station displays “Receive Data” followed by “Complete”.
- When BLE Scan is enabled, each time the mobile station receives synchronization information from KAS-20E, the mobile station updates and stores it in the internal memory.
- When BLE Scan is disabled, even if the mobile station receives synchronization information from KAS-20E, the mobile station discards the information.
- The mobile station does not perform the BLE transmission behavior related to Time Mark until the mobile station receives synchronization information from KAS-20E.

In the following cases, the mobile station initializes the synchronization information stored in the internal memory:

- Upon deactivating BLE Scan
- When a channel is changed with a System change

Note

- When a channel is changed without a System change, because the mobile station does not initialize the synchronization information, the reference time of the BLE Report will be slightly different from that of other mobile stations at the destination channel. This may cause the BLE Report transmission timing to conflict with other mobile stations until the synchronization information is received at the destination channel.

Configuration using KPG-D3/ D3N

- Configuring **GPS/BLE Time Mark** in an NXDN Conventional system ( See Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Auto)
- Configuring **GPS/BLE Time Mark** in an NXDN Site Roaming system ( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > Auto)
- Configuring **GPS/BLE Time Mark** in an NXDN Trunking system ( See Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Auto)

Respond to Polling ID (Indoor Location)

Supported Models: Portable

Respond to Polling ID is the function to send BLE data to the Polling requestor, not to the Base ID, when a Polling request is received.

Respond to Polling ID is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with Respond to Polling ID for GPS. Respond to Polling ID for GPS and Respond to Polling ID for BLE function with the same configuration.

If Respond to Polling ID is configured, BLE data is sent to the Polling requestor.

If Respond to Polling ID is not configured, BLE data is sent to the Base ID.

The following Polling requests are applicable:

- GPS Data Single Polling Request
- GPS Data Multiple Polling Request

The Base ID and BLE Base ID configured for the current System are enabled.

Configuration using KPG-D3/ D3N

- Configuring **ID Type** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Base Station)
- Configuring **ID Type** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming > GPS/BLE > Base Station)
- Configuring **ID Type** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Base Station)
- Configuring **ID** in an NXDN Conventional system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Base Station)
- Configuring **ID** in an NXDN Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming > GPS/BLE > Base Station)
- Configuring **ID** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Base Station)
- Configuring **Respond to Polling ID** in an NXDN Conventional system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE > Poll)
- Configuring **Respond to Polling ID** in an NXDN Site Roaming system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > GPS/BLE > Poll)
- Configuring **Respond to Polling ID** in an NXDN Trunking system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE > Poll)

BLE ACK Request (Indoor Location)

BLE ACK Request is the function to place a request to send the acknowledgment with a mobile station transceiver when BLE data in the NXDN format is sent from the base station transceiver to the mobile station transceiver.

Table 2-46 BLE ACK Request

Configuration	Description
Enabled	The base station transceiver requests the mobile station transceiver to send the acknowledgment message when a request message to send BLE data in the NXDN format is sent by the base station transceiver. The mobile station transceiver sends an acknowledgment message and then BLE data upon receipt of a request message to send BLE data in the NXDN format.
Disabled	The base station transceiver does not request the mobile station transceiver to send an acknowledgment message when a request message to send BLE data in the NXDN format is placed by the base station transceiver. Upon receipt of a message which requests transmission of BLE data in the NXDN format, the mobile station transceiver sends BLE data without sending an acknowledgment message. Disable the sending and receiving of an acknowledgment message to shorten transmission times and reduce transmission traffic.

BLE ACK Request is an item to configure for the base station transceiver in Indoor Location, and is the function of the RF System method.

Configuration using KPG-D3/ D3N

- Configuring **GPS/BLE ACK Request** in an NXDN Conventional system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS/BLE)
- Configuring **GPS/BLE ACK Request** in an NXDN Trunking system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)

Map Header (Indoor Location)

Map Header (Indoor Location) is an item to configure for the base station transceiver in Indoor Location, and is the function of the RF System method. Whether to send data to the mapping application when the base station transceiver receives the BLE data from the mobile station transceiver can be configured.

Table 2-47 Map Header (Indoor Location)

Data	Description
\$PKPBD (KW)	Upon receipt of the BLE data, the base station transceiver creates the \$PKPBD data which is the KENWOOD proprietary sentence from the received BLE data and sends the created data from the communication port. BLE beacon data is included in the \$PKPBD data.

Configuration using KPG-D3/ D3N

- Configuring **\$PKPBD (KW)** in an NXDN Conventional system to be enabled or disabled ( [See](#) Radio Configuration > Global Options > External Device > General > Serial Interface > BLE Base Station Settings)
- Configuring **\$PKPBD (KW)** in an NXDN Trunking system to be enabled or disabled ( [See](#) Radio Configuration > Global Options > External Device > General > Serial Interface > BLE Base Station Settings)

NXDN is a generic name for a digital communication system protocol utilizing 4-level FSK. Using NXDN, the transceiver can initiate an Individual Call or Group Call for voice calls, communicate various types of messages, or send and receive GPS data. Also, connecting a transceiver to an external device (such as a PC) allows communication because the NEXEDGE transceiver supports serial command communication.

In an NXDN Trunking system, 2 types of channels, control channels and traffic channels, are used (these are referred to collectively as a system).

A control channel is used for sending various messages to control a system. A control channel is also used for calls, such as Status Call or Short Data Call.

A traffic channel is used for sending various types of communication information of users.

Via a system, the transceiver can establish communications using NXDN IDs (Unit ID and Group ID), such as an individual call or group call.

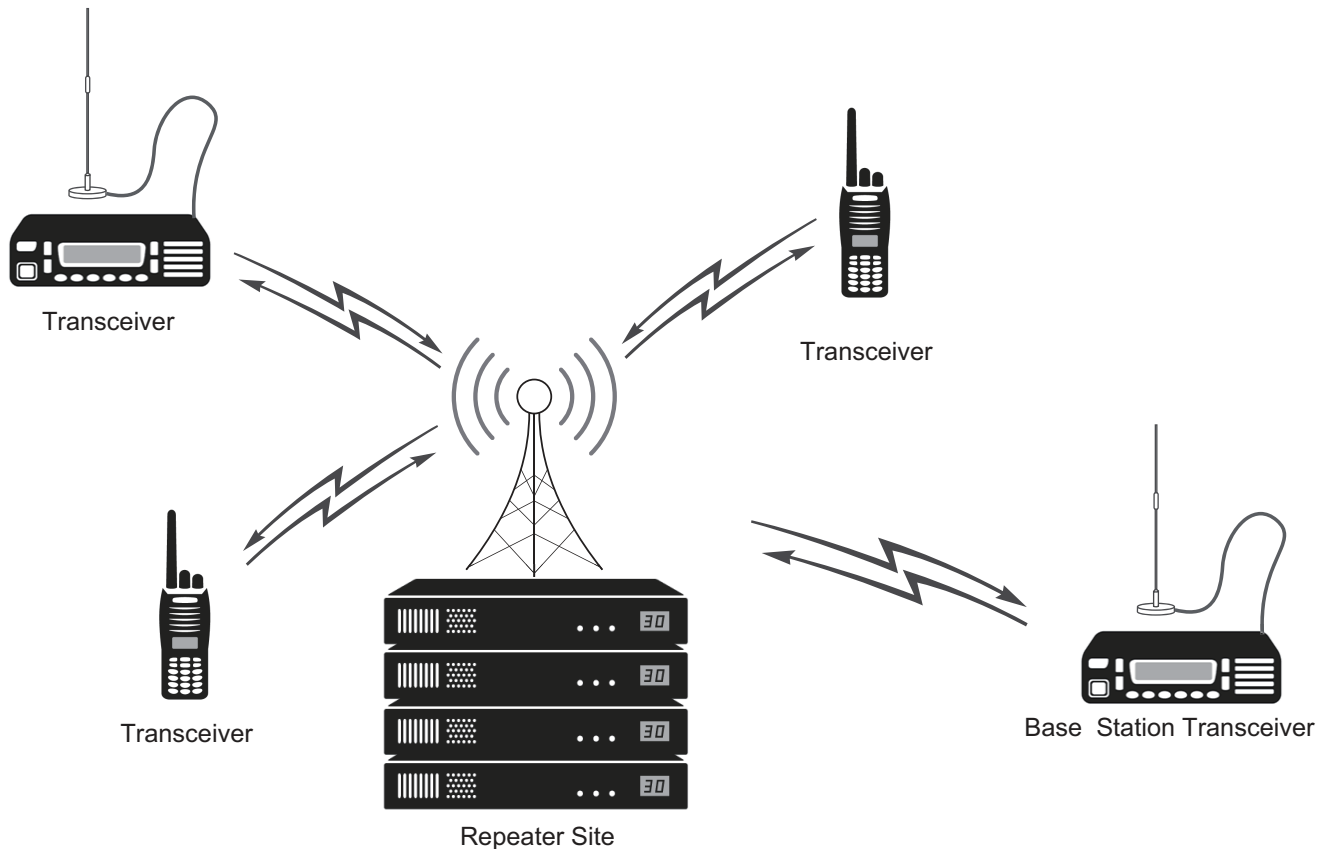


Figure 3-1 Image of Communications in an NXDN Trunking System

3.1 Initiating Voice Communications (Basic Transmission and Reception)

This section describes the basic methods for transmission and reception in an NXDN Trunking system and the relevant functions.

About Own ID

To initiate various communications using NXDN, a Unit ID (Own), the identification code of a transceiver, needs to be configured for the transceiver.

A Unit ID can be configured in the range between 0001 and FFEF (hexadecimal), or between 1 and 65519 (decimal). However, an ID having the number of 60001 or larger cannot be used in an NXDN Trunking system.

If **Global ID** is enabled, a Unit ID is shared by all NXDN Conventional and NXDN Trunking.

If **Global ID** is disabled, a Unit ID needs to be configured for each NXDN Conventional and NXDN Trunking.

Also, a name specific to the transceiver can be configured for Unit ID, with Unit ID Name.

Configuration using KPG-D3/ D3N

- Configuring **Unit ID** and **Unit ID Name** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > General > ID (Own))
- Configuring **Global ID** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > NXDN Trunking > General > ID (Own))

About Communication Security (Encryption)

The transceiver is equipped with the Encryption function (Bit scramble encryption type and AES/ DES encryption type) which can enhance the confidentiality of communications by encrypting communication data when making various communications on an NXDN digital channel. (Refer to [USING COMMUNICATION SECURITY](#).)

About Trunking Type

To establish various types of communications in an NXDN Trunking system, **Trunking Type** needs to be configured along with the configuration of the system. Refer to “[Trunking Type](#)” for **Trunking Type**.

Control Channel Acquisition and Registration

To establish various types of communications in an NXDN Trunking system, the transceiver needs to acquire a control channel and register in a system before starting communication. The control channel acquisition and registration are automatically executed when the transceiver is turned ON or when a system to be used is changed with site roaming. Refer to “[Control Channel Hunt \(Control Channel Hunt\)](#)” for details on the transceiver behavior of control channel acquisition. Refer to “[Registration in an NXDN Trunking System](#)” for details on the transceiver behavior of registration.

Receive

Received audio sounds from the speaker if the transceiver receives a message requesting various types of communications on a control channel from a system and the received NXDN ID matches the NXDN ID preconfigured for the transceiver.

Auto Reset Timer

Auto Reset Timer is the amount of time from when the received Unit ID or Group ID matches the Unit ID or Group ID preconfigured for the transceiver until the LCD, flashing of LED and emission of Alert Tone will automatically be reset.

By using KPG-D3/ D3N, **Auto Reset Timer** can be configured. Also, how the transceiver behaves after the amount of time configured in **Auto Reset Timer** elapses can be configured.

Respective **Auto Reset Timer** can be configured for each voice communication (Voice) and data communication (Message).

Table 3-1 Auto Reset Timer

Configuration		Description
Auto Reset Timer (Voice or Message)	Off	Auto Reset Timer will not be activated.
	0 sec to 300 sec	After the configured time elapses, the matching state of the Unit ID or Group ID is automatically reset.
LED (Voice only)		If this function is enabled, the flashing Busy LED for the Selective Call Alert LED turns off when the length of time configured in Auto Reset Timer elapses.
Alert Tone (Voice or Message)		If this function is enabled, the intermittently emitted Alert Tone stops when the length of time configured in Auto Reset Timer elapses.
LCD (Voice or Message)		While this function is enabled, the display will change from one of the following displays to the previous channel display if the amount of time configured for Auto Reset Timer elapses. • ID display after receiving an Individual Call or Group Call • Status Message display after receiving a Status Message • Short Message display after receiving a Short Message

Configuration using KPG-D3/ D3N

- Configuring **Auto Reset Timer** (Voice) ( See Radio Configuration > Protocol Options > NXDN > General > Common Options > Auto Reset > Voice)
- Configuring **Auto Reset Timer** (Message) ( See Radio Configuration > Protocol Options > NXDN > General > Common Options > Auto Reset > Message)

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a call using an NXDN ID. A user can notice by the LED that the transceiver is receiving a call.

One of the 7 colors can be used to make the LED flash, and the flashing color can be configured for each type of call.

- Yellow
- Purple
- Blue
- Light Blue
- Red
- Green
- White

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)
- Configuring **LED Color** ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/LED)

Optional Signaling LED

Optional Signaling LED is the function to make the LED flash yellow when the Optional Signaling matches.

A user can notice by the LED that the transceiver is receiving a call.

If the matching state of Optional Signaling is disabled when the buttons on the transceiver are pressed, or when the time configured in **Auto Reset Timer** elapses, the LED is turned off.

However, if **Selective Call Alert LED** is enabled even if **Optional Signaling LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

Configuration using KPG-D3/ D3N

Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > RX Options)

Over-the-Air Alias

Over-the-Air Alias allows the receiving transceiver to display the ID Name of the transmitting transceiver when receiving a call even if the ID Name of the transmitting transceiver is not configured for the receiving transceiver.

Using this function, Unit ID Name of the added unit does not need to be configured such as when a unit is added to the system in service.

The transmitting transceiver sends Unit ID Name data when making voice calls. If the receiving transceiver receives a call such as an Individual Call, the Unit ID Name stored in the reception frame will appear on the display.



- The received Unit ID Name appears after displaying differently from the received Unit ID Name in the following cases.
 - The Unit ID of the transmitting transceiver is not configured in the Individual ID List.
 - The Unit ID of the transmitting transceiver is not stored as Caller ID.
 - The received Unit ID Name is different from the ID Name configured in the Individual ID List or the ID Name stored in the transceiver.
- Voice communications by NXDN Trunking system does not allow Unit ID Name data transmission on the control channel. Unit ID Name data is transmitted at the same as voice data on the call channel only.
- If **Caller ID Stack** is enabled, received Unit ID Name also is stored in the transceiver stack memory. The stored Unit ID Name is also reflected to ID Name with Individual ID List selected.
- Configure **Over-the-Air Alias** for each of NXDN Conventional and NXDN Trunking systems. The Unit ID Name configured for each system is used for the Unit ID Name to be transmitted.

Configuration using KPG-D3/ D3N

Configuring **Over-the-Air Alias** to be enabled or disabled

(**See** Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)

(**See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > TX Options)

Receiving a High-priority Call (Priority Monitor ID)

Priority Monitor ID is the ID that the transceiver preferentially receives when the transceiver is making voice calls using Group Call on a traffic channel in an NXDN Trunking system.

If a Group Call of a **Priority Monitor ID** is initiated on another traffic channel while a Group Call of anything other than a **Priority Monitor ID** is being received, the transceiver participates in a communication by receiving the Group Call of a **Priority Monitor ID**. If a Group Call of a **Priority Monitor ID** having higher priority is initiated on another traffic channel while a Group Call of a **Priority Monitor ID** is being received, the transceiver participates in a communication by receiving the Group Call of a **Priority Monitor ID** having higher priority.

KPG-D3/ D3N can be used to configure up to 4 zone channels used as Priority Monitor ID.

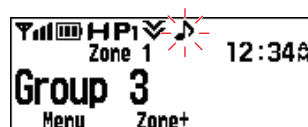
Note

- Priority Monitor ID is the target of receiving even if Scan is stopped.

Transceiver behavior

The transceiver receives a Priority Monitor ID while the transceiver is making a voice call using a Group Call on a traffic channel.

The “” icon blinks and the transceiver starts communicating using the Priority Monitor ID.



The following icons will be displayed:

Priority Monitor ID 1: **P1**

Priority Monitor ID 2: **P2**

Priority Monitor ID 3: **P3**

Priority Monitor ID 4: **P4**

Note

- This function is applicable only if the transceiver is making voice calls using the Group Call. This function is not applicable to data communications.
- If the transceiver is receiving a Group Call by a Group ID not configured in **Priority Monitor ID**, the transceiver can receive only a Group Call of a **Priority Monitor ID** by switching to **Priority Monitor ID** communication. If the transceiver is receiving a Group Call of a **Priority Monitor ID**, the transceiver can receive only a Group Call of a **Priority Monitor ID** having higher priority.
- The transceiver that is transmitting on a traffic channel cannot participate in Group Call communication even if a Group Call of a **Priority Monitor ID** is initiated on another traffic channel.
- If the transceiver receives a **Priority Monitor ID** during scanning, transmission from the transceiver is performed according to the configuration in **Revert Channel** because the scan behavior is prioritized. If “Last Called + Selected” is configured in **Revert Channel**, the transceiver behaves with Talkback by **Priority Monitor ID** in the same manner as when the scan is disabled.
- The following are the basic behaviors of the transceiver when a call by a Priority Monitor ID is received when the scan is enabled or disabled:

Table 3-2 Behaviors of the Transceiver When a Call by a Priority Monitor ID Is Received

Scan Status	Transceiver Behavior	
When the scan is enabled	Display upon Receipt	Display by Priority Monitor ID ^{*1}
	Transmission upon Receipt	Transmission by Revert Channel
When the scan is disabled	Display upon Receipt	Display by Priority Monitor ID ^{*2}
	Transmission upon Receipt	Talkback by Priority Monitor ID

^{*1} Channels configured as Priority Monitor ID will be scanned every time during scanning independent of Scan Delete/ Add configuration.

^{*2} After the call of Priority Monitor ID ends, the transceiver returns to the selected channel after the Auto Reset Timer elapses.

- Channels configured as **Priority Monitor ID** will be scanned even if the ID is not registered as a member of List Scan.
- **Priority Monitor ID** is mainly the function on a traffic channel, but a Group Call of a channel configured in **Priority Monitor ID** is received even on a control channel if **Priority Monitor ID** is configured.

However, for a control channel, a Group Call is received without applying the priority of a Priority Monitor ID number (priority order).

(Example: Even if a Group Call of Priority Monitor ID 1 is received on a traffic channel, the Group Call of Priority Monitor ID 2 is received after the migration to a control channel when a Group Call configured for Priority Monitor ID 2 is received.)

Using selected channel as Priority Monitor ID (Selected Channel)

Selected Channel is a function that the channel selected during scanning is used as Priority Monitor ID.

Using KPG-D3/ D3N allows a configuration whether selected channel is used as a Priority Monitor ID from 1 through 4.

Configuration using KPG-D3/ D3N

- Configuring **Priority Monitor ID** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > RX Options > Priority Monitor ID)
- Configuring **Selected Channel** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > RX Options > Priority Monitor ID)

Participating in an On-going Voice Call Midway Through the Call (Late Entry)

The transceiver can participate in an on-going voice call even if the transceiver receives this call midway through.

In an NXDN Trunking system, the transmitting transceiver sends a communication request on the control channel, and the transceiver will migrate to the specified traffic channel to communicate. A transceiver that is turned ON after the traffic channel assignment is completed or a transceiver that migrated from another site cannot participate in the on-going communications because they have not received the traffic channel assignment message. In this case, the transceiver can participate in on-going communications by receiving the traffic channel assignment message that is periodically sent from the system on the control channel.

The Late Entry depends on the system configuration.

Searching Whether the Transceiver Receives a Call (Scan)

Using the scan function, the transceiver searches for a call or communications from target Group IDs according to the following scan functions. The transceiver migrates to a traffic channel and start receiving if a channel which can be decoded is detected.

- Single Scan
- List Scan

Refer to “[USING SCAN](#)” for details of Scan.

Transmitting

Pressing the **PTT** switch, or selecting an NXDN ID and then pressing the **PTT** switch sends a message requesting various types of communications to a system on a control channel. The transceiver can start communications after the system assigns a traffic channel to the transceiver.

Restricting the Continuous Transmission Duration (Time-out Timer)

Time-out Timer (TOT) is the function to restrict the duration for the transceiver to continuously transmit.

This function is used to prevent communication channel occupancy by a specific user for a long duration of time. The transceiver automatically stops transmitting and releases the channel if it continuously transmits longer than the configured time.

In an NXDN Trunking system, the system controls the amount of time that the transceiver can continuously transmit on a traffic channel. When time that allows continuous transmission has not been specified in the system, the **Time-out Timer** configured in the transceiver is used.

Also, TOT Pre-alert, timer configuration relevant to the **Time-out Timer** function, can be configured.

TOT Pre-alert

TOT Pre-alert is the function to notify a user that a continuous transmission is about to end by the **Time-out Timer**. A TOT Pre-alert Tone (3 beeps) sounds from the transceiver before the transceiver stops the continuous transmission by the **Time-out Timer**.

Example: Time-out Timer: 30 sec, TOT Pre-alert: 4 sec

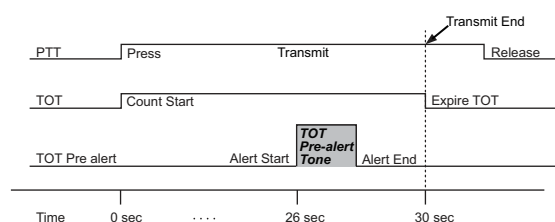


Figure 3-2 TOT Pre-alert

Note

- If "Off" is configured for **TOT Pre-alert**, no TOT Pre-alert tone will sound from the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Time-out Timer** ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)
- Configuring **TOT Pre-alert** ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)

3.2 Using the Optional Signaling (Optional Signaling for Group Call)

Optional Signaling is the signaling used to initiate a selective call. In an NXDN Trunking system, **Optional Signaling for Group Call** is the Optional Signaling for a Group Call, and an individual call can be made using 2-tone. (Refer to [Using 2-tone to Initiate an Individual Call](#).)

2-tone signaling uses a pair of 2 different tone frequencies in series for an individual call. The transceiver emits a ring tone (Alert Tone) and flashes the LED if the received Group ID matches the Group ID preconfigured for the transceiver and the received 2-tone code matches the 2-tone code preconfigured for the transceiver.

To decode a 2-tone code in an NXDN Trunking system, “2-tone 1”, “2-tone 2”, “2-tone 3”, or “2-tone 4” needs to be configured in **Optional Signaling for Group Call** used for the channel.

Configuration using KPG-D3/ D3N

Configuring **Optional Signaling for Group Call**

( See) Radio Configuration > System Properties > Systems > NXDN Trunking > Personalities > General)

Unmuting the Speaker (Audio Control for Group Call)

Audio Control for Group Call is the condition which allows the transceiver to unmute the speaker by a Group ID and Optional Signaling (2-tone). The conditions on which the transceiver unmutes the speaker can be configured for each NXDN Trunking system by using KPG-D3/ D3N.

The transceiver unmutes the speaker and emits the received audio when the conditions configured in **Audio Control for Group Call** are satisfied.

Conditions to unmute the speaker can be changed by a combination of the Group ID and the Optional Signaling.

The following are the conditions to unmute the speaker:

Table 3-3 Audio Control for Group Call

Configuration	Description
Group ID	The transceiver unmutes the speaker if the received Group ID matches the Group ID preconfigured for the transceiver. The conditions for unmuting the speaker do not change even if the transceiver transmits.
Group ID and Optional Signaling	The transceiver unmutes the speaker if the received Group ID matches the Group ID preconfigured for the transceiver and the received Optional Signaling (2-tone) matches the Optional Signaling preconfigured for the transceiver. The conditions for unmuting the speaker do not change even if the transceiver transmits.

Configuration using KPG-D3/ D3N

Configuring **Audio Control for Group Call** ( See) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > RX Options)

Temporarily Disabling the Squelch (Squelch Off)

Squelch Off is the function to disable the Optional Signaling (2-tone) configured for the channel on which the transceiver waits and to unmute the speaker if the received Group ID alone matches the Group ID preconfigured for the transceiver.

The same as with the Monitor function, the Squelch Off function is used to monitor the availability of channels prior to transmitting in order to avoid interfering with other parties.

To use this function, the **Squelch Off** button or the **Squelch Off Momentary** button is used.

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then **Squelch Off** can be toggled between enabled and disabled by selecting "Squelch Off". (Refer to Common Function Part [Using Menu Mode.](#))

Operating the transceiver

● Squelch Off button

1 Press the **Squelch Off** button while **Squelch Off** is disabled.

The "🔊" icon appears.

The Optional Signaling is disabled. The transceiver unmutes the speaker if the received Group ID matches the Group ID preconfigured for the transceiver.

The Busy LED lights green if Busy LED is enabled.

2 Press the **Squelch Off** button while **Squelch Off** is enabled.

The "🔊" icon disappears.

The squelch function by the Optional Signaling is enabled.

● Squelch Off Momentary button

1 Press and hold the **Squelch Off Momentary** button.

The "🔊" icon appears.

The Optional Signaling is disabled. The transceiver unmutes the speaker if the received Group ID matches the Group ID preconfigured for the transceiver.

The Busy LED lights green if Busy LED is enabled.

2 Release the **Squelch Off Momentary** button.

The "🔊" icon disappears.

The squelch function by the Optional Signaling is enabled.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Temporarily Disabling the Optional Signaling (Monitor)

Monitor is the function that temporarily disables the Optional Signaling (2-tone) configured for a channel on which the transceiver waits.

Monitor is used to check the availability of channels prior to transmitting in order to avoid interfering with other parties.

Using the Monitor function temporarily unmutes the speaker if the speaker is muted because the Optional Signaling does not match. However, if the speaker is muted due to a very weak carrier, the speaker is not unmuted even by using the Monitor function. In this case, using the Squelch Off function temporarily unmutes the speaker and the audio can be heard.

To use the Monitor function, the **Monitor** button or the **Monitor Momentary** button is used.

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then **Monitor** can be toggled between enabled and disabled by selecting "Monitor". (Refer to Common Function Part [Using Menu Mode.](#))

When **Monitor** is enabled, the "🔊" icon appears, and the Optional Signaling will be disabled.

Operating the transceiver

● Monitor button

1 Press the **Monitor** button while **Monitor** is disabled.

The "🔊" icon appears.

The Optional Signaling is disabled. The transceiver unmutes the speaker if the received Group ID matches the Group ID preconfigured for the transceiver.

2 Press the **Monitor** button while **Monitor** is enabled.

The "🔊" icon disappears.

The squelch function by the Optional Signaling is enabled.

● Monitor Momentary button

1 Press and hold the **Monitor Momentary** button.

The "🔊" icon appears.

The Optional Signaling is disabled. The transceiver unmutes the speaker if the received Group ID matches the Group ID preconfigured for the transceiver.

2 Release the **Monitor Momentary** button.

The "🔊" icon disappears.

The squelch function by the Optional Signaling is enabled.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Unmuting the Speaker by Linking with the Microphone (Off-hook Decode)

Supported Models: Mobile

Off-hook Decode is the function that enables the transceiver to decode the Optional Signaling (2-tone) even when the microphone is in the off-hook state.

The transceiver behaves as follows according to the configuration in **Off-hook Decode**:

Table 3-4 Off-hook Decode

Configuration	Description
Enabled	The transceiver unmutes the speaker according to the configuration in Audio Control for Group Call regardless of the microphone on-hook or off-hook state.
Disabled	The transceiver unmutes the speaker if the received Group ID matches the Group ID preconfigured for the transceiver while the microphone is in the off-hook state. The transceiver unmutes the speaker according to the configuration in Audio Control for Group Call while the microphone is in the on-hook state.

 Note

- On-hook indicates the state that the microphone is hooked. Off-hook indicates the state that the microphone is not hooked.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Decode** to be enabled or disabled ( **See** Radio Configuration > Global Options > Basics > General > Control > Microphone-hook)

3.3 Control Channel Hunt (Control Channel Hunt)

The control channel hunt is the function to search for and acquire automatically an available control channel on a system when the transceiver is turned ON.

By searching for a control channel according to the hunt sequence, the transceiver can acquire a control channel providing better communication conditions, such as a control channel having better signal strength or higher priority.

The control channel hunt is automatically started when the transceiver is in the following states.

- When the transceiver is turned ON
- When a channel for NXDN Trunking is used
- When the transceiver cannot receive a signal on a control channel
- When the transceiver receives a DISC message on a traffic channel

Table 3-5 Hunt Sequence

Order	Hunt Sequence	Description
1	Resuming a Control Channel Sequence	The control channel search which was stopped before the transceiver was turned OFF is resumed.
2	Preferential Hunt Sequence	2 channels configured as Preferential Hunt Control Channel are searched. Preferential Hunt Control Channel is the channel having the highest priority when searching for a control channel.
3	DFA Hunt Sequence	A channel acquired by DFA (Direct Frequency Assignment) is searched. (Refer to Using a Frequency Added to a System without Changing the Transceiver Configuration (Direct Frequency Assignment) .)
4	Normal Hunt Sequence	A channel configured as Normal Hunt Control Channel is searched. Normal Hunt Control Channel is a channel that can be used as a control channel in each site.
5	System Add Channel Sequence	48 channels that are additionally registered by a broadcast message sent from the system are searched.
6	Site Hunt Sequence	A channel configured as Site Hunt Control Channel in each site is searched. Site Hunt Control Channel is a channel that can be used as a control channel in each site.
7	Comprehensive Hunt Sequence	All channels that can be used as a control channel are searched based on all frequencies configured in a Frequency Table.
8	Failsoft Channel Sequence	A channel configured as Failsoft Channel is searched.

Background Hunt

Background Hunt is the function to periodically attempt to acquire a control channel providing better conditions while the transceiver is in the standby state on a control channel.

When the transceiver receives a message or annunciation information from a system after acquiring a control channel, the transceiver starts the Background Hunt to acquire a control channel providing better conditions, such as a control channel having better signal strength or higher priority.

If the transceiver finds a site providing better conditions compared with the current control channel, the transceiver will migrate to that control channel and start the process to acquire the control channel to be in the standby state.

The transceiver executes the Background Hunt at the intervals configured in **Search Interval Time**.

Also, if **Background Hunt** is enabled, the Background Hunt can be executed among different systems. (Refer to [Executing the Background Hunt in Different Systems \(Background Hunt\)](#).)

Comprehensive Hunt

Comprehensive Hunt is the function to check for all channels configured in the Frequency Table as candidate control channels if the transceiver cannot acquire a control channel according to the normal control channel acquisition procedure. If the transceiver fails the acquisition test for all candidate control channels, the transceiver reactivates the Preferential Hunt Sequence.

Note

- Since the Comprehensive Hunt Sequence attempts the acquisition for all candidate control channels, it may take an overly long time to acquire the control channel.

Configuration using KPG-D3/ D3N

- Configuring **Preferential Hunt Control Channel** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Hunt Options > Preferential Hunt Control Channel)
- Configuring **Normal Hunt Control Channel** ( [See](#) Radio Configuration > System Properties > Trunking Network > NXDN Network > Normal > Normal Hunt)
- Configuring **Site Hunt Control Channel** ( [See](#) Radio Configuration > System Properties > Trunking Network > NXDN Network > Site > Site Hunt)
- Configuring **Frequency Table** ( [See](#) Radio Configuration > System Properties > Trunking Network > NXDN Frequency Table > Frequency Table)
- Configuring **Failsoft Channel** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Failsoft Channel)
- Configuring **Background Hunt** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Trunking Network > NXDN Network > Hunt Option > Background Hunt)
- Configuring **Comprehensive Hunt** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Trunking Network > NXDN Network > Hunt Option)

System Search Policy

System Search Policy is a policy used by the transceiver to search the system.

Using this function, the transceiver can be configured to start roaming easily in order for a user to select the system having good signal strength. The transceiver can also be configured not to start roaming in order to keep using the system in use as much as possible around the system critical point.

Table 3-6 System Search Policy

System Search Policy	Description
Normal	This is normal configuration considering both roaming and coverage. This configuration is used for normal communications.
Roaming Preferential	This configuration gives higher priority for roaming to maintain communication quality and allows the transceiver to start the system search easily. This configuration is used to install many multiple sites having relatively small communication area.
Site Preferential	This configuration prioritizes the coverage of the current site, and the transceiver is less likely to start a system. This configuration is used when the transceiver is operated with a single site, or the transceiver is used to widen the operation area of the transceiver by installing a small number of sites having wide coverage.

Note

- For the signal strength level while the transceiver acquires a control channel, Roaming Preferential is the strongest level followed by Normal and Site Preferential.
- For the frequency of the transceiver to migrate from the current site to another site, Roaming Preferential is the highest frequency rate followed by Normal and Site Preferential.

Configuration using KPG-D3/ D3N

Configuring **System Search Policy** ( See Radio Configuration > System Properties > Trunking Network > NXDN Network > Hunt Option)

Retaining the Information of the Control Channel Used When the Transceiver Is Turned OFF (Last Control Channel)

The **Last Control Channel** can be used to retain the information for the last-used site if the transceiver is turned OFF while the transceiver is operated in an NXDN Trunking system.

There are two types of operation for the system. Whether the transceiver starts searching for a control channel from the last-used site or from the preferred channel when the transceiver searches for a control channel can be configured depending on the operation mode of the system.

- **If giving preference to always using the site having good signal strength:**

Since the last-used site normally has high signal strength, it is effective to start searching for a control channel from the last-used site.

- **If giving preference to always using the preconfigured site:**

The transceiver may register at a site having poor signal strength every time. To avoid this problem, it is effective to always start searching for a preferred channel.

If this function is enabled, the information for the last-used site is retained even if the transceiver is turned OFF. When the transceiver is turned ON again, the transceiver starts searching for a control channel from a control channel in the retained site.

If this function is disabled, the information for the last-used site is not retained after the transceiver is turned OFF. When the transceiver is turned ON again, the transceiver starts searching for a control channel from the control channel configured as a Preferential Hunt Control Channel. Preferential Hunt Control Channel is the channel having the highest priority when searching for a control channel.

Configuration using KPG-D3/ D3N

Configuring **Last Control Channel** to be enabled or disabled ( See Radio Configuration > System Properties > Trunking Network > NXDN Network > Hunt Option)

Starting the Control Channel Hunt Manually (Forced Search)

Forced Search allows a user to manually start the test to acquire another control channel providing better conditions while the transceiver is in the idle state after acquiring a control channel.

The following are hunt sequences to be used by Forced Search. (Refer to [Hunt Sequence.](#))

- Preferential Hunt Sequence
- Normal Hunt Sequence
- DFA Hunt Sequence
- System Add Channel Sequence
- Site Hunt Sequence
- Comprehensive Hunt Sequence

Note

- Channels configured as Failsoft Channel will not be target control channels to be searched.

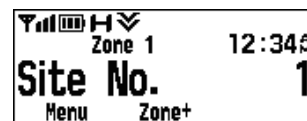
Operating the transceiver

1 Press the **System Search** button.

The site number of the current control channel appears for 2 sec.

Note

- Transceiver operation is identical even if “System Search” is selected after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode.](#))



2 Press and hold the **System Search** button.

A Search Mode Tone (1 beep) sounds from the transceiver, and then the transceiver will start the Forced Search.

The transceiver leaves the acquired control channel and starts the hunt sequence, and then the transceiver proceeds to search for another control channel using the Preferential Hunt Sequence. If a control channel is found, the transceiver migrates to that control channel. In such a case, the transceiver is in the standby state after processing an acquisition of control channel. If no control channel is found, the transceiver continues the hunt sequence.

Note

- Transceiver operation is identical even if “System Search” is selected after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode.](#))



Note

- The transceiver cannot receive a call while the transceiver is performing the Forced Search.
- The Forced Search cannot be used if Site Lock is enabled on the transceiver. However, the site number can be displayed.
- In an NXDN Trunking system with **Multi-System Hunt** enabled, the Multi-System Hunt is executed for each system configured in **Multi-System Hunt List**. (Refer to [Communicating Using Multiple Systems \(Multi-System Roaming\).](#))

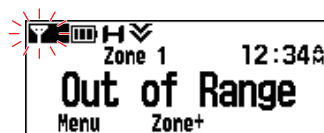
Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver (See [Radio Configuration > Global Options > Button Assignment](#))

Out of Range Indicator

Out of Range Indicator is the function to notify a user that no available control channel has been found after searching for a control channel.

If **Out of Range Indicator** is enabled, “Out of Range” appears on the display for 1 sec when no available control channel has been found even if approximately 10 sec elapse after starting to search for a control channel.



Out of Range Tone

Out of Range Tone is the tone to notify a user that the transceiver cannot acquire a control channel.

An Out of Range Tone (1 beep) can be configured to sound from the transceiver when no available control channel has been found even if approximately 10 sec elapse after starting to search for a control channel. The transceiver behaves as follows according to the configuration in **Out of Range Tone**:

Table 3-7 Out of Range Tone

Configuration	Description
Off	An Out of Range Tone (1 beep) does not sound from the transceiver.
One-shot	An Out of Range Tone (1 beep) sounds from the transceiver only once when no available control channel has been found even if approximately 10 sec elapse after starting to search for a control channel. After that, an Out of Range Tone (1 beep) does not sound from the transceiver even if an available control channel has still not been found.
Cycle	An Out of Range Tone (1 beep) sounds from the transceiver at 30-sec intervals while no available control channel has been found.

In-service Tone

In-service Tone is the tone to notify a user that the transceiver has acquired an available control channel.

If **In-service Tone** is enabled, after an Out of Range Tone (1 beep) sounds from the transceiver which continues to be unable to acquire a control channel, an In-service Tone (3 beeps) sounds from the transceiver when the transceiver is able to acquire an available control channel.

Note

- If the transceiver roams to another system by using Multi-System Roaming, the transceiver behaves according to the configuration in **In-service Tone** of the system used before roaming.

Configuration using KPG-D3/ D3N

- Configuring **Out of Range Indicator** to be enabled or disabled (See Radio Configuration > System Properties > Trunking Network > NXDN Network > Indicator)
- Configuring **Out of Range Tone** (See Radio Configuration > System Properties > Trunking Network > NXDN Network > Indicator)
- Configuring **In-service Tone** to be enabled or disabled (See Radio Configuration > System Properties > Trunking Network > NXDN Network > Indicator)

3.4 Registration in an NXDN Trunking System

Registration is a function that enables registration with the system the location data of the transceiver at the time the transceiver searches for or acquires a control channel, for instance by turning the transceiver ON. By registering the location of the transceiver, the system can recognize which site the transceiver belongs to and specifies the site where the communication can be established. Therefore, in the case of Individual Call, a request for an incoming call can immediately be placed with a site where the called transceiver resides; hence, the system can effectively be operated.

Group-registration is a function that enables the transceiver to register with the system groups to be used. By registering groups, the system can recognize in which site the transceiver waiting for a Group Call resides. Therefore, in the case that a Group Call is made in a multi-site system, the system can limit the registered sites as coverage for the call; hence, the system can effectively handle a Group Call.

Registration Clear is a function that enables clearing from the system of the transceiver registration information, for instance by turning the transceiver OFF. This function can be used on the system side to recognize a transceiver that does not reside in the site.

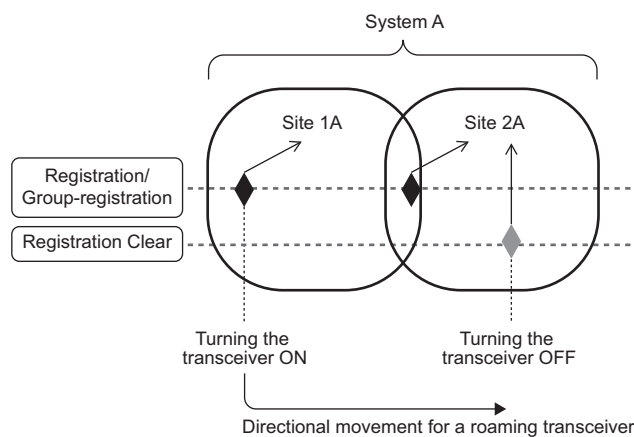


Figure 3-3 Registration/ Group-registration/ Registration Clear

Registering the Own Unit ID in a System (Registration)

The transceiver can register its own Unit ID in the system.

Conditions for the transceiver to begin Registration

The transceiver begins Registration under the following conditions.

- **When the transceiver is turned ON**

The transceiver begins Registration upon acquisition of a control channel after the transceiver is turned ON.

- **If roaming to different sites**

The transceiver begins Registration when the transceiver roams to different sites regardless of single-site system or multi-site system.

- **If the zone is changed to a zone in an NXDN Trunking System**

The transceiver will begin Registration if a zone in an Analog Conventional system or NXDN Conventional system is changed to an NXDN Trunking system by a user operating the transceiver and a control channel is acquired.

- **If changed to a different NXDN Trunking system**

If an NXDN Trunking system is changed to a different NXDN Trunking system by operating the transceiver, the transceiver begins Registration when a control channel is acquired.

- **When an available control channel is found**

The transceiver begins Registration again when an available control channel is found by a channel number (frequency number) that is different from the current channel number (frequency number).

Transceiver's behavior for Registration

The following is the transceiver's behavior during Registration.

- If the location of the own transceiver is successfully registered, the transceiver will remain on the acquired control channel. Otherwise, the transceiver attempts to acquire another control channel again.
- If the transceiver receives the response message indicating failure in Registration from the system when the transceiver begins Registration, the transceiver retains the information (a maximum of 1152 messages) and then the transceiver will attempt to acquire a control channel again. Since the information is not cleared even if the zone is changed and it is retained until the transceiver is turned OFF, the transceiver will not begin Registration if the acquired control channel has the same Site No. as the Site No. that was previously determined as a Registration failure. Also, if the transceiver does not receive any response from the system when the transceiver begins Registration or if a timer for Random Access expires, the transceiver will attempt to acquire a new control channel again. In this case, incompleteness of Registration prevents the transceiver from being used in the system. Upon acquisition of a new control channel, the transceiver begins Registration according to the conditions.
- The transceiver cannot initiate a call until location registration is completed, because Registration is a mandatory condition to communicate using a system. However, in a system that does not require location registration, the transceiver can initiate a call even if location registration is not completed. This depends on the system configuration.
- If the transceiver information registered in the system has already been cleared when the transceiver initiates a call, the transceiver begins Registration and then terminates the call upon receipt of a response message from the system indicating non-registration.

Registering the Group ID Used by the Own Transceiver in a System (Group-registration)

The transceiver can register the Group ID used by itself in the system.

Conditions for the transceiver to begin Group-registration

The transceiver begins Group-registration under the following conditions.

● For Registration

The transceiver registers both the Unit ID of own transceiver (location registration) and Group ID (group registration) when the transceiver begins Registration, such as a case when the transceiver is turned ON or when the transceiver roams to a different site.

● If changing to another Group ID without Group Registration

The transceiver begins Group-registration 2 sec after changing the Group ID by a user operating the transceiver.

● If attempting to initiate a call using a Group ID without Group Registration

If the transceiver attempts to transmit using a new Group ID that is different from the registered Group ID in the system, the transceiver will continue to initiate a Group Call after beginning Group Registration for the new Group ID.



Note

- The transceiver does not begin Group-registration while the transceiver is on a traffic channel. If a Group ID for which the transceiver waits on a control channel is different from the Group ID registered in the system at the time when a call on a traffic channel ends, the transceiver will begin Group-registration again.
- The transceiver's behavior is similar to the behavior if the transceiver sends data using a Group Call or initiates a Group Call using a PC command. If the Group ID for a group that has not been registered in the system is changed after a transmission ends, the transceiver will begin Group-registration 2 sec after changing the Group ID.
- If the transceiver begins Group-registration prior to a user pressing the **PTT** switch to initiate a Group Call, the transceiver will terminate the Group Call when the transceiver receives a response message from the system indicating a group registration failure.

Transceiver's behavior if the transceiver begins location registration and group registration

The following is the transceiver's behavior if the transceiver begins location registration and group registration.

- The transceiver remains on the acquired control channel if both location registration and group registration are successful.
- The transceiver attempts to acquire a control channel again if the transceiver receives a response message from the system indicating rejection of group registration, even if location registration is successful.
- The transceiver remains on the acquired control channel without registering the group if the transceiver receives a response message from the system indicating failure in Group Registration, even if location registration is successful. If **Group-registration Invalid Tone** is enabled, a Group-registration Invalid Tone (2 beeps) sounds from the transceiver at 30-sec intervals. If **Group-registration Invalid Indicator** is enabled, "GP Reg Invalid" is displayed for 1 sec on the display of the transceiver.



Transceiver's behavior for Group-registration

The transceiver starts Group-registration if changing to a Group ID without group registration, or if attempting to transmit using a Group ID without group registration. The following is the transceiver's behavior during Group-registration.

- The transceiver remains on the acquired control channel if the transceiver receives a response message from the system indicating permission for group registration.
- The transceiver attempts to acquire a control channel again if the transceiver receives a response message from the system indicating rejection of group registration, or if the transceiver does not receive any response from the system, or if the timer for random access expires.
- The transceiver remains on the acquired control channel without registering the group if the transceiver receives the response message from the system indicating failure in group registration. If **Group-registration Invalid Tone** is enabled, a Group-registration Invalid Tone (2 beeps) sounds from the transceiver at 30-sec intervals. If **Group-registration Invalid Indicator** is enabled, "GP Reg Invalid" is displayed on the display of the transceiver.



- If the transceiver information registered in the system is already cleared when the transceiver initiates a Group Call, the transceiver begins Group-registration and then the transceiver will terminate the Group Call upon receipt of a response message from the system indicating non-registration of the group in the system.

 Note

- The transceiver may not be able to receive a Group Call using the Group ID without group registration in the system. This depends on the system configuration.
- If receiving a Group ID differing from the Group ID for the group registered in the system, the transceiver will not begin Group-registration at the time of receiving the call.
- If a Group ID is added to the transceiver by receiving a request for changing the remote group, the transceiver will begin Group-registration 2 sec after changing to add the Group ID. If the transceiver restores to the previous channel upon receipt of a message requesting to reset the change of the remote group, the transceiver will begin Group-registration 2 sec after changing to that Group ID of the channel.
(Refer to [Adding a Group ID by Remote Control \(Remote Group Add\)](#).)

Group-registration Timer

In **Group-registration Timer**, the length of time until Group-registration is executed again before the Group ID expiration date in a system expires is configured.

The transceiver can continue the registration of a Group ID by configuring **Group-registration Timer** and executing Group-registration again.

Group-registration Timer starts or restarts in the following cases:

- **Group-registration Timer** starts when the transceiver executes Group-registration to a system and a message from the system indicating permission for group registration is received.
- **Group-registration Timer** restarts if the transceiver executes a Voice Call, Data Call, or Status addressed to a Group ID for a system, and the initiation of a Group Call in the system is confirmed after a message for traffic channel assignment or an acknowledgment is received on a control channel.
- If the transceiver executes Registration Clear (De-Registration), **Group-registration Timer** stops.

 Note

- Even if **Group-registration Timer** expires while the transceiver is unable to execute Group-registration such as when some services are running, for example, while a Group Call is being received, or when the transceiver is outside of the communication area, the service is not immediately interrupted. The Group-registration behavior is performed after the transceiver is ready for Group-registration, for example, after the service is terminated.

Configuration using KPG-D3/ D3N

- Configuring **Group-registration Invalid Indicator** ( [See](#) Radio Configuration > System Properties > Trunking Network > NXDN Network > Indicator)
- Configuring **Group-registration Invalid Tone** ( [See](#) Radio Configuration > System Properties > Trunking Network > NXDN Network > Indicator)
- Configuring **Group-registration Timer** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Timer)

Clearing the Registration Information from a System (Registration Clear)

The transceiver can clear from the system the information about the transceiver location registration.

Conditions for the transceiver to clear the transceiver location registration information from the system

The transceiver clears from the system the information about the transceiver location registration under the following conditions.

- **If the transceiver is turned OFF**

The transceiver will be turned OFF after clearing from the system the information about the location registration. If **Power-off Status** is configured, the transceiver will clear from the system the information about location registration after sending the **Power-off Status**.

In Portable, if the transceiver is turned OFF by a user removing the battery pack, the transceiver will not clear from the system the information about the location registration.

- **If changed to a system other than NXDN Trunking system**

The transceiver will migrate to the changed Zone-channel after clearing from the system the information about location registration.

- **If changed to a different NXDN Trunking system**

The transceiver will migrate to the changed channel after clearing from the system the information about location registration.

Transceiver's behavior if clearing the information about location registration from the system

If the transceiver receives from the system a response message (indicating permission, rejection or failure), the transceiver does not receive any response from the system, or the timer for random access expires, the transceiver will refresh the information about the site from where the information of the location registration has cleared.

3.5 Using NXDN ID to Initiate a Selective Call

An individual call and group call are available by using NXDN IDs. In addition, a message can be sent to a specified target ID in various types of message communications.

Available Calls

The following various types of calls can be used in an NXDN Trunking system. For transceiver operations and behaviors, refer to the instructions of each call type.

- Individual Call (Transmission Trunked)
- Group Call (Transmission Trunked)
- Individual Call (Message Trunked (Enhanced))
- Group Call (Message Trunked (Enhanced))
- Broadcast Group Call
- Status Call
- Short Data Call
- Long Data Call
- Telephone Call

For an Individual Call and Group Call, the transceiver behavior varies depending on the configuration of the **Trunking Type** ("Transmission Trunked" or "Message Trunked (Enhanced)"). (Refer to [Trunking Type](#).)

Note

- If a user wishes to send or receive an Individual Call, Group Call, Status Message, or Short Message, refer to "[Transition for Each Mode](#)" for the transitions to each mode.

Trunking Type

For an Individual Call and Group Call in an NXDN Trunking system, the method for releasing a traffic channel varies as follows, depending on the configuration of **Trunking Type**. The configuration for **Trunking Type** must be changed along with the configuration of the system.

Table 3-8 Trunking Type

Configuration	Description
Transmission Trunked	The system releases a traffic channel after the communication ends on the traffic channel by a user of the transmitting transceiver releasing the PTT switch. This parameter can be used for calls such as an Individual Call and Group Call which do not determine whether or not the receiving transceiver is available for communications before initiating a call. (Refer to Making an Individual Call (Transmission Trunked), Making a Group Call (Transmission Trunked).)
Message Trunked (Enhanced)	The link to a traffic channel is maintained after the communication ends by a user of the transmitting transceiver releasing the PTT switch on a traffic channel until a certain period of time elapses. To release the traffic channel before a certain period of time elapses, an additional operation is required on the transceiver. While the link to a traffic channel is being maintained, the transceiver can communicate again without reestablishing a link by pressing the PTT switch. This parameter can be used for calls such as an Individual Call and Group Call which determine whether or not the receiving transceiver is available for communications before initiating a call. (Refer to Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Message Trunked (Enhanced)), Making a Group Call with the Link to a Traffic Channel Retained (Message Trunked (Enhanced)).)

Configuration using KPG-D3/ D3N

Configuring **Trunking Type** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > General)

Transition for Each Mode

If a user wishes to send or receive an Individual Call, Group Call, Status Message, or Short Message, the user must operate the transceiver after selecting the desired mode. Refer to “[Transition for Each Mode](#)” for transition for each mode.

3.6 Making an Individual Call (Transmission Trunked)

Individual Call can be used to initiate a call to a target transceiver individually to establish voice calls.

By specifying a Unit ID, the transceiver can initiate a call to the transceiver having the Unit ID.

“Transmission Trunked” needs to be configured for **Trunking Type** on both the transmitting transceiver and the receiving transceiver to initiate an Individual Call in an NXDN Trunking system. “Transmission Trunked” or “Message Trunked” also needs to be configured for **Trunking Type** on the system. (Refer to [Trunking Type](#).)

Initiating an Individual Call (Transmission Trunked)

An Individual Call can be started by one of the following methods:

- **Individual Call Mode**

In Individual Call Mode, an Individual Call is initiated by selecting a Unit ID configured in the Individual ID List or directly entering a Unit ID. (Refer to [Individual ID List](#).)

Pressing the **Individual**, **Individual + Status**, or **Individual + Short Message** button places the transceiver in Individual Call Mode.

The transceiver also enters Individual Call Mode by selecting “Individual”, “Individual + Status”, or “Individual + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

If “Individual”, “Individual + Status”, or “Individual + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad also places the transceiver in Individual Call Mode. The transceiver enters Unit ID Shortcut Entry Mode or will be on hold as the first digit of the Unit ID is entered. (Refer to Common Function Part [Keypad Operation](#).)

- **Selcall on PTT**

The transceiver initiates an Individual Call when the **PTT** switch is pressed on a channel where “Individual Call” is configured for **Selcall on PTT**. The Unit ID of the target transceiver can be configured by selecting one Unit ID from the Individual ID List by using KPG-D3/ D3N.

- **Talkback**

After an Individual Call is received, pressing the **PTT** switch while the Unit ID Name or Unit ID of the transmitting transceiver is displayed enables the transceiver to respond (Talkback) to the transmitting transceiver of the Individual Call.

- **Stack Mode**

Selecting the receive history in Stack Mode and pressing the **PTT** switch initiates an Individual Call. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

- **PC command**

The transceiver starts an Individual Call upon the receipt of a PC command from the communication port.

The following describes how to initiate an Individual Call in Individual Call Mode.

Operating the transceiver

● Initiating an Individual Call by list selection

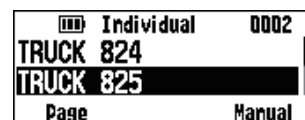
1 Press the **Individual**, **Individual + Status**, or **Individual + Short Message** button.

The transceiver enters Individual Call Mode, and a selection screen for the Individual ID List will appear.

The following operations are identical even if the transceiver enters Individual Call Mode by a user pressing the **Menu** button or using the keypad.

2 Press the **[▲]** or **[▼]** button to select a Unit ID from the Individual ID List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Initiating an Individual Call.

Press the **PTT** switch to initiate a Voice Call.

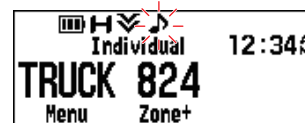
The display changes to “Individual” and “Calling”.



The transceiver can start communications after a traffic channel is assigned to the transceiver and the “” icon is blinking.

Press the **Menu** () or **[*]** button to initiate a Paging Call.

If Individual Call Mode has been entered with “Individual + Status” or “Individual + Short Message”, Status Mode or Short Message Mode is entered by pressing the **[▶]** button.



Note

- The selection screen for the Individual ID List closes at the same time as pressing the **PTT** switch. If selecting an ID and sending an Individual Call again, reexecute the operations from step 1.

● Initiating an Individual Call using Manual Dialing

To initiate an Individual Call using Manual Dialing, **Manual Dialing** must be enabled using KPG-D3/ D3N.

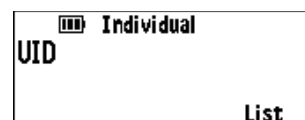
1 Press the **Individual**, **Individual + Status**, or **Individual + Short Message** button.

The transceiver enters Individual Call Mode, and a selection screen for the Individual ID List will appear.

The following operations are identical even if the transceiver enters Individual Call Mode by a user pressing the **Menu** button or using the keypad.

2 Press the **Back** () button.

The Unit ID entry display appears.



3 Enter a Unit ID.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

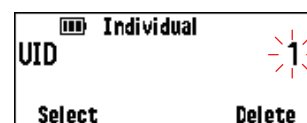
- **If using the keypad:**

A Unit ID can be entered by pressing the [0] to [9] buttons.

- **Using the PF buttons**

Press the [▲] or

[▼] button to select the number and press the **Menu** ([□]) or [*] button to confirm the selected number.



4 Initiating an Individual Call.

Press the **PTT** switch to initiate a Voice Call.

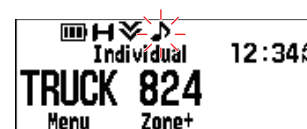
The display changes to “Individual” and “Calling”.



The transceiver can start communications after a traffic channel is assigned to the transceiver and the “” icon is blinking.

Press the **Menu** ([□]) or [*] button to initiate a Paging Call.

If Individual Call Mode has been entered with “Individual + Status” or “Individual + Short Message”, Status Mode or Short Message Mode is entered by pressing the [▶] button.



Note

- The entry screen for the ID closes at the same time as pressing the **PTT** switch. If entering an ID and sending an Individual Call again, reexecute the operations from step 1.

Note

- If the Individual Call Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode by pressing the **Individual** button. A selection screen for the Individual ID List will appear by pressing the **Back** ([←]) button.
- If no ID is registered in the Individual ID List, the transceiver enters Manual Dialing mode by pressing the **Individual** button if **Manual Dialing** is enabled. In this case, the transceiver cannot enter Individual Call Mode if **Manual Dialing** is disabled.

Transceiver behavior during transmitting

“Calling” appears on the display of the transceiver from when the transceiver initiates various call requests until the call requests are determined.



The following displays appear depending on the response message from the system after initiating various calls in an NXDN Trunking system.

Table 3-9 Transceiver Behavior During Transmitting

Status	Transceiver Behavior
If the transceiver receives a response message indicating the queue state from the system:	If no traffic channel is available in the system and if the transceiver receives a response message indicating the queue state from the system, a Call Queue Tone (2 beeps) sounds from the transceiver and then “Queued” appears on the display. After that, the transceiver will enter the standby state.
If the transceiver receives a response message from the system indicating a busy state of the receiving transceiver:	The Busy Tone 2 (3 beeps) sounds from the transceiver, and “Busy” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a response message from the system, indicating that no traffic channel is available:	The System Busy Tone (3 beeps) sounds from the transceiver and “System Busy” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a response message from the system indicating no response from the receiving transceiver:	The No Reply Tone (4 beeps) sounds from the transceiver, and “No Reply” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a message from the system, such as a service invalid message:	The Call Invalid Tone (4 beeps) sounds from the transceiver, and “Invalid” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver does not receive any message from the system:	The Call Fail Tone (2 beeps) sounds from the transceiver, and “Fail” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.

Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when the **PTT** switch is pressed to initiate a call request. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver while the **PTT** switch is pressed and held after a call request is initiated by pressing the **PTT** switch. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Manual Dialing** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)
- Configuring **Selcall on PTT** ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Personalities > General > Selcall on PTT)

Receiving an Individual Call (Transmission Trunked)

The transceiver can receive an Individual Call if the received Unit ID matches the Unit ID preconfigured for the transceiver.

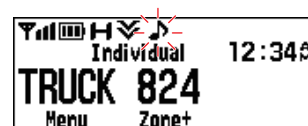
Note

- When the transceiver receives an Individual Call in an NXDN Trunking system, the transceiver will automatically send a response message to the system indicating permission for the incoming calls.

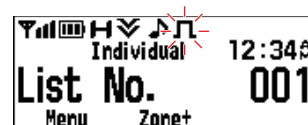
Transceiver behavior

1 The transceiver receives an Individual Call.

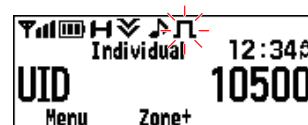
The “” icon blinks, and the ID Name of the transmitting transceiver appears.



If the ID Name is not configured in the Individual ID List, the Individual ID List number appears.



If the Unit ID is not configured in the Individual ID List, the Unit ID appears.



2 Press the PTT switch.

The transceiver can respond to the received Unit ID. When a button other than the PTT switch is pressed, the configured function will be activated.

Note

- If **Busy LED** is enabled, the LED lights green regardless of whether a call is received or not on a traffic channel. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving an Individual Call \(Transmission Trunked\)/ Paging Call](#).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [Transceiver behavior when receiving an Individual Call \(Transmission Trunked\)/ Paging Call](#).)
- If the transceiver receives the Unit ID Name by Over-the-Air Alias, the received Unit ID Name will appear.
- If the Unit ID Name received using Over-the-Air Alias is stored in the stack memory of the transceiver, the stored Unit ID Name will appear.
- The transceiver can send the ID of the transmitting transceiver from the communication port on the transceiver when receiving an Individual Call (Transmission Trunked).

Transceiver behavior when receiving an Individual Call (Transmission Trunked)/ Paging Call

● Alert Tone

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration of **Alert Tone (Individual Call)** or **Alert Tone (Paging Call)** for the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert Tone (Individual Call)** or **Alert Tone (Paging Call)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to NXDN Trunking.

● Selective Call Alert LED

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration of **Alert LED (Individual)** or **Alert LED (Paging Call)** for the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert LED (Individual Call)** or **Alert LED (Paging Call)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration in **LED Color** common to NXDN Trunking.

● Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration in **Selective Call Alert LED**. Also, if the buttons on the transceiver are pressed while the LED flashes according to the configuration of **Selective Call Alert LED**, and if the matching state of the Optional Signaling continues, the LED flashes yellow.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **Alert Tone (Individual Call)/ Alert Tone (Paging Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Individual ID > NXDN Individual ID List)
- Configuring **Alert LED (Individual Call)/ Alert LED (Paging Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Individual ID > NXDN Individual ID List)
- Configuring **Tone Number** common to NXDN Trunking ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **LED Color** common to NXDN Trunking ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)

Individual ID List

If making Individual Calls, the desired Unit IDs need to be preconfigured in the transceiver using KPG-D3/ D3N prior to use of the transceiver. A maximum of 1500 Unit IDs can be configured for Individual ID List.

Individual ID List is commonly used in an NXDN Conventional system and NXDN Trunking system.

Table 3-10 Individual ID List

Configuration	Description
ID	A Unit ID can be configured in the range between 1 and 65519 (decimal). However, an ID having the number of 60001 or larger cannot be used in an NXDN Trunking system.
ID Name	The caller's ID Name is configured. A maximum of 14 characters can be configured for the ID Name. If the ID Name of the transmitting transceiver is registered in the Individual ID List, the ID Name appears when the transceiver receives a call. After that, the received Unit ID Name appears upon receipt of the Unit ID Name by Over-the-Air Alias while receiving a call. If the transceiver cannot receive the Unit ID Name, the stored ID Name appears if the ID Name is stored for the Unit ID stored in the transceiver. The Unit ID number appears if the above conditions are not satisfied.
Type	The permission or inhibition of transmission of the receiving party can be configured. An ID for which "RX Only" is configured for Type does not appear on the ID selection display in Individual Call Mode, and a user cannot select the ID in Individual Call Mode. If the transceiver receives a call from an ID for which "RX Only" is configured for Type , the caller's ID Name appears. In this case, a user cannot initiate a call to the party even if the user attempts to respond by pressing the PTT switch.
Alert Tone (Individual Call)	The type of tone sounding from the transceiver can be configured for an Individual Call from the Unit IDs registered in the Individual ID List.
Alert LED (Individual Call)	The color of flashing LED can be configured for an Individual Call from the Unit IDs configured in the Individual ID List.
Alert Tone (Individual Call (Incoming))	If Automatic Response is disabled, the type of tone sounding from the transceiver can be configured for an Individual Call (Message Trunked (Enhanced)) from the Unit IDs registered in the Individual ID List.
Alert LED (Individual Call (Incoming))	If Automatic Response is disabled, the color of flashing LED can be configured for an Individual Call (Message Trunked (Enhanced)) from the Unit IDs registered in the Individual ID List.
Alert Tone (Paging Call)	The type of tone sounding from the transceiver can be configured for a Paging Call from the Unit IDs configured in the Individual ID List.
Alert LED (Paging Call)	The color of flashing LED can be configured for a Paging Call from the Unit IDs configured in the Individual ID List.



- To use each function of Alert LED, **Selective Call Alert LED** needs to be enabled.

Configuration using KPG-D3/ D3N

Configuring **Individual ID List** (See Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Individual ID > NXDN Individual ID List)

Notifying the User with a Tone That a Call Request Has Been Initiated (Call Request Tone)/ Notifying the User with a Tone That a Call Request Is in Progress (Call Processing Tone)

Call Request Tone is the function to sound a Call Request Tone (1 beep) from the transceiver when a call request for an Individual Call or Group Call is initiated by pressing the **PTT** switch in an NXDN Trunking system.

Also, **Call Processing Tone** is the function to sound a Call Processing Tone (2 beeps) from the transceiver while the **PTT** switch is pressed and held after a call request for an Individual Call or Group Call is initiated by pressing the **PTT** switch in an NXDN Trunking system.

Depending on the system condition, it may take few seconds to determine the call request upon the initiation of a call request using Individual Call or Group Call. Use of this function notifies a user by emitting a tone from the transceiver of the condition from when the transceiver initiates a call request using Individual Call or Group Call until the call request is determined.

When the transceiver initiates an Individual Call or Group Call using this function, the transceiver behaves as follows.

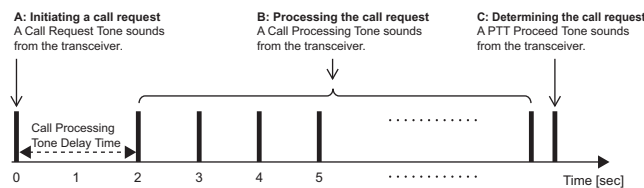


Figure 3-4 Call Request Tone/ Call Processing Tone

- A:** A Call Request Tone (1 beep) sounds from the transceiver when a call request is initiated by pressing the **PTT** switch.
- B:** A Call Processing Tone (2 beeps) sounds from the transceiver while the **PTT** switch is pressed and held after initiating a call request by pressing the **PTT** switch. The length of time from when a call request is initiated by pressing the **PTT** switch until the Call Processing Tone (2 beeps) sounds from the transceiver can be configured in **Call Processing Tone Delay Time**.
- C:** If **PTT Proceed Tone** is enabled, a PTT Proceed Tone (3 beeps) sounds from the transceiver when a call request is determined. The user can initiate the communication after the call request has been established. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)

Note

- This function can be used with the following calls:
 - Individual Call (Message Trunked (Enhanced))
 - Group Call (Transmission Trunked)
 - Group Call (Message Trunked (Enhanced))

Configuration using KPG-D3/ D3N

- Configuring **Call Request Tone** to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **Call Processing Tone** to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)

Restricting IDs for Which the Transceiver Can Initiate a Call (Encodable Unit ID Range)

Encodable Unit ID Range is the range of the Unit ID used by the transceiver to initiate a call.

A Unit ID with which a user is allowed to initiate a call can be restricted using KPG-D3/ D3N. A user can initiate a call to a Unit ID configured in the Individual ID List even if it is outside the range of **Encodable Unit ID Range**. However, if making Individual Calls using **Manual Dialing**, the transceiver cannot call the Unit ID by entering the Unit ID outside the range of **Encode Unit ID Range**.

The transceiver for which **Encodable Unit ID Range** is not configured can initiate a call to all transceivers.

The transceiver unmutes the speaker and emits received audio when the transceiver receives the Unit ID satisfying the receiving conditions. In this case, the Unit ID of the transmitting transceiver appears on the receiving transceiver. If the Unit ID of the transmitting transceiver is in the range of the **Encodable Unit ID Range** or has been registered in the Individual ID List, the receiving transceiver can respond to the transmitting transceiver by pressing the **PTT** switch. If the Unit ID of the transmitting transceiver is outside the range of the **Encodable Unit ID Range** and also has not been registered in the Individual ID List, the receiving transceiver cannot respond to the transmitting transceiver.

Configuration using KPG-D3/ D3N

Configuring **Encodable Unit ID Range** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)

3.7 Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Message Trunked (Enhanced))

The Individual Call (Message Trunked (Enhanced)) is the function that allows a user to distinguish whether or not the receiving transceiver is available to communicate for initiating an Individual Call in an NXDN Trunking system.

Using the Individual Call (Message Trunked (Enhanced)) function, communications can be started without reestablishing a link between the transceiver and a traffic channel to respond to a call, as the link to the traffic channel has been maintained. This enables the occupation of a traffic channel assuring the continuity of communications without facing the busy channel to respond to a call. The traffic channel can be released by the transceiver operation.

The transmitting transceiver sends a message requesting an Individual Call to a system when initiating an Individual Call. After receiving the message requesting an Individual Call, the system sends a message requesting an acknowledgment to the receiving transceiver to confirm the availability of the receiving transceiver. The receiving transceiver sends an acknowledgment for the message requesting the acknowledgment to the system. Subsequently, upon receipt of a message requesting the connection from the receiving transceiver, the system assigns a traffic channel. The transmitting transceiver and the receiving transceiver can communicate after receiving from the system a message assigning a traffic channel.

To use this function, "Message Trunked (Enhanced)" needs to be configured for **Trunking Type** on both the transmitting transceiver and the receiving transceiver using KPG-D3/ D3N. "Message Trunked (Enhanced)" also needs to be configured for **Trunking Type** on the system. (Refer to [Trunking Type](#).)

Note

- For an Individual Call (Message Trunked (Enhanced)), the following functions for a normal Individual Call are available. (Refer to [Making an Individual Call \(Transmission Trunked\)](#).)
 - Individual ID List
 - Encodable Unit ID Range

Initiating an Individual Call (Message Trunked (Enhanced))

An Individual Call (Message Trunked (Enhanced)) can be initiated by doing any one of the following operations.

● Individual Call Mode

A message requesting an Individual Call is sent to a system by pressing the **PTT** switch after selecting a Unit ID configured in the Individual ID List, or directly specifying a Unit ID in Individual Call Mode.

Pressing the **Individual**, **Individual + Status**, or **Individual + Short Message** button places the transceiver in Individual Call Mode.

The transceiver also enters Individual Call Mode by selecting “Individual”, “Individual + Status”, or “Individual + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

If “Individual”, “Individual + Status”, or “Individual + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad also places the transceiver in Individual Call Mode. The transceiver enters Unit ID Shortcut Entry Mode or will be on hold as the first digit of the Unit ID is entered. (Refer to Common Function Part [Keypad Operation](#).)

● Stack Mode

Selecting the receive record in Stack Mode and then pressing the **PTT** switch sends a message requesting an acknowledgment. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

● Selcall on PTT

A message requesting an Individual Call is sent to a system by selecting the channel for which the target Unit ID for **Selcall on PTT** has been configured and then by pressing the **PTT** switch. The Unit ID of the target transceiver can be configured by selecting one Unit ID from the Individual ID List by using KPG-D3/ D3N.

● Call button

Pressing one of the **Call 1** to the **Call 6** buttons sends a message requesting an Individual Call to the system for the Unit ID allocated to the button pressed.

For mobile, if any of ports from “Call 1” through “Call 6” assigned as AUX Input ports becomes active, a message requesting Individual Call will be sent to the system for the Unit ID corresponding to the activated port.

● PC Command

A message requesting an Individual Call is sent to a system by receiving the PC command from the communication port.

Operating the transceiver

1 Initiate an Individual Call (Message Trunked (Enhanced)) by following one of the methods mentioned above.

A message requesting an Individual Call is sent to a system.



If the receiving transceiver is within the communications range, “Holding” appears on the display waiting for a response from the receiving transceiver.



2 Receive from the system a message for traffic channel assignment.

The “” icon blinks, and the transceiver enters a state allowing transmission of an Individual Call.



3 Press the PTT switch.

The Individual Call is initiated.

Even after the **PTT** switch is released to end the transmission, the link between the transceiver and the traffic channel is maintained.

Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call requesting an Individual Call (Message Trunked (Enhanced)) is initiated. Also, if the **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment after the call requesting an Individual Call (Message Trunked (Enhanced)) is initiated. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for transmissions with Individual Call.
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- The DTMF code can be sent during the call by pressing one of the [0] button to [9] buttons, the [*] button or the [#] button.
- Press the **Clear** button to terminate the Individual Call. While the transceiver is on standby to receive a response from the receiving transceiver, canceling the call is possible by pressing the **Clear** button.
- If **Disconnect Indication Tone** is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver when an Individual Call is completed.
- For Mobile, if **On-hook Disconnect** is enabled, an Individual Call terminates by placing the microphone in the on-hook state.
- For details on the information displayed on the display during transmission, refer to “[Transceiver behavior during transmitting](#)”.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port ( [See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)
- Configuring **Selcall on PTT** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Personalities > General > Selcall on PTT)
- Configuring a Unit ID corresponding to the **Call 1** to **Call 6** buttons or ports ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call > Call 1~Call 6)

Receiving an Individual Call (Message Trunked (Enhanced))

The transceiver can receive an Individual Call if the received Unit ID matches the Unit ID preconfigured for the transceiver. To receive an Individual Call (Message Trunked (Enhanced)), the transceiver must receive from the system a message requesting an acknowledgment for the Individual Call, and send to the system a message requesting the connection. The transceivers can initiate the communication after receiving the message for traffic channel assignment from the system.

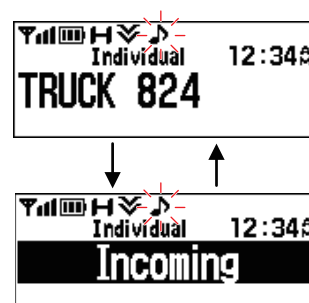
Operating the transceiver

The transceiver's behavior varies depending on the configuration for Automatic Response.

● If Automatic Response is disabled

1 Receive from the system a message requesting reception of an Individual Call.

The “” icon blinks and then “Incoming” appears for 1 sec and the ID Name of the transmitting transceiver appears for 2 sec alternately.



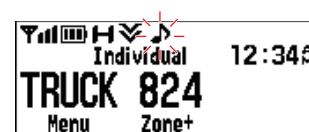
2 Press the **PTT** switch or the **Call Response** button.

The “” icon blinks and a message requesting the connection is sent to the system.



3 Receive from the system a message for traffic channel assignment.

The transceiver enters a state allowing communication. By pressing the **PTT** switch, the transmitting transceiver can be called.



Note

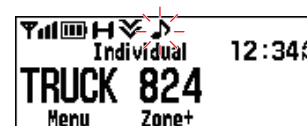
- If a response to the received Individual Call is not sent and the status below is initiated, “Missed Call” appears on the display.
 - When the time configured with **Incoming Reset Time** elapses
 - When the transmitting transceiver cancels call
 - The time configured in **Incoming Reset Time** elapsed.
 - The system timed out.
 - When an Individual Call is received from an opponent having the **Type** configured as “RX Only” with the Individual ID List, pressing the **PTT** switch causes the transceiver to generate Warning Tone A (continuous beep) and does not allow response. Even in this case, pressing the **Call Response** button still allows the transceiver to respond to the received Individual Call.
 - For Mobile, if **Off-hook Connect** is enabled, the received Individual Call can be answered by placing the microphone in the off-hook state.
 - If the **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a message requesting the connection is transmitted. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
 - If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for transmissions with Individual Call.
 - Reception can be canceled by pressing the **Clear** button while the transceiver is in the state in Step 1.
 - Pressing the **Clear** button allows terminating the Individual Call. For Mobile, if **On-hook Disconnect** is enabled, an Individual Call terminates by placing the microphone in the on-hook state.
 - If **Disconnect Indication Tone** is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver when an Individual Call is completed.
 - If the transceiver receives an Emergency Call, the transceiver automatically sends a message requesting a connection regardless of the configuration for the Automatic Response.
 - If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving an Individual Call \(Message Trunked \(Enhanced\)\)](#).)
 - If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [Transceiver behavior when receiving an Individual Call \(Message Trunked \(Enhanced\)\)](#).)
- If Automatic Response is enabled

1 Receive from the system a message requesting reception of an Individual Call.

A message requesting the connection is automatically sent to the system.

**2 Receive from the system a message for traffic channel assignment.**

The “” icon blinks and the transceiver enters a state allowing communication. By pressing the **PTT** switch, the transmitting transceiver can be called.



 Note

- Pressing the **Clear** button allows terminating the Individual Call. For Mobile, if **On-hook Disconnect** is enabled, an Individual Call terminates by placing the microphone in the on-hook state.
- If the transceiver receives an Emergency Call, the transceiver automatically sends a message requesting a connection regardless of the configuration for the Automatic Response.
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving an Individual Call \(Message Trunked \(Enhanced\)\)](#).)
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [Transceiver behavior when receiving an Individual Call \(Message Trunked \(Enhanced\)\)](#).)

Transceiver behavior when receiving an Individual Call (Message Trunked (Enhanced))● **Alert Tone****If Automatic Response is disabled:**

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration for **Alert Tone (Individual Call (Incoming))** of the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert Tone (Individual Call (Incoming))** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to NXDN Trunking.

If Automatic Response is enabled:

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration for **Alert Tone (Individual Call)** of the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert Tone (Individual Call)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to NXDN Trunking.

● **Selective Call Alert LED****If Automatic Response is disabled:**

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration for **Alert LED (Individual Call (Incoming))** of the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert LED (Individual Call (Incoming))** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration in **LED Color** common to NXDN Trunking.

If Automatic Response is enabled:

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration for **Alert LED (Individual Call)** of the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert LED (Individual Call)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration in **LED Color** common to NXDN Trunking.

● **Optional Signaling LED**

If **Optional Signaling LED** is enabled, the LED flashes yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration in **Selective Call Alert LED**. Also, if the buttons on the transceiver are pressed while the LED flashes according to the configuration of **Selective Call Alert LED**, and if the matching state of the Optional Signaling continues, the LED flashes yellow.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **Alert Tone (Individual Call (Incoming))/ Alert Tone (Individual Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Individual ID > NXDN Individual ID List)
- Configuring **Alert Tone (Individual Call (Incoming))/ Alert Tone (Individual Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > NXDN Individual ID > NXDN Individual ID List)
- Configuring **Tone Number** common to NXDN Trunking ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **LED Color** common to NXDN Trunking ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)

Sending an Acknowledgment Automatically (Automatic Response)

Automatic Response is the function to automatically send a message requesting the connection upon receipt of a message requesting an acknowledgment for an Individual Call.

If this function is enabled, the transceiver automatically sends a message requesting the connection upon receipt of a message requesting an acknowledgment for an Individual Call.

If this function is disabled, the transceiver automatically sends no message requesting the connection even if the transceiver has received message requesting an acknowledgment for an Individual Call. In this case, a message requesting the connection can be sent manually by a user operating the transceiver. For operation methods, refer to “[If Automatic Response is disabled](#)” of “[Receiving an Individual Call \(Message Trunked \(Enhanced\)\)](#)”.

Configuration using KPG-D3/ D3N

Configuring **Automatic Response** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > RX Options)

3.8 Making a Group Call (Transmission Trunked)

Group Call can be used to engage in 2-way group voice calls by initiating a call to a group.

The transceiver can initiate a call to the transceivers having the same Group ID by specifying the Group ID. The transceiver can also initiate a call to all transceivers by specifying the Group ID for which "ALL" is configured.

"Transmission Trunked" needs to be configured for **Trunking Type** on both the transmitting transceiver and the receiving transceiver to initiate a Group Call in an NXDN Trunking system. "Transmission Trunked" or "Message Trunked" also needs to be configured for **Trunking Type** on the system. (Refer to [Trunking Type](#).)

Initiating a Group Call (Transmission Trunked)

Group Call can be started by one of the following methods:

- **Selecting a channel**

When a channel is selected and the **PTT** switch is pressed, the transceiver starts a Group Call using Group ID configured for the channel.

If "TX and RX" is configured in **Type** of the selected channel, the transceiver can call or wait for a call on the channel. If "RX Only" is configured in **Type**, the transceiver can wait for a call on the channel but not make a call.

- **Selcall on PTT**

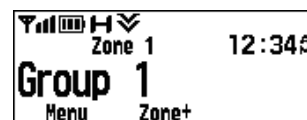
The transceiver starts a Group Call using Group ID configured for the channel when the **PTT** switch is pressed on the channel where "Group Call" is configured for Selcall on PTT.

- **PC Command**

The transceiver starts a Group Call upon the receipt of a PC command from the communication port.

Operating the transceiver

1 Select a channel configured with a Group ID for making a Group Call.



2 Press the **PTT** switch.

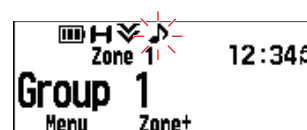
A message requesting a Group Call is sent to the system.



3 Receive from the system a message for traffic channel assignment.

The "📡" icon blinks and the transceiver enters a state allowing communication.

Even after the **PTT** switch is released to end the transmission, the link between the transceiver and the traffic channel is maintained.



Note

- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when the **PTT** switch is pressed to initiate a call request. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver while the **PTT** switch is pressed and held after a call request is initiated by pressing the **PTT** switch. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- The transceiver starts a Group Call only by a user pressing the **PTT** switch if the transceiver transmits on a channel with “Group Call” configured for **Selcall on PTT**. In this case, a Group ID does not need to be selected by using the transceiver.
- For details on the information displayed on the display during transmission, refer to “[Transceiver behavior during transmitting](#)”.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Selcall on PTT** (NXDN Trunking System) ([See](#) Radio Configuration > System Personalities > Systems > NXDN Trunking > Personalities > General > Selcall on PTT)

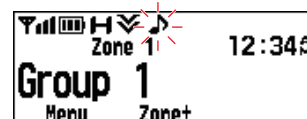
Receiving a Group Call (Transmission Trunked)

If the received Group ID matches the Group ID configured for the transceiver, the transceiver can receive the Group Call.

Transceiver behavior**1 The transceiver receives a Group Call.**

The “” icon blinks and a received Group ID appears.

According to the configuration of **Group Call Display Type**, any of the received Group ID, the Unit ID of the transmitting transceiver, or both appears. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)

**2 Press the PTT switch.**

The transceiver can respond to the received Group ID. When a button other than the **PTT** switch is pressed, the configured function will be activated.

Note

- If **Busy LED** is enabled, the LED lights green on a traffic channel regardless of whether reception is enabled or disabled. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound from the transceiver according to the configuration in **Tone Number**.
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving according to the configuration in **LED Color**.
- The transceiver can record the receipt of a Group Call. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)
- When the transceiver receives the Group ID for which “ALL” is configured, the transceiver can respond using the Group ID if the received Group ID is registered in the received zone.
If no Group ID is configured in the ID List, the receiving transceiver can receive a call but the receiving transceiver cannot respond to the call. In this case, the ID Name of the transmitting transceiver does not appear even if **Over-the-Air Alias** is enabled. (Refer to [Over-the-Air Alias](#).)
- The transceiver can send the ID of the transmitting transceiver from the communication port on the transceiver when receiving a Group Call.
- If the transceiver receives a Group Call from a telephone, the Encryption function will be disabled.

Configuration using KPG-D3/ D3N

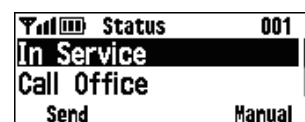
- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **Tone Number** ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **LED Color** ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)

Transmission Operation during Receipt of a Group Call

The transceiver can send a Status Message or Short Message, etc. during receipt of a Group Call.

Sending a Status Message after entering Status Mode during receipt of a Group Call**1** Select a Status Message after entering Status Mode during receipt of a Group Call.

Refer to “[Sending a Status Message](#)” of 2 NXDN CONVENTIONAL SYSTEM for operation methods.

**2** Press the **PTT** switch, the **Menu** () button, or **[*]** button.

The transceiver sends the Status Message.



Sending a Short Message after entering Short Message Mode during receipt of a Group Call

1 Enter a Short Message after entering Short Message Mode during receipt of a Group Call.

Refer to “[Sending a Short Message](#)” of 2 NXDN CONVENTIONAL SYSTEM for operation methods.



2 Press the PTT switch or the Menu ([M]) button.

The transceiver sends the Short Message.



Sending the own location information by the button operation during receipt of a Group Call

Pressing the **Send the GPS Data** button or the **Send the Location Data** button during receipt of a Group Call sends the own location information. (Refer to [Sending GPS Data](#).)



Display When the Transceiver Receives a Group Call (Group Call Display Type)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Group Call Display Type is the function to display the received information on the display when the transceiver receives a Group Call.

Table 3-11 Group Call Display Type

Configuration	Description
Group ID	The Group ID of the received Group Call appears. If the ID Name is not configured in the Group ID List, the Group ID List number appears.
Calling Transceiver ID	The Unit ID of the transmitting transceiver appears. If the ID Name is stored in the Unit ID stored in the stack memory of the transceiver, the stored ID Name appears. If the ID Name is not stored in the Unit ID stored in the stack memory of the transceiver, and if the ID Name of the received Unit ID is configured in the Unit ID List, the ID Name in the Unit ID List appears. The Unit ID List number appears if the above conditions are not satisfied. If the transceiver receives the Unit ID Name, the received Unit ID Name appears after 500 ms elapses upon the appearance of the Unit ID. “PHONE CALL” appears if the transceiver receives a Group Call from a telephone.
Calling Transceiver ID/ Group ID	The Group ID of the received Group Call and the Unit ID of the transmitting transceiver appear for 2 sec alternately. If the transceiver receives a Group Call from a telephone, the Group ID of the received Group Call and “PHONE CALL” appear for 2 sec alternately.

Note

- If the transceiver receives Status Message or Short Message in Group Call, the Unit ID of the transmitting transceiver and the received message appear regardless of the configuration in **Group Call Display Type**.
- This function can be used with the Group Call (Message Trunked (Enhanced)) and the Broadcast Group Call.

Configuration using KPG-D3/ D3N

Configuring **Group Call Display Type** (See Radio Configuration > Protocol Options > NXDN > General > Common Options)

Preventing the Functions Working with Group Call Reception from Activating (Group Call Alert Inhibit)

Group Call Alert Inhibit is the function that disables the Alert Tone, Selective Call Alert LED, Horn Alert and Caller ID Stack functions when the transceiver receives a Group Call.

Use of this function prevents specific functions from activating as follows even if these functions are enabled or configured to be enabled when the transceiver receives a Group Call.

- **Alert Tone**

The Alert Tones do not sound from the transceiver even if the transceiver receives a Group Call.

- **Selective Call Alert LED**

A Selective Call Alert LED does not blink even if the transceiver receives a Group Call.

- **Horn Alert (Mobile only)**

The headlights or the horn of a vehicle being connected to the Horn Alert port does not light or sound even if the transceiver receives a Group Call.

- **Caller ID Stack**

The Caller ID will not be stored in the transceiver stack memory even if the transceiver receives a Group Call.



- This function can be used with the Group Call (Message Trunked (Enhanced)) and the Broadcast Group Call.

Configuration using KPG-D3/ D3N

Configuring **Group Call Alert Inhibit** to be enabled or disabled (See Radio Configuration > Protocol Options > NXDN > General > Common Options)

Preventing Reception of a Group Call While the Transceiver Is Receiving an Individual Call (Ignore Group Call during Individual Call)

Ignore Group Call during Individual Call is the function that prevents receipt of a Group Call if receiving an Individual Call.

This function is used to prioritize the receipt of Individual Calls.

If this function is enabled, the transceiver cannot receive a Group Call (including data communications) while receiving an Individual Call and the Auto Reset Timer is counting down.



- Even if this function is enabled, the following Group Calls can be received.
 - A Group Call by a Group ID registered as a Priority Monitor ID
 - A Group Call using All Group ID
 - A Group Call for Emergency
- This function can be used with the Group Call (Message Trunked (Enhanced)) and the Broadcast Group Call.

Configuration using KPG-D3/ D3N

Configuring **Ignore Group Call during Individual Call** to be enabled or disabled (See Radio Configuration > Protocol Options > NXDN > General > Common Options)

PTT Hold Inhibit

PTT Hold Inhibit can be used to prevent the transmission behavior if transmission is disabled on a traffic channel when the transceiver starts transmitting using Group Call in an NXDN Trunking system.

While a transceiver transmits a Group Call, another transceiver receiving this Group Call cannot transmit a Group Call. If this function is enabled, the transceiver can notify the user that transmission is disabled even if the **PTT** switch is pressed to transmit when the transceiver is receiving a Group Call while another transceiver is transmitting using Group Call.

Using this function prevents the transceivers maintaining transmission from initiating transmission simultaneously when transmission becomes possible; therefore, the collision of calls can be avoided.

Table 3-12 PTT Hold Inhibit

Configuration	Description
Enabled	If transmission is inhibited on a traffic channel when the transceiver initiates a transmitting using Group Call in an NXDN Trunking system, the transmission behavior is not retained and the transmission ends immediately. While pressing the PTT switch, the Warning Tone A (continuous beep) sounds from the transceiver and transmission cannot be initiated.
Disabled	If transmission is inhibited on a traffic channel when the transceiver initiates a transmitting using Group Call in an NXDN Trunking system, the transmission behavior is maintained until the transmission is possible. While pressing the PTT switch, the transmission behavior is maintained. Pressing and holding the PTT switch, transmission will initiate if transmission becomes possible.

Note

- The transmission behavior is maintained regardless of the **PTT Hold Inhibit** configuration in Emergency Mode.
- This function can be used with the Group Call (Message Trunked (Enhanced)).

Configuration using KPG-D3/ D3N

Configuring **PTT Hold Inhibit** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > TX Options)

Initiating Another Call While Receiving a Group Call

The following operations are available while the transceiver is receiving a Group Call on the traffic channel:

● Transmission of Individual Call and Paging Call from Individual Call Mode

Selecting an Individual ID from the Individual ID List and pressing the **PTT** switch after entering Individual Call Mode initiates an Individual Call. Also, selecting an Individual ID from Individual Call Mode and pressing the **Menu** () button or **[*]** button initiates a Paging Call. To initiate a Paging Call, “Transmission Trunked” needs to be configured in **Trunking Type**. (Refer to [Initiating an Individual Call \(Transmission Trunked\)](#), [Initiating an Individual Call \(Message Trunked \(Enhanced\)\)](#).)

● Status Message transmission from Status Mode

Selecting a status from the Status List and pressing the **Menu** () button, **[*]** button, or **PTT** switch after entering Status Mode sends a Status Message. (Refer to [Sending and Receiving a Status Message \(Status Call\)](#).)

● Short Message transmission from Short Message Mode

A Short Message is entered after entering Short Message Mode. Pressing the **PTT** switch or **Menu** () button sends the Short Message. (Refer to [Sending and Receiving a Short Message \(Short Data Call\)](#).)

● Telephone Call transmission from Autodial Mode

Pressing the **PTT** switch or the **Menu** () button after entering Autodial Mode and then selecting a telephone number from the Autodial List sends a Telephone Call. (Refer to [Initiating a Telephone Call](#).)

● Remote Control message transmission from Remote Control Mode

The message to be sent is selected from the options menu after entering Remote Control Mode. Pressing the **Menu** () button, **[*]** button, or **PTT** switch sends the Remote Control message. (Refer to [Remote Operation by Radio Communication \(Remote Control\)](#).)

● Individual Call or Paging Call transmission from Stack Mode

Selecting the receive history in Stack Mode and pressing the **PTT** switch initiates an Individual Call. Also, selecting the receive history in Stack Mode and pressing the **Menu** () button or **[*]** button initiates a Paging Call. To initiate a Paging Call, “Transmission Trunked” needs to be configured in **Trunking Type**. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

● GPS data transmission

GPS data can be sent manually by a user pressing the **Send the GPS Data** button or the **Send the Location Data** button during receipt of GPS data. Also, pressing the **Menu** () button causes the transceiver to enter Menu Mode, and then the GPS data can be sent by selecting “Send the GPS Data” or “Send the Location Data”. (Refer to [Sending GPS Data](#), [Sending BLE Data Manually by Using a Button \(Send the Location Data \(Indoor Location\)\)](#), Common Function Part [Using Menu Mode](#).)

● BLE data transmission

By pressing the **Send the Location Data** button while a valid beacon signal (**Send Location via** configuration: “RF System”) is received, BLE data can be sent. Also, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the BLE data can be sent by selecting “Send the Location Data”. (Refer to [Sending BLE Data Manually by Using a Button \(Send the Location Data \(Indoor Location\)\)](#), Common Function Part [Using Menu Mode](#).)

● Call transmission by using a Call button

Pressing one of the **Call 1** to **Call 6** buttons sends the request message preconfigured in the transceiver for the following Call to the system. (Refer to [Initiating an Individual Call \(Message Trunked \(Enhanced\)\)](#), [Sending and Receiving a Status Message \(Status Call\)](#), and [Initiating a Telephone Call](#).)

- Individual Call (Message Trunked (Enhanced))
- Status Data Call
- Telephone Call

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Late Entry Cancel Time

Late Entry Cancel Time is the function to cancel the message for the configured length of time if the transceiver receives a message assigned to a traffic channel of the specified Group Call.

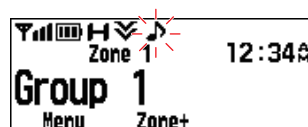
By canceling the message for traffic channel assignment which is sent on a control channel, the transceiver does not participate in a Group Call even if the call is receivable, and the transceiver can remain on the control channel.

This function allows another Call prioritized over a Group Call, and the efficient operation in a system. (Refer to [Late Entry](#).)

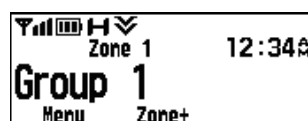
Operating the transceiver

Press the **Clear** button while receiving a Group Call on a traffic channel.

- While receiving a Group Call



- When the **Clear** button is pressed



If “Message Trunked (Enhanced)” is configured in **Trunking Type** of the transceiver, a Button Beep A (1 beep) sounds from the transceiver. However, if **Disconnect Indication Tone** is enabled, a Disconnect Indication Tone (2 beeps) sounds after a Button Beep A (1 beep).

If the own transceiver has started the transmission of a Group Call when “Message Trunked (Enhanced)” is configured in **Trunking Type**, **Late Entry Cancel Time** does not start counting down because the following operations terminate the call:

- Pressing the **Clear** button
- The microphone is placed in the on-hook state when **On-hook Disconnect** is enabled (Mobile only).

If “Transmission Trunked” is configured in **Trunking Type** of the transceiver, a Button Beep B (2 beeps) sounds from the transceiver.

The transceiver starts the countdown of Late Entry Cancel Time after migrating from a traffic channel to a control channel.

During the countdown, the following messages for traffic channel assignment of the Group Call received until just before the countdown starts are canceled.

- VCALL_ASSGN message
- VCALL_ASSGN_DUP message

If **Auto Reset Timer** is configured in the transceiver, the Auto Reset Timer stops.

Note

- For Mobile, if **On-hook Disconnect** is enabled, Late Entry Cancel Time is activated by placing the microphone in the on-hook state.

To use Late Entry Cancel Time, the transceiver needs to be preconfigured by using KPG-D3/ D3N.

Table 3-13 Late Entry Cancel Time Configuration

Configuration	Description
Off	The transceiver does not start the countdown of Late Entry Cancel Time.
1 sec to 254 sec	The transceiver starts the countdown of Late Entry Cancel Time. During the configured length of time, the message for traffic channel assignment of the Group Call received on the traffic channel is canceled.

The following operations or states of the transceiver stop the countdown of **Late Entry Cancel Time**:

- If a call other than a canceled Group Call is initiated (including if data transmission such as Status Message transmission from Status Mode is executed)
- If a message for traffic channel assignment other than a cancellation target ("VCALL_ASSGN", "VCALL_ASSGN_DUP") is received
- If Hunt is initiated
- If the zone or system is changed
- If the Group is changed
- If roaming to another NXDN Trunking site or NXDN Trunking system

Configuration using KPG-D3/ D3N

Configuring **Late Entry Cancel Time** ( See Radio Configuration > System Properties > Trunking Network > NXDN Network > Hunt Option)

3.9 Making a Group Call with the Link to a Traffic Channel Retained (Message Trunked (Enhanced))

Group Call (Message Trunked (Enhanced)) is the function that allows you to establish two-way group voice communications by initiating a call to a group. Using the Group Call (Message Trunked (Enhanced)) function, communications can be started without reestablishing a link between the transceiver and a traffic channel to respond to a call, as the link to the traffic channel has been maintained. This enables the occupation of a traffic channel assuring the continuity of communications without facing the busy channel to respond to a call. The traffic channel can be released by the transceiver operation.

To use this function, "Message Trunked (Enhanced)" needs to be configured for **Trunking Type** on both the transmitting transceiver and the receiving transceiver using KPG-D3/ D3N. "Message Trunked (Enhanced)" also needs to be configured for **Trunking Type** on the system. (Refer to [Trunking Type](#).)

Note

- The following functions can be used with the Group Call (Message Trunked (Enhanced)). (Refer to [Making a Group Call \(Transmission Trunked\)](#).)
 - Group Call Display Type
 - Group Call Alert Inhibit
 - Ignore Group Call during Individual Call
 - PTT Hold Inhibit

Initiating a Group Call (Message Trunked (Enhanced))

Group Call can be started by one of the following methods:

● Selecting a channel

When a channel is selected and the **PTT** switch is pressed, the transceiver starts a Group Call using Group ID configured for the channel.

If "TX and RX" is configured in **Type** of the selected channel, the transceiver can call or wait for a call on the channel. If "RX Only" is configured in **Type**, the transceiver can wait for a call on the channel but not make a call.

● Selcall on PTT

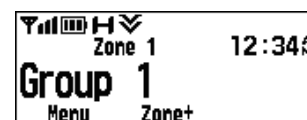
The transceiver starts a Group Call using Group ID configured for the channel when the **PTT** switch is pressed on the channel where "Group Call" is configured for Selcall on PTT.

● PC Command

The transceiver starts a Group Call upon the receipt of a PC command from the communication port.

Operating the transceiver

1 Select a channel configured with a Group ID for making a Group Call.



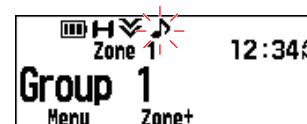
2 Press the **PTT** switch.

A message requesting a Group Call is sent to the system.



3 Receive from the system a message for traffic channel assignment.

The “” icon blinks and the transceiver enters a state allowing communication.



4 Press the **PTT** switch.

The Group Call is initiated.

Even after the **PTT** switch is released to end the transmission, the link between the transceiver and the traffic channel is maintained.

Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If **Optional Signaling LED** is enabled, the LED flashes yellow when the transceiver is transmitting.
- If the **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call requesting a Group Call (Message Trunked (Enhanced)) is initiated. Also, if the **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment after the call requesting a Group Call (Message Trunked (Enhanced)) is initiated. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for transmissions with Group Call.
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- The DTMF code can be sent during the call by pressing one of the **[0]** button to **[9]** buttons, the **[*]** button or the **[#]** button.
- Pressing the **Clear** button allows terminating the Group Call. For Mobile, if **On-hook Disconnect** is enabled, a Group Call terminates by placing the microphone in the on-hook state.
- If **Disconnect Indication Tone** is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver when a Group Call is completed.
- For details on the information displayed on the display during transmission, refer to “[Transceiver behavior during transmitting](#)”.

Receiving a Group Call (Message Trunked (Enhanced))

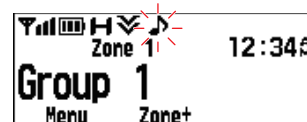
If the received Group ID matches the Group ID configured for the transceiver, the transceiver can receive the Group Call.

Transceiver behavior

1 The transceiver receives a Group Call.

The “” icon blinks and a received Group ID appears.

According to the configuration of **Group Call Display Type**, any of the received Group ID, the Unit ID of the transmitting transceiver, or both appears.



2 Press the PTT switch.

The transceiver can respond to the received Group ID.

Even after the **PTT** switch is released to end the transmission, the link between the transceiver and the traffic channel is maintained.

Note

- If **Busy LED** is enabled, the LED lights green on a traffic channel regardless of whether reception is enabled or disabled. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound from the transceiver according to the configuration in **Alert Tone** that has been configured in the Personality. However, if “Protocol Common” is configured in **Alert Tone**, the Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to NXDN Trunking.
- If **Selective Call Alert LED** is enabled, the LED flashes when receiving according to the configuration for **Alert LED Color** that has been configured in the Personality. However, if “Protocol Common” is configured in **Alert LED Color**, the LED flashes according to the configuration for **LED Color** common to NXDN Trunking.
- If **Optional Signaling LED** is enabled, the LED flashes yellow when the transceiver is receiving.
- Pressing the **Clear** button allows terminating the Group Call. For Mobile, if **On-hook Disconnect** is enabled, a Group Call terminates by placing the microphone in the on-hook state.
- If **Disconnect Indication Tone** is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver when a Group Call is completed.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **Alert Tone/ Alert LED Color** (Individually) ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Personalities > Individually > General)
- Configuring **Tone Number** common to NXDN Trunking ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **LED Color** common to NXDN Trunking ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)

3.10 Making an Informative Group Call (Broadcast Group Call)

Broadcast Group Call can be used to engage in one-way informative group voice calls by initiating a call to a group in an NXDN Trunking system.

The transceiver can initiate a call to the transceivers having the same Group ID by specifying the Group ID. The transceiver can also initiate a call to all transceivers by specifying the Group ID for which "ALL" is configured.

The transceiver initiates a Broadcast Call upon the receipt of a PC command from the communication port.

Note

- The following functions can be used with the Broadcast Group Call. (Refer to [Making a Group Call \(Transmission Trunked\)](#), [Making a Group Call with the Link to a Traffic Channel Retained \(Message Trunked \(Enhanced\)\)](#).)
 - Group Call Display Type
 - Group Call Alert Inhibit
 - Ignore Group Call during Individual Call

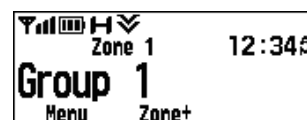
Initiating a Broadcast Call

The transceiver can initiate a Broadcast Group Call by a user pressing the **PTT** switch while Broadcast Group Call is enabled. Pressing the **Broadcast** button toggles the Broadcast Group Call between enabled and disabled.

If the **Menu** button is pressed to enter Menu Mode and then "Broadcast" is selected, Broadcast Group Call can also be toggled between enabled and disabled. (Refer to Common Function Part [Using Menu Mode](#).)

Operating the transceiver

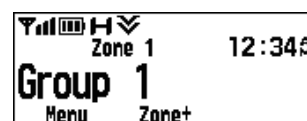
1 Select a channel configured with a Group ID for making a Broadcast Group Call.



2 Press the **Broadcast** button.

"**Group**" icon appears and then Broadcast Group Call will be enabled.

The following operations are identical even if Broadcast Group Call is enabled by pressing the **Menu** button.



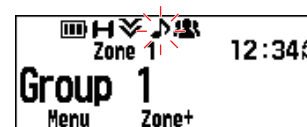
3 Press the **PTT** switch.

A message requesting a Broadcast Group Call is sent to a system.



4 Receive from the system a message for traffic channel assignment.

The “” icon blinks and the transceiver enters a state allowing communication.



5 Press the **PTT** switch.

The Broadcast Group Call is initiated.

Even after the **PTT** switch is released to end the transmission, the link between the transceiver and the traffic channel is maintained.

Pressing the **Broadcast** button after the transmission causes Broadcast Group Call to be disabled.

Note

- If the **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call requesting a Broadcast Group Call is initiated. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment after the call requesting a Broadcast Group Call is initiated. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- For details on the information displayed on the display during transmission, refer to “[Transceiver behavior during transmitting](#)”.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Receiving a Broadcast Group Call

If the received Group ID matches the Group ID configured for the transceiver, the transceiver can receive the Broadcast Group Call.

Note

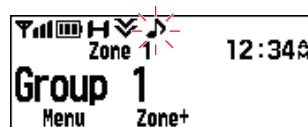
- The transceiver can receive the Broadcast Group Call initiated using the Group ID for which “ALL” is configured even if no Group ID is configured for the transceiver.

Transceiver behavior

The transceiver receives a Broadcast Group Call.

According to the configuration of **Group Call Display Type**, any of the received Group ID, the Unit ID of the transmitting transceiver, or both appears. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)

The “” icon blinks and a received Group ID appears.



Note

- If Alert Tone is configured to sound when receiving, an Alert Tone will sound from the transceiver according to the configuration in **Tone Number**.
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving according to the configuration in **LED Color**.
- If **Optional Signaling LED** is enabled, the LED flashes yellow when the transceiver is receiving.
- A user cannot reply to the received Group ID. Pressing the **PTT** switch causes “Receive Only” to appear on the transceiver display.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **Tone Number** ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **LED Color** ( [See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)

3.11 Common Functions for Data Communications

The following functions are used in common for data communications such as Status Call or Short Data Call, Long Data Call data transmission.

- Number of Retries
- Transmit Busy Wait Time
- Maximum ACK Wait Time

Number of Retries

If the transceiver does not receive the acknowledgment after the transceiver sends data and the time configured for **Maximum ACK Wait Time** elapses, the transceiver resends data. **Number of Retries** is the number of times for the transceiver to resend data. A smaller number can be configured if there is good communicating conditions, and a larger number can be configured if there are inferior communicating conditions.

Configuration using KPG-D3/ D3N

Configuring **Number of Retries** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Data Communications)

Transmit Busy Wait Time

The transceiver confirms that the traffic channel is available before sending data and then starts sending data when the channel is available. **Transmit Busy Wait Time** is the duration to wait for the traffic channel to become available. A transmission is canceled when the channel is busy and the Transmit Busy Wait Time elapses.

Configuration using KPG-D3/ D3N

Configuring **Transmit Busy Wait Time** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Data Communications)

Maximum ACK Wait Time

Maximum ACK Wait Time is the length of time that the transceiver stands by to receive the acknowledgment after the transceiver sends data. If the transceiver does not receive the acknowledgment within the time configured for **Maximum ACK Wait Time**, the transceiver resends data.

Note

- A Long Data Message transmits data divided over multiple times. The receiving transceiver stands by to receive the next data for the time configured for **Maximum ACK Wait Time** after receiving the previous data. The transceiver exits Long Data Message Receive Mode if the transceiver does not receive any data during the period.

Configuration using KPG-D3/ D3N

Configuring **Maximum ACK Wait Time** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Data Communications)

3.12 Sending and Receiving a Status Message (Status Call)

Refer to “[Sending and Receiving a Status Message \(Status Call\)](#)” in 1 NXDN CONVENTIONAL SYSTEM.

Power-on Status

Refer to “[Power-on Status](#)” in 1 NXDN CONVENTIONAL SYSTEM.

Power-off Status

Refer to “[Power-off Status](#)” in 1 NXDN CONVENTIONAL SYSTEM.

3.13 Sending and Receiving a Short Message (Short Data Call)

Refer to “[Sending and Receiving a Short Message \(Short Data Call\)](#)” in 1 NXDN CONVENTIONAL SYSTEM.

3.14 Sending and Receiving a Long Message (Long Data Call)

Refer to “[Sending and Receiving a Long Message \(Long Data Call\)](#)” in 1 NXDN CONVENTIONAL SYSTEM.

3.15 Using 2-tone to Initiate an Individual Call

2-tone signaling uses a pair of 2 different tone frequencies in series for an individual call.

2-tone is a signaling system that can receive a signal with squelch disabled only when 2 tone signals in series sent from the transmitting transceiver match the tone signals preconfigured for the receiving transceiver.

2-tone consists of 2 tone signals in series with 2 different frequencies within the frequency range between 281.25 Hz and 3093.75 Hz in an NXDN Trunking system. These 2 tone signals are sent in series with the carrier wave.

The following are the methods for sending the 2-tone code:

- 2-tone encoding list selection
- **Call** button
- PC command

Note

- For the 800 MHz/ 900 MHz model, the 800 MHz model, and the 900 MHz model, the 2-tone function cannot be used.

Selecting and Sending the 2-tone Code from a List

The transceiver can send a 2-tone code by initiating a Group Call after the 2-tone code configured in the 2-tone encoding list is selected. (Refer to [2-tone encoding list](#).)

An encoding tone configured in the 2-tone encoding list can be selected by pressing the **2-tone** button.

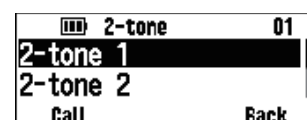
An encoding tone configured in the 2-tone encoding list can also be selected by selecting “2-tone” after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

Operating the transceiver

1 Press the 2-tone button.

The transceiver enters 2-tone Mode, and the 2-tone encoding list appears.

The following operations are the same even if the transceiver enters 2-tone Mode by pressing the **Menu** button.

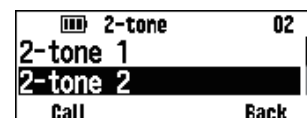


2 Press the [▲] or [▼] button and select the 2-tone code.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

Note

- A fixed text string (“List No.”) and the list number appear for a 2-tone code for which **2-tone Name** is not configured in the 2-tone encoding list.



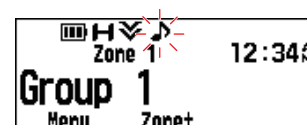
3 Press the **PTT** switch.

The transceiver initiates a Group Call.



4 Receive from the system a message for traffic channel assignment.

The “” icon blinks, and the transceiver enters a state allowing transmission of a Group Call.



5 Press the **PTT** switch.

Transmission of a Group Call is initiated, and the selected 2-tone code is sent. Even if the **PTT** switch is being pressed and held to receive a message for traffic channel assignment, transmission by a Group Call is initiated. Even after the 2-tone code is sent, the transmission continues while the **PTT** switch is pressed and held.

Note

- If “Group ID and Optional Signaling” is configured in **Audio Control for Group Call**, the Optional Signaling is in the matching state if transmission is on a channel with “2-tone 1” to “2-tone 4” configured in **Optional Signaling for Group Call**. In this case, the “” icon appears, and the LED flashes yellow if **Optional Signaling LED** is enabled. (Refer to [Using the Optional Signaling \(Optional Signaling for Group Call\)](#).)
- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If **Busy LED** is enabled, the LED lights green regardless of whether reception is enabled or disabled on a traffic channel. (Refer to Common Function Part [Busy LED](#).)
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving according to the configuration in **LED Color**.
- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call requesting a Group Call is initiated. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment after the call requesting a Group Call is initiated. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Using the Call Button to Send the 2-tone Code

Pressing one of the **Call 1** to **Call 6** buttons causes the transceiver to transmit the preconfigured tone.

Call 1 to **Call 6** can be assigned to the **PF** buttons by using KPG-D3/ D3N and the tone corresponding to each button can be configured by selecting from the 2-tone encoding list of 2-tone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring the tones corresponding to the **Call 1** to **Call 6** buttons ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call > Call 1~Call 6)

Using the PC Command to Send the 2-tone Code

The transceiver sends a 2-tone code when a transmission command for a 2-tone code is sent from a PC to the communication port of the transceiver.

To send a 2-tone code by using a PC command, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common Function Part [Available Functions for COM Port.](#))

Functions Related to 2-tone Code Encoding

Functions related to 2-tone code encoding are shown below:

- Duration of 1st Tone
- Duration of 2nd Tone
- Duration of Single Tone
- Gap Time
- First Tone Delay Time
- Sidetone
- 2-tone encoding list

Refer to “[Functions Related to 2-tone Code Encoding](#)” of 1 NXDN CONVENTIONAL SYSTEM for details of each function.

Decoding the 2-tone Code

The transceiver can wait for a 2-tone code on a channel with “2-tone 1”, “2-tone 2”, “2-tone 3”, or “2-tone 4” configured in **Optional Signaling for Group Call**. (Refer to [Using the Optional Signaling \(Optional Signaling for Group Call\)](#).)

Transceiver Behavior

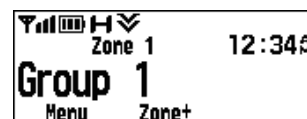
The transceiver behavior varies depending on the configuration in **Audio Control for Group Call** (Group ID, or Group ID and Optional Signaling). (Refer to [Unmuting the Speaker \(Audio Control for Group Call\)](#).)

● If “Group ID” is configured in Audio Control for Group Call

1 The transceiver receives a Group Call.

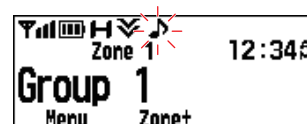
The transceiver migrates to the traffic channel.

The “🔊” icon blinks and the transceiver emits the received audio if the received Group ID matches the Group ID preconfigured for the transceiver.



2 Receive the 2-tone code corresponding to the **Call Format** preconfigured for the transceiver.

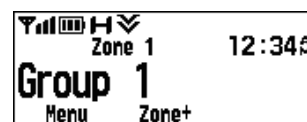
The “🔊” icon blinks if the received 2-tone code matches the 2-tone code preconfigured for the transceiver.



● If “Group ID and Optional Signaling” is configured in Audio Control for Group Call

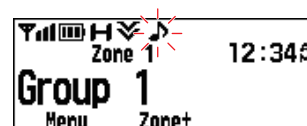
1 The transceiver receives a Group Call.

The transceiver migrates to the traffic channel.



2 Receive the 2-tone code corresponding to the **Call Format** preconfigured for the transceiver.

The “🔊” icon blinks and the transceiver emits the received audio if the received 2-tone code matches the 2-tone code preconfigured for the transceiver.



 Note

- If **Busy LED** is enabled, the LED lights green regardless of whether reception is enabled or disabled on a traffic channel. (Refer to Common Function Part [Busy LED](#).)
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving according to the configuration in **LED Color**.
- If **Optional Signaling LED** is enabled, the LED flashes yellow when the transceiver is receiving.
- If anything other than “Off” is configured in **Alert Tone** of **Call Format**, an Alert Tone sounds from the transceiver. Also, if **Transpond** of **Call Format** is enabled, the transceiver transmits a multiplexed Transpond tone.
- After the length of time configured in **Auto Reset Timer** elapses, the matching state of the 2-tone code is reset.
- The transceiver cannot transmit even if the **PTT** switch is pressed while in the matching state of the 2-tone codes after the transceiver receives the 2-tone code by a Broadcast Call. In this case, while the **PTT** switch is being pressed, “Receive Only” appears on the display and Warning Tone A (continuous beep) sounds from the transceiver. (Refer to [Making an Informative Group Call \(Broadcast Group Call\)](#).)
- The matching state of the 2-tone codes is reset if the transceiver switches to communications by Priority Monitor ID while in the matching state of the 2-tone codes. (Refer to [Receiving a High-priority Call \(Priority Monitor ID\)](#).)

Functions Related to 2-tone Code Decoding

The following functions associated with 2-tone code decoding can be configured for each of 2-tone 1, 2-tone 2, 2-tone 3, and 2-tone 4:

- Decoder 1 to Decoder 4
- A Tone/ B Tone/ C Tone/ D Tone
- Auto Reset Timer
- Clear to Transpond
- Selective Call Alert LED

Refer to “[Functions Related to 2-tone Code Decoding](#)” of 1 NXDN CONVENTIONAL SYSTEM for details of each function.

 Note

- The **Transpond** and **Clear to Transpond** functions of 2-tone decoding cannot be used in an NXDN Trunking system.

3.16 Communicating with a Telephone (Telephone Call)

Telephone Call is the function to initiate voice communications using a telephone by connecting to a telephone line such as PSTN and PABX.

A call can be initiated from the transceiver to a telephone, and from a telephone to the transceiver.

Initiating a Telephone Call

A Telephone Call can be initiated by one of the following methods:

- **Autodial Mode**

In Autodial Mode, a Telephone Call is initiated by selecting a DTMF code configured in the Autodial List, or directly entering a DTMF code and pressing the **PTT** switch. (Refer to [Sending a DTMF Code by Selecting from a List \(Autodial List\)](#).)

Pressing the **Autodial** button places the transceiver in Autodial Mode.

The transceiver can also be placed in Autodial Mode by executing “Autodial” after placing the transceiver in Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

- **Keypad entry**

If “Autodial” is configured in **Keypad Operation**, pressing a button on the keypad causes the transceiver to enter Autodial Mode. The transceiver will be on hold as the first digit of the DTMF code is entered. A Telephone Call is initiated by entering a DTMF code and pressing the **PTT** switch. (Refer to [Sending Entered DTMF Codes All at Once \(Store and Send\)](#).)

- **Call button**

A Telephone Call can be initiated by pressing one of the **Call 1** to **Call 6** buttons. A DTMF code of the target transceiver can be configured for the **Call 1** to **Call 6** buttons by selecting one DTMF code from the Autodial List by using KPG-D3/ D3N. (Refer to [Sending the DTMF Code with a Single Touch \(Call 1 to Call 6 Buttons\)](#).)

- **Selcall on PTT**

The transceiver initiates a Telephone Call when the **PTT** switch is pressed on a channel where “Telephone Call” is configured in **Selcall on PTT**. A DTMF code of the target transceiver can be configured by selecting one DTMF code from the Autodial List by using KPG-D3/ D3N.

- **Response to incoming calls**

When the transceiver receives a Telephone Call, the transceiver can respond to the transmitting telephone by pressing the **PTT** switch, or the **Call Response** button while “Phone Call” appears on the main display.

For Mobile, when **Off-hook Connect** is enabled, the transceiver can respond to the transmitting telephone by placing the microphone in the off-hook state.

Note

- To use the speed dial, the dial number needs to be entered as “***nnn”. A maximum of 3 numerical digits between 001 and 255 needs to be entered in “nnn”. For example, if the speed dial number is “1”, “***001” needs to be entered. If “nnn” is not within the extent, the transceiver does not initiate a Telephone Call and a Warning Tone A (continuous beep) sounds from the transceiver.

Operating the transceiver

1 Initiate a Telephone Call by one of the methods mentioned above.

“Phone Call” appears and the “📞” icon blinks when the transceiver becomes ready for communications.

If **Optional Signaling LED** is enabled, the LED flashes yellow.



2 Press the PTT switch.

A user can start conversations.



Note

- If **Call Request Tone** is enabled, a Call Request Tone sounds from the transceiver when the **PTT** switch is pressed to initiate a call request. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)/ Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\).](#))
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for communications.
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\).](#))
- The DTMF code can be sent during the call by pressing one of the **[0]** button to **[9]** buttons, the **[*]** button or the **[#]** button.
- Pressing the **Clear** button allows terminating the Telephone Call. For Mobile, if **On-hook Disconnect** is enabled, a Telephone Call terminates by placing the microphone in the on-hook state.
- The transceiver also terminates communications when the length of time configured in **Incoming Reset Time** elapses.
- If **Disconnect Indication Tone** is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver when the communication ends.
- For details on the information displayed on the display during transmission, refer to “[Transceiver behavior during transmitting](#)”.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Selcall on PTT** ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Personalities > General > Selcall on PTT)
- Configuring **Off-hook Connect** to be enabled or disabled ([See](#) Radio Configuration > Global Options > Basics > General > Control > Microphone-hook)
- Configuring **Telephone Call Alert LED** to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **LED Color** ([See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **Call in Progress Tone** to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **Incoming Reset Time** ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Individual Call)
- Configuring **Disconnect Indication Tone** to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)

Receiving a Telephone Call

“Phone Call” appears and the “📞” icon blinks when the transceiver receives a Telephone Call.



Note

- An Alert Tone sounds from the transceiver according to the configuration in **Tone Number** when the transceiver receives a Telephone Call by Individual Call.
- If **Telephone Call Alert LED** is enabled, the LED flashes according to the configuration in **LED Color**.
- If **Optional Signaling LED** is enabled, the LED flashes yellow.
- The transceiver can respond to the transmitting telephone by pressing the **PTT** switch or the **Call Response** button when the transceiver receives a Telephone Call. For Mobile, when **Off-hook Connect** is enabled, the transceiver can also respond to the transmitting telephone by placing the microphone in the off-hook state.

Configuration using KPG-D3/ D3N

- Configuring **Off-hook Connect** to be enabled or disabled ( See Radio Configuration > Global Options > Basics > General > Control > Microphone-hook)
- Configuring **Tone Number** to be enabled or disabled ( See Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **Telephone Call Alert LED** to be enabled or disabled ( See Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)
- Configuring **LED Color** ( See Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/LED)

3.17 Using a Frequency Added to a System without Changing the Transceiver Configuration (Direct Frequency Assignment)

Direct Frequency Assignment (DFA) is the function where an NXDN Trunking system directly notifies the transceiver of frequency information as the frequency information.

The transceiver which received from the system a broadcast message with the frequency information of a new site added, such as when the site is added to an NXDN Trunking system, can immediately use the site. The site can be expanded without overwriting the configuration data of the transceiver in operation.

When receiving a broadcast message with frequency information from an NXDN Trunking system, the following frequency information is stored in the internal memory of the transceiver. In addition to the configuration data of KPG-D3/ D3N, a new Hunt Table is structured and becomes a search target of a control channel. This information is not cleared even if turning the transceiver OFF, and is stored in the internal memory of the transceiver.

Table 3-14 Parameters of Direct Frequency Assignment

Frequency Information	Broadcast Message Including Frequency Information	Amount That Can Be Stored	Timing of Storage
Base frequency	SITE_INFO message	A maximum of 8 pairs (available for managed in each network)	When a SITE_INFO message is received
Step			
Frequency numbers ascending and descending on a control channel	CCH_INFO message	A maximum of 1,152 pairs (available for managed in each network)	When a CCH_INFO message is received
Bandwidth (or Bit Rate)			

The transceiver calculates the frequency of a newly added site as follows:

$$\text{Frequency} = \text{base frequency} + (\text{frequency number}) \times (\text{step})$$

Note

- To use this function, "Direct Frequency Assignment" needs to be configured for the frequency notification method in an NXDN Trunking system.

Confirming the Stored Frequency Information (DFA Information)

The frequency information stored in the internal memory of the transceiver can be confirmed in **DFA Information** of KPG-D3/ D3N. By reading the frequency information from the transceiver in **DFA Information**, the various information of each network can be viewed. Refer to the help texts of KPG-D3/ D3N for instructions on how to operate **DFA Information**.

Configuration using KPG-D3/ D3N

Confirming the Stored Frequency Information ( See Read/Write > DFA Information)

Deleting the Stored Frequency Information (DFA Data Erase)

The frequency information stored in the internal memory of the transceiver can be deleted when writing the configuration data to the transceiver. Refer to the help texts of KPG-D3/ D3N (**DFA Data Erase**) for instructions.

Configuration using KPG-D3/ D3N

Deleting the Stored Frequency Information ( See Read/Write > Write Configuration > Write Data List > No. 1~100)

Example of System Operation Using Direct Frequency Assignment

This section describes the operation example of an NXDN Trunking system using **Direct Frequency Assignment**.

Adding a new site

- 1) The transceiver acquires the base frequency and step information from a SITE_INFO message in an existing site and stores them in the internal memory of the transceiver.
- 2) After acquiring the frequency number (descending only) of a control channel in a new adjacent site from an ADJ_SITE_INFO message in the existing site, the transceiver calculates the frequency and migrates to this new site.
- 3) After acquiring the ascending and descending frequency numbers from a CCH_INFO message in the new site, the transceiver stores the ascending and descending frequency numbers in the internal memory of the transceiver, calculates the frequency, and executes location registration.

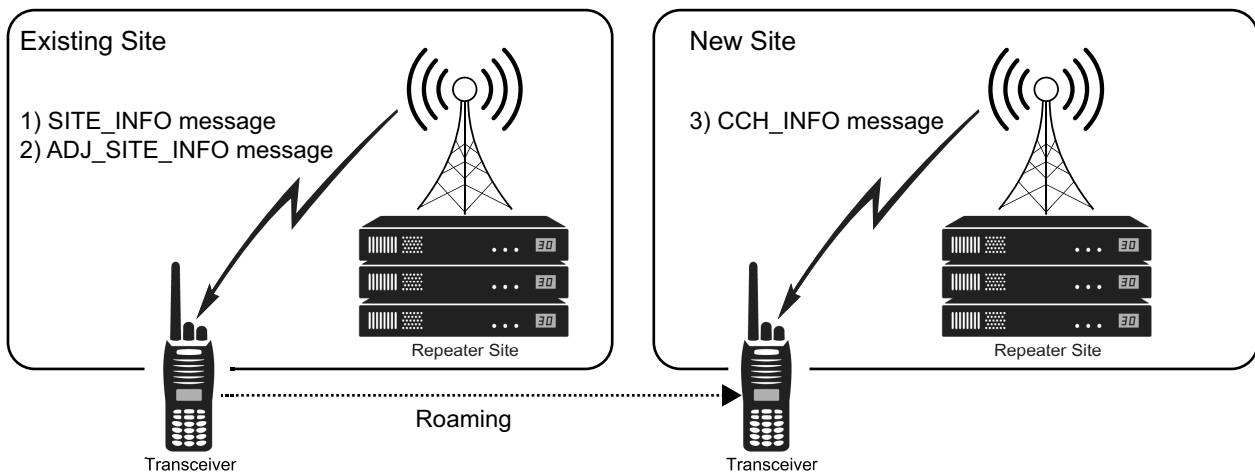


Figure 3-5 Adding a new site

Acquiring a traffic channel in a new site

- 1) The transceiver sends a VCALL_REQ message to a newly added site.
- 2) If the transceiver receives a VCALL_ASSGN message with the frequency number of a traffic channel added, the transceiver calculates the frequency of the traffic channel and migrates to this traffic channel.

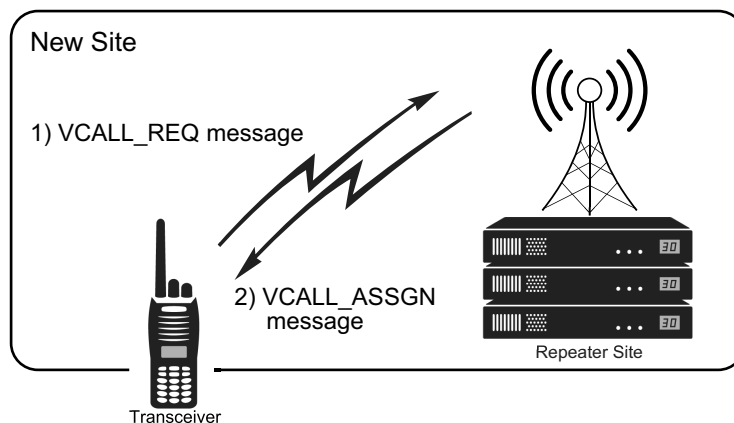


Figure 3-6 Acquiring a traffic channel in a new site

Adding a control channel to an existing site

- 1) The transceiver acquires the base frequency and step information from a SITE_INFO message and stores them in the internal memory of the transceiver.
- 2) The transceiver acquires the frequency number of a control channel newly added from a CCH_INFO message and stores the frequency number in the internal memory of the transceiver. Then, the transceiver calculates the frequency of the control channel and migrates to this control channel.

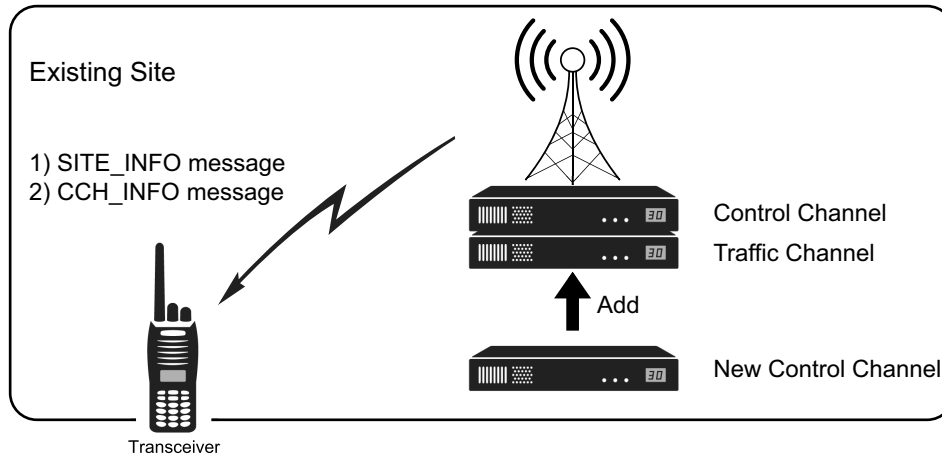


Figure 3-7 Adding a Control Channel to an Existing Site

Adding a traffic channel to an existing site

- 1) The transceiver sends a VCALL_REQ message to the existing site.
- 2) If the transceiver receives a VCALL_ASSGN message with the frequency number of a newly added traffic channel, the transceiver calculates the frequency of the traffic channel and migrates to this traffic channel.

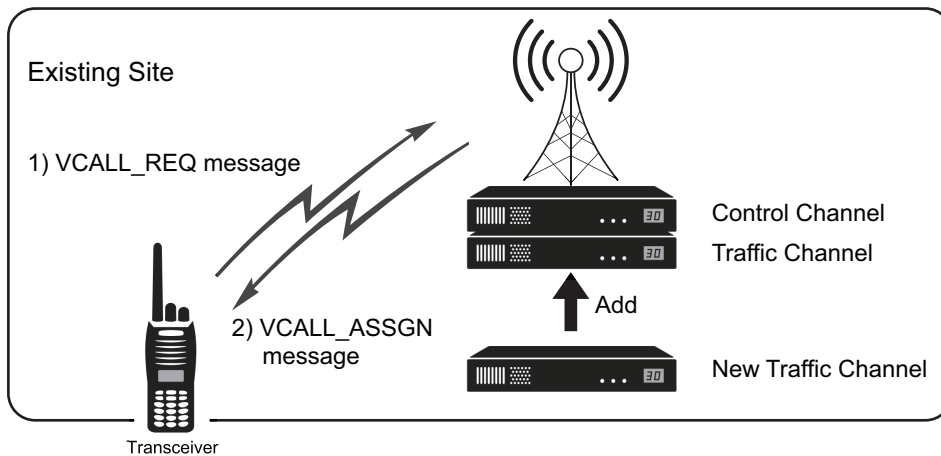


Figure 3-8 Adding a Traffic Channel to an Existing Site

3.18 Automatically Switching the System (System Auto Select)

System Auto Select is the function to search for an available system and automatically switch the system when the transceiver is outside the communication area in the current system, if the transceiver is being operated in an NX-Bridge system (Multi System operation).

If the transceiver becomes outside the communication area in an NXDN Trunking system, **System Selection Wait Time** is activated. The transceiver remains in the current system while **System Selection Wait Time** is counting down. After the length of time configured in **System Selection Wait Time** elapses, **System Auto Select** is initiated. In **System Auto Select**, the search target system preconfigured in the transceiver is searched sequentially, and the transceiver automatically switches to an available system when the system is found.

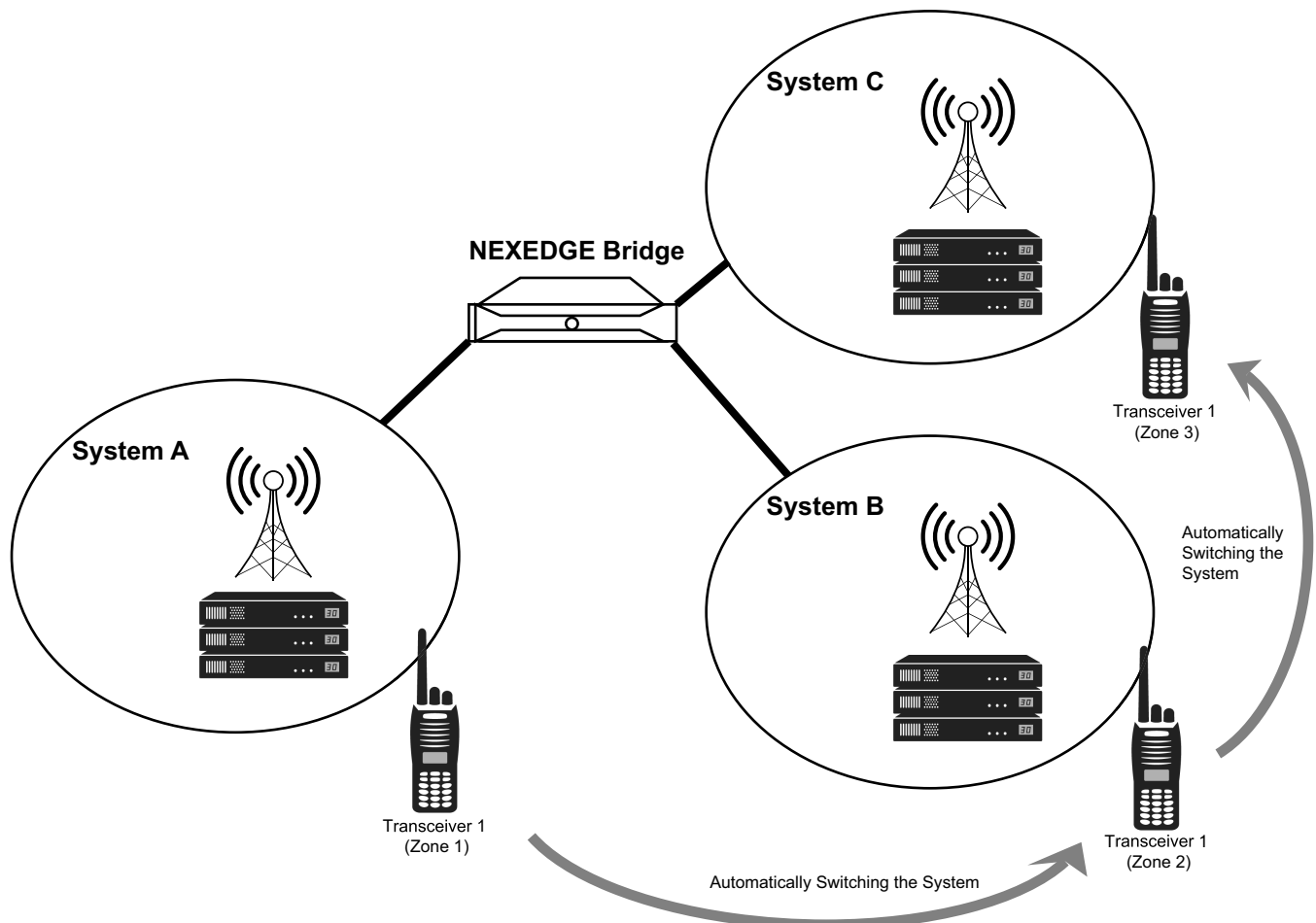


Figure 3-9 System Auto Select

3.18 Automatically Switching the System (System Auto Select)

In **System Auto Select**, if the transceiver migrates to the Zone-channel of the system to be the search target, the following hunt sequence is executed in the same manner as when the transceiver normally switches the system. (Refer to [Control Channel Hunt \(Control Channel Hunt\)](#).)

If an available control channel is not found by executing a hunt sequence, the transceiver migrates to the next Zone-channel configured in the System Search List. (Refer to [System Search List](#).)

Resuming a Control Channel Sequence



Preferential Hunt Sequence



Normal Hunt Sequence



System Add Channel Sequence



Site Hunt Sequence



Comprehensive Hunt Sequence



Failsoft Channel Sequence



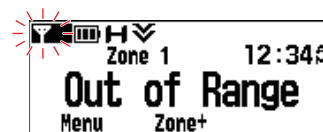
- If the following buttons are operated while **System Auto Select** is activated, **System Auto Select** ends. Then, the transceiver returns to the zone channel selected when starting **System Auto Select**.
 - **Channel Up/Down** button
 - **Zone Up/Down** button
 - **Channel Down** button
 - **Channel Up** button
 - **Zone Down** button
 - **Zone Up** button
 - **Site Up** button
 - **Site Down** button
- If the following buttons are operated or the status of the AUX Input port changes while **System Auto Select** is activated, **System Auto Select** ends. Then, the transceiver returns to the zone channel selected when starting **System Auto Select**, and the function behaves. The behavior is the same even if the channel is changed in Channel Entry Mode or Group ID Entry Mode, and even if each function is executed from Menu Mode.
 - **Channel Select** button
 - **Zone Select** button
 - **Site Select** button
 - **Scan** button
 - **Scan Normal** button
 - **Direct Channel 1 to Direct Channel 5** buttons
 - **Direct Channel 1 Select to Direct Channel 5 Select** buttons
 - **Home Channel** button
 - **Home Channel Select** button
 - **Emergency** button
 - **Transceiver Password** button
 - **Maintenance** button
 - **Lone Worker** button
 - **Activity Detection** button

- **Zeroize** button
 - **Channel Recall** button
 - **Channel Select A to Channel Select D** (AUX Input) (Mobile only)
 - **Emergency** (AUX Input) (Mobile only)
 - **Scan** (AUX Input) (Mobile only)
 - **DTC** (AUX Input) (Mobile only)
 - **Data PTT** (AUX Input) (Mobile only)
 - **Zeroize** (AUX Input) (Mobile only)
- Even if the following buttons are operated while **System Auto Select** is behaving and the status of the AUX Input port changes, a Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not respond at all. In this case, the behavior of **System Auto Select** continues.
- **Scan Program** button
 - **Front Panel Programming** button
 - **Low Transmit Power** button
 - **High Transmit Power** button
 - **Scrambler/Encryption** button
 - **Scrambler/Encryption Code** button
 - **Scrambler/Encryption** (AUX Input) (Mobile only)

Transceiver behavior

- 1 The transceiver becomes outside the communication area in an NXDN Trunking system.

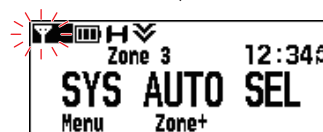
System Selection Wait Time is activated.



- 2 The length of time configured in **System Selection Wait Time** elapses.

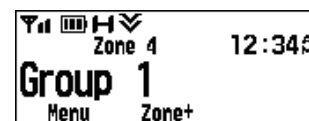
System Auto Select starts and the system is switched sequentially.

"SYS AUTO SEL" appears on the transceiver display while **System Auto Select** is behaving.



3 An available system is found, and registration succeeds.

A System Select Tone (4 beeps) sounds from the transceiver, and then **System Auto Select** ends.



Note

- If an available system is not found, the transceiver returns to the zone selected when starting **System Select Tone**, and **System Auto Select** ends.
- If **Comprehensive Hunt** is enabled and many channels are configured in **Frequency Table**, the migration to the next zone may take time because the number of channels to be searched is large.
- If the transceiver is turned OFF and then turned ON again while **System Auto Select** is activated, the transceiver is turned ON in the zone where **System Auto Select** is started.
- In a zone where "Timer" is configured in **Revert** (Home Channel), the transceiver migrates to a channel other than the Home Channel, and **System Selection Wait Time** is not activated even if the transceiver becomes outside the communication area in the destination channel while the **Revert Timer** is counting down. If the transceiver is outside the communication area when the countdown of the **Revert Timer** ends and the transceiver returns to the Home Channel, **System Selection Wait Time** is activated.
- When the transceiver is in the following states, System Auto Select is not activated:
 - "Off" is configured in **System Selection Wait Time**
 - Lone Worker Mode
 - Activity Detection On
 - Emergency Mode
 - Maintenance Mode
 - OTAP Mode
 - Transceiver Password Mode
 - Front Panel Programming Mode
 - Scan Programming Mode
 - Error Zone-Channel
 - Remote Group Add (GID change prohibition)
 - When the channel is changed by using **Direct CH/GID 1** to **Direct CH/GID 5** (**Return** is enabled)
 - When the channel is changed by using **Home Channel** (only if "Home Channel button" is configured in **Revert** (Home Channel))
 - When the channel is changed by using **Channel Recall**
 - When the channel is changed by using **Channel Select A** to **Channel Select D** (AUX Input) (Mobile only)
 - Stun state
 - When executing Zeroize
 - When executing Forced Search
 - Failsoft Mode
 - When the Zone-channel is changed

System Selection Wait Time

System Selection Wait Time is the length of time from when the transceiver becomes outside the communication area in the currently selected system until the transceiver starts the **System Auto Select** behavior.

Configuring **System Selection Wait Time** can prevent **System Auto Select** from being activated accidentally even if the transceiver temporarily enters a coverage area with weak signals and becomes outside the communication area.

If the transceiver becomes outside the communication area, **System Selection Wait Time** is activated. If no available control channel is found and the length of time configured in **System Selection Wait Time** elapses, the transceiver starts **System Auto Select**. If an available control channel is found while the **System Selection Wait Time** is counting down, the transceiver stops the countdown of the **System Selection Wait Time** and does not start **System Auto Select**.

Note

- If “Off” is configured in **System Selection Wait Time**, **System Auto Select** does not behave and the transceiver remains in the selected system even if the transceiver becomes outside the communication area.

Configuration using KPG-D3/ D3N

Configuring **System Selection Wait Time** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > System Auto Selection)

System Search List

System Search List is the function to specify the Zone-channel of the system to be the search target of **System Auto Select**. The transceiver sequentially migrates to the Zone-channel configured in **System Search List** and executes the control channel hunt.

The channel number and also “Last Used Channel” can be configured in the configuration of the channel. The transceiver migrates to the backup channel of the destination zone if “Last Used Channel” is configured. If no backup channel exists in the destination zone, the transceiver migrates to the lowest channel number in the zone and executes the control channel hunt.

Note

- If “Last Used Channel” is configured for a channel of the System Search List, and if “Timer” is configured in **Revert** (Home Channel) for the zone that includes the channel, the transceiver migrates to the Home Channel of this zone, not to the backup channel, and executes the control channel hunt.

Configuration using KPG-D3/ D3N

Configuring **System Search List** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > System Auto Select > No. 1~32)

3.19 Locking the Site to Be Used (Site Lock/ Site Select)

Site Lock can be used to lock the site to be used as the current site and prevent the transceiver from roaming to other sites by a user operating transceiver buttons when the transceiver is used around the border of the site coverage area. If this function is enabled, the transceiver is locked on the current site and cannot roam.

Selecting a site in Site Select Mode or directly entering the site number can lock the transceiver on the selected site. Also, selecting a site by using the **Selector** or **PF** buttons can lock the transceiver on the selected site. To select a site, site information must be configured using KPG-D3/ D3N. Or, the following functions must be assigned to the **Selector** and **PF** buttons in order to select a site using the **Selector** or **PF** buttons:

Table 3-15 Site Select

Button	Function	Reference
Selector *1	Site Up/Down Site Select	Common Function Part Available Functions for the Selector (Portable only)
PF button	Site Up Site Up (Continuous) Site Down Site Down (Continuous)	Common Function Part Available Functions for the PF Buttons

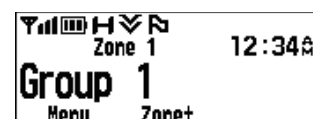
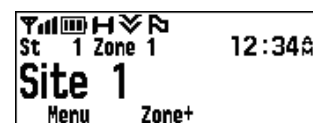
*1 Portable only

Operating the transceiver

● Enabling or disabling the Site Lock

1 Press the **Site Lock** button while Site Lock is disabled.

The “” icon appears and then Site Lock will be enabled. The site number and site name of the current site appear on the display for 2 sec.



2 Press the **Site Lock** button while Site Lock is enabled.

The “” icon disappears and then Site Lock will be disabled.

Note

- Transceiver operation is identical even if “Site Lock” is selected after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)
- The Site Lock can be enabled for the current site only if the transceiver has acquired a control channel.

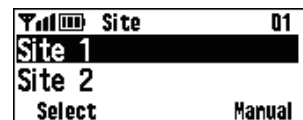
● Using Site Select Mode (list selection)

1 Press and hold the **Site Lock** button.

The transceiver enters Site Select Mode, and then the list will appear.

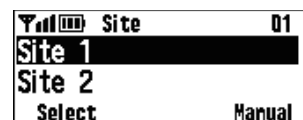
Note

- If “Site Select” is selected after the transceiver enters Menu Mode by pressing the **Menu** button, the transceiver can also enter Site Select Mode.



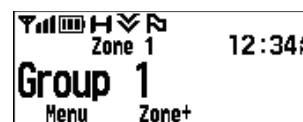
2 Select the site to be locked by pressing the [▲] or [▼] button.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **Menu** ([□]) or [*] button.

The “” icon appears and Site Lock is enabled for the selected site number.



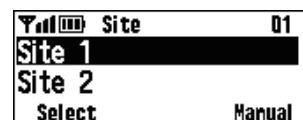
● Using Site Select Mode (manual entry)

1 Press and hold the **Site Lock** button.

The transceiver enters Site Select Mode, and then the list will appear.

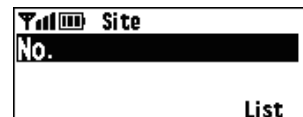
Note

- If “Site Select” is selected after the transceiver enters Menu Mode by pressing the **Menu** button, the transceiver can also enter Site Select Mode.
- If no Site Name is configured, the site number entry display appears. In this case, proceed to step 3.



2 Press the **Back** ([↩]) button.

The site number entry display appears.



3 Enter a site number.

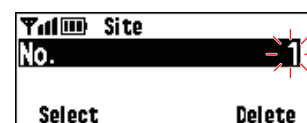
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

- **If using the keypad:**

A site number can be entered by pressing the [0] to [9] buttons.

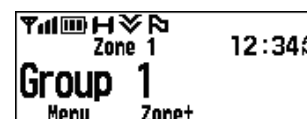
- **Using the PF buttons**

Press the [▲] or [▼] button to select the site number and press the **Menu** ([□]) or [*] button to confirm the selected site number.



4 Press the **Menu** ([□]) or [*] button.

Site Lock is enabled for the entered site number.

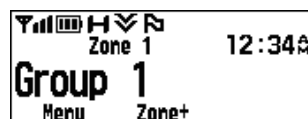
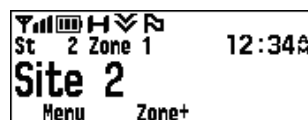


- **Using the Selector (Portable only) or the PF button**

Select one of the following operations:

- Select the site to be locked by using the **Site Up** or **Site Down** button.
- Select the site to be locked by turning the **Selector** (Site Up/Down).
- Select the site to be locked by turning the **Selector** (Site Select).

The “” icon appears and then Site Lock will be enabled. The site number and site name of the selected site appear on the display for 2 sec.



Note

- The status of the Site Lock, either enabled or disabled, is retained in the transceiver. The site number is also retained while the Site Lock is enabled.
- The Site Lock will not be disabled even if the transceiver cannot receive signals from a control channel while the Site Lock is enabled.
- If no Site Name is configured, the manual entry mode appears. If no Site Name is configured, the site cannot be selected using the **Site Up** or **Site Down** button or **Selector** (Site Up/Down). However, rotating the **Selector** (Site Select) selects a Site Number from 1 to 16 even if no Site Name is configured.
- If the Site Lock is enabled, **Background Hunt** does not function. (Refer to [Executing the Background Hunt in Different Systems \(Background Hunt\)](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the **Selector** ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Selector)
- Configuring site information ( [See](#) Radio Configuration > System Properties > Trunking Network > NXDN Network > Site List)

3.20 Adding a Group ID by Remote Control (Remote Group Add)

Remote Group Add is the function to make a transceiver receive a message requesting to change the remote group and add a Group ID by sending the request message for the remote group change from a transceiver connected to a PC.

This function allows the system to establish communications by making target transceivers temporarily participate in a group or temporarily configuring a new group by gathering mobile stations in different parties.

To run this function, the following need to be configured using KPG-D3/ D3N.

- **Remote Regrouping**

To enable Remote Regrouping function, enable **Remote Regroup** per NXDN Trunking system.

- **Channel for Remote Regrouping**

One channel per NXDN Trunking system can be assigned for Remote Regrouping channel. This channel is configured by selecting “Regroup” for Group ID of the Personality and assigning the Personality as the channel for Remote Regrouping.

Configuration using KPG-D3/ D3N

- Configuring **Group ID** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Personalities > General)

Sending the Message Requesting to Change the Remote Group or Reset the Change of the Remote Group

The transceiver connected to a PC sends the message requesting to change the remote group or reset the change of the remote group.

Operating the transceiver

- **Sending the message requesting to change the remote group**

Send the command requesting to change the remote group to the transceiver from the PC.

The transceiver sends the message requesting to change the remote group to the specified transceiver using an Individual Call.

- **Sending the message requesting to reset the change of the remote group**

Send the command requesting to reset the change of the remote group to the transceiver from the PC.

The transceiver sends the message requesting to reset the change of the remote group to the specified transceiver using an Individual Call.

Note

- To send the message requesting to change the remote group or reset the change of the remote group, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common Function Part [Available Functions for COM Port.](#))
- The message requesting to change the remote group or reset the change of the remote group can only be sent using an Individual Call.

Receiving the Message Requesting to Change the Remote Group or Reset the Change of the Remote Group

A transceiver that received a message requesting to change the remote group will move to the channel for Remote Regrouping configured in the system of a channel received and run with the Group ID specified by the message. (Hereinafter, this Group ID is referred to as Regroup ID.)

Operating the transceiver

● Receiving the message requesting to change the remote group

1 The transceiver starts receiving the message requesting to change the remote group.

“Receive Data” appears.



2 Receive the message requesting to change the remote group.

“Complete” appears.

The transceiver runs with the Regroup ID specified by the message requesting to change the remote group.

If the change of the Group ID is permitted by the information in the received message, transmission and reception are available with Regroup ID. The transceiver can also transmit and receive by selecting a Group ID other than the Regroup ID by a user operating transceiver buttons.

If the change of the Group ID is prohibited by the information in the received message, transmission and reception are available only with Regroup ID. In this case, another zone or channel cannot be selected by a user operating transceiver buttons.



● Receiving the message requesting to reset the change of the remote group

1 The transceiver starts receiving the message requesting to reset the change of the remote group.

“Receive Data” appears.



2 Receive the message requesting to reset the change of the remote group.

“Complete” appears.

The transceiver returns to the previous channel and runs with the Group ID configured for the channel.



Note

- Multiple Regroup IDs cannot be added. Therefore, the Regroup ID will be overwritten if the transceiver to which the Regroup ID has already been added receives the message requesting to change the remote group.
- The Regroup ID will be cleared if the configuration data is written on the transceiver by using KPG-D3/ D3N.

Transceiver's Behavior when Using the Regroup ID

The following are the transceiver's behavior when using the added Regroup ID.

- The added Regroup ID will be retained even after the transceiver is turned OFF.
- The added Regroup ID can be used even if the transceiver migrates to another site.
- A Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not respond at all even by a user pressing the **Scan Delete/Add** button while the Regroup ID is selected.
- During a scan, if the transceiver receives a message requesting to change the remote group where the change of Group ID is enabled, the scan will continue. During the scan, if the transceiver receives a message requesting to change the remote group where changes of the Group ID is not allowed, the scan will pause. The transceiver transmits using the Regroup ID when the transceiver transmits in the above conditions. Also, the transceiver resumes the scan when the transceiver receives the message requesting to reset the change of the remote group in this state.
- If the transceiver receives the message requesting to change the remote group where the change of the Group ID is enabled, the conditions to resume a scan are satisfied and the transceiver will resume the scan, while the scan is temporarily paused if the conditions to resume the scan are not satisfied because of the lack of channels to scan. If the transceiver receives the message requesting to reset the change of the remote group in this state, the conditions to resume the scan are not satisfied again and the scan will pause.
- In Emergency mode, the transceiver cannot send and receive the message requesting to change the remote group or to reset the change of the remote group.

3.21 Transceiver Behavior When the System Fails to Provide the Trunking Control Service (Failsoft)

Failsoft is a function that provides the minimal communication capability for the transceivers in the site coverage area in the case that the system fails to provide the Trunking control service among the sites, for instance, in a case when a cable connecting repeaters is cut or an error occurs in communication between controllers.

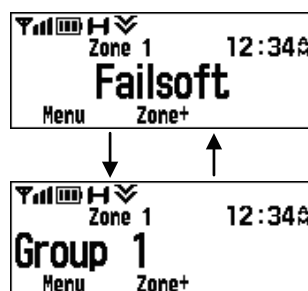
If the system fails to provide the trunking control service for the site, the system migrates the channel to the Failsoft channel and then the system will send a broadcast message to the transceivers indicating that the system is in Failsoft state. When a transceiver searches using the hunt sequence for a channel configured as a Failsoft Channel and then receives the broadcast message from the system indicating the Failsoft state of the system, the transceiver will enter Failsoft Mode.

On the Failsoft Channel, signals are simply repeated within the site and only Group voice communications (Conference Group Call, Broadcast Group Call, All Group Call) can be done for the selected Group ID. In Failsoft Mode, the transceiver searches for a control channel in adjacent sites at intervals configured in **Search Interval Time**, and then acquires a channel operating as a control channel, the transceiver will exit Failsoft Mode.

Transceiver behavior

The transceiver receives the broadcast message from the system indicating the Failsoft state of the system.

The transceiver enters Failsoft Mode. "Failsoft" appears on the display for 1 sec.



Note

- While the system is in the Failsoft state, functions on a control channel, such as location registration, will not be available.
- If the transceiver acquires a control channel in Failsoft Mode, the transceiver exits Failsoft Mode and then starts location registration. The transceiver also starts location registration if the transceiver acquires a control channel in the site where the location of the transceiver has already been registered or the transceiver acquires a control channel in another site.
- If the transceiver is unable to acquire a Failsoft Channel, the transceiver will not enter Failsoft Mode.
- The transceiver turns off current scan if the transceiver enters Failsoft Mode during the scan. The scan remains off even if Failsoft Mode completed.

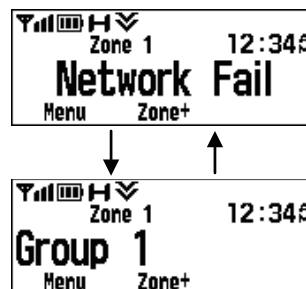
Configuration using KPG-D3/ D3N

- Configuring **Failsoft Channel** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Failsoft Channel)
- Configuring **Search Interval Time** ( See Radio Configuration > System Properties > Trunking Network > NXDN Network > Hunt Option > Background Hunt)

3.22**Transceiver Behavior in the Case that the Site Fails to Connect to the Network (Network Failure)**

Network Failure is the function to provide a communication capability as a single site within a site if the site fails to connect to the network in a multi-site system due to a system failure. Use of this function allows the transceiver to communicate within the site even if the system is in the state of Network Failure.

Upon the receipt of the broadcast message notifying that the system is in the state of Network Failure, the transceiver enters Network Failure Mode. If **Network Failure Indicator** is enabled, “Network Fail” appears on the display of the transceiver for 1 sec while the transceiver is operated in Network Failure Mode.



Also, if **Network Failure Tone** is enabled, a Network Failure Tone A (2 beeps) sounds at 5-sec intervals from the transceiver while the transceiver is operated in Network Failure Mode, and a Network Failure Tone B (1 beep) sounds from the transceiver when the transceiver exits Network Failure Mode.

Note

- The transceiver cannot transmit/receive within a roaming site while the system is in a state of Network Failure.
- Even if the transceiver is operating in Network Failure Mode, the Background Hunt will operate as normal.
- Pressing any button on the transceiver stops the Network Failure Tone A (2 beeps) from sounding.

Configuration using KPG-D3/ D3N

- Configuring **Network Failure Indicator** ( See Radio Configuration > System Properties > Trunking Network > NXDN Network > Indicator)
- Configuring **Network Failure Tone** ( See Radio Configuration > System Properties > Trunking Network > NXDN Network > Indicator)

3.23 Sending GPS Data

Refer to “[Sending GPS Data](#)” in 1 NXDN CONVENTIONAL SYSTEM.

This section describes the function for GPS data transmission available only in an NXDN Trunking system.

Sending GPS Data on a Channel in an NXDN Conventional System (GPS Data System-personality)

The **GPS Data System-personality** is the channel in a Conventional Group that is used for sending GPS data in an NXDN Trunking system. To use a **GPS Data System-personality**, “Conventional Channel” needs to be configured for the **GPS Report Channel Type**.

If “Conventional Channel” has been configured in **GPS Report Channel Type**, the transceiver automatically migrates to the **GPS Data System-personality** corresponding to the current site so as to send the GPS data at the time of sending GPS data. After sending the GPS data, the transceiver restores the previous channel in an NXDN Trunking system.

Also, only a channel in an NXDN Conventional system can be configured for the **GPS Data System-personality**.

GPS Report Channel Type

The **GPS Report Channel Type** is the channel type in an NXDN Trunking system that is used by the transceiver to automatically send GPS data.

The transceiver can use a control channel, traffic channel or channel in an NXDN Conventional system to automatically send GPS data.

GPS Report Channel Type is enabled when GPS data is automatically sent by receiving a Polling request, when GPS data is automatically and periodically sent at the time configured in FPU, and when GPS data linked with the travel distance of the transceiver is automatically sent (**GPS Distance Change**).

The transceiver behaves as follows depending on the configuration for the **GPS Report Channel Type**.

Table 3-16 Configuration for GPS Report Channel Type

Configuration	Description
Control Channel	The GPS data is automatically sent on a control channel in the current site including polling.
Traffic Channel	The GPS data is automatically sent on a traffic channel in the current site as a Long Data Message including polling.
Conventional Channel	The GPS data including polling is automatically sent on the channel configured for GPS Data System-personality . The channel corresponding to the current site number is applied. The transceiver automatically migrates to a GPS Data System-personality corresponding to the current site to send the GPS data at the time of sending GPS data.

Note

- During audio transmission, the transceiver multiplexes GPS data on the audio and sends the data, except when “Conventional Channel” is configured in **GPS Report Channel Type**
- This function is not applicable to GPS data sent by using the **Send the GPS Data** button, the **Send the Location Data** button and the **GPS Combination** function.
- If the transceiver receives a Polling request and sends GPS data, the transceiver sends GPS data without applying the configuration in **Channel Type** only the first time. If the transceiver is to subsequently continue GPS data transmission, **GPS Report Channel Type** is enabled for automatic transmission, and the transceiver sends GPS data according to the configuration in **Channel Type**.

Configuration using KPG-D3/ D3N

- Configuring **GPS Data System-personality** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS)
- Configuring **GPS Report Channel Type** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS)

Sending GPS Data Preferentially While Receiving a Group Call (GPS Report Priority over Group Call)

GPS Report Priority over Group Call is the function that gives higher priority to sending GPS data, and stops receipt if the timing of automatic GPS data transmission including polling while the transceiver is receiving Group Call (Transmission Trunked).

If this function is enabled, the transmission of GPS data is started at the timing of automatic GPS data transmission including polling while the transceiver is receiving Group Call (Transmission Trunked). However, if the Group ID of the Group Call which is being received and the target ID (Base Station) of the GPS data are the same, the receipt of the Group Call continues and the transceiver does not send the GPS data, even if the timing of automatic GPS data transmission arrives.

This function is used to avoid restricting automatic GPS data transmission by the frequent receipt of Group Calls (Transmission Trunked).

Note

- This function can be used only if “Transmission Trunked” is configured for **Trunking Type**. If “Message Trunked (Enhanced)” is configured for **Trunking Type**, even if the timing of automatic GPS data transmission including polling comes while receiving a Group Call (Message Trunked (Enhanced)), the transmission of GPS data will not start.
- GPS data transmission will not start even if the timing of automatic GPS data transmission including polling comes when a control channel is used as a traffic channel in a system where a channel is used as both a control channel and traffic channel.

Configuration using KPG-D3/ D3N

Configuring **GPS Report Priority over Group Call** to be enabled or disabled ( **See** Radio Configuration > System Properties > Systems > NXDN Trunking > GPS)

Sending GPS Data by Using a GPS Data Transmission Channel (GPS Report Channel (GRCH))

GPS Report Channel (GRCH) is the function that allows the transceiver to send GPS data by using a GPS data transmission channel.

By using **GPS Report Channel (GRCH)**, the transceiver can send GPS data without using the control channel at the timing specified in a NEXEDGE system. In this case, the transceiver sends GPS data by using the slot assigned by **GPS Report Channel (GRCH)**.

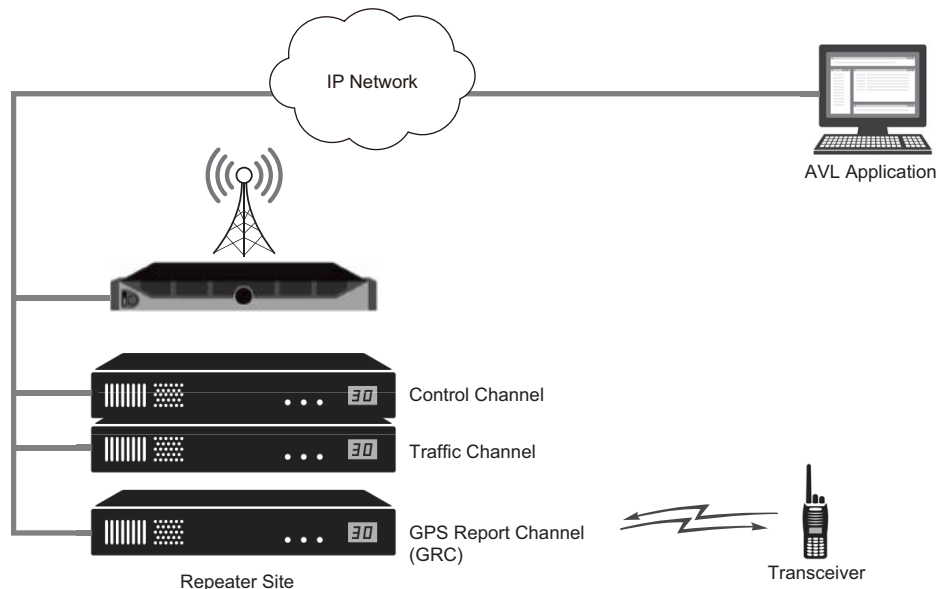


Figure 3-10 Advanced GPS Report Mode

If the transceiver sends GPS data by using the **GPS Report Channel (GRCH)**, the traffic to the control channel can be reduced.

Also, a transmission interval of the transceiver GPS data can be configured for each UID in the NEXEDGE system. The transceiver used for a purpose of high update rates of GPS data (such as police or emergency services) can be configured and operated with a short GPS data transmission interval and the number of transceivers that can be added can be expanded.

Refer to NEXEDGE 2nd Generation Function Reference “ABOUT GPS” for details.

Note

- The transceiver behavior of when the transceiver sends GPS data by using the channel for GPS data transmission depends on the system configuration. However, using KPG-D3/ D3N, the warning display (**Advanced GPS Report Error Indicator**) and warning tone (**Advanced GPS Report Error Tone**) of when the channel for GPS data transmission cannot be used because of a problem in the system can be configured for the transceiver.
- The GPS data is sent to the ID configured in **Base ID** or **Base ID (GPS)**.
- If the transceiver is operated in a system using the channel for GPS data transmission, the transceiver does not use the following functions even if the functions are configured:
 - GPS Report Mode
 - Number of Times
 - GPS Time Mark
 - GPS Message Type
 - Channel Type
 - GPS Report Interval Time
- These functions are disabled while the transceiver is in Emergency Mode.

Advanced GPS Report Error Indicator

Advanced GPS Report Error Indicator is the function to display a warning message on the display when the channel for GPS data transmission cannot be used because of a problem in the system, even if **GPS Report Channel (GRCH)** is enabled.

If this function is enabled, "GPS Report Err" appears on the display of the transceiver when the channel for GPS data transmission cannot be used.

Advanced GPS Report Error Tone

Advanced GPS Report Error Tone is the function to emit a warning tone from the transceiver when the channel for GPS data transmission cannot be used because of a problem in the system, even if **GPS Report Channel (GRCH)** is enabled.

If this function is enabled, a warning tone sounds from the transceiver at 30 sec intervals when the channel for GPS data transmission cannot be used.

Configuration using KPG-D3/ D3N

- Configuring **GPS Report Channel (GRCH)** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS > Advanced GPS Report on Gen2 Trunking)
- Configuring **Advanced GPS Report Error Indicator** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Trunking Network > NXDN Network > Indicator)
- Configuring **Advanced GPS Report Error Tone** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Trunking Network > NXDN Network > Indicator)

3.24 Receiving GPS Data

Refer to "[Receiving GPS Data](#)" in 2 NXDN CONVENTIONAL SYSTEM.

3.25 Remote Operation by Radio Communication (Remote Control)

Refer to "[Remote Operation by Radio Communication \(Remote Control\)](#)" in 2 NXDN CONVENTIONAL SYSTEM.

3.26 Communicating Using Multiple Systems (Multi-System Roaming)

Multi-System Roaming is the function that enables the transceiver to roam into a system other than the system to which the transceiver belongs in a multi system where multiple systems of different System Codes are connected by using the Roaming Gateway.

If this function is used, the communication area expands because the transceiver can communicate using multiple systems.

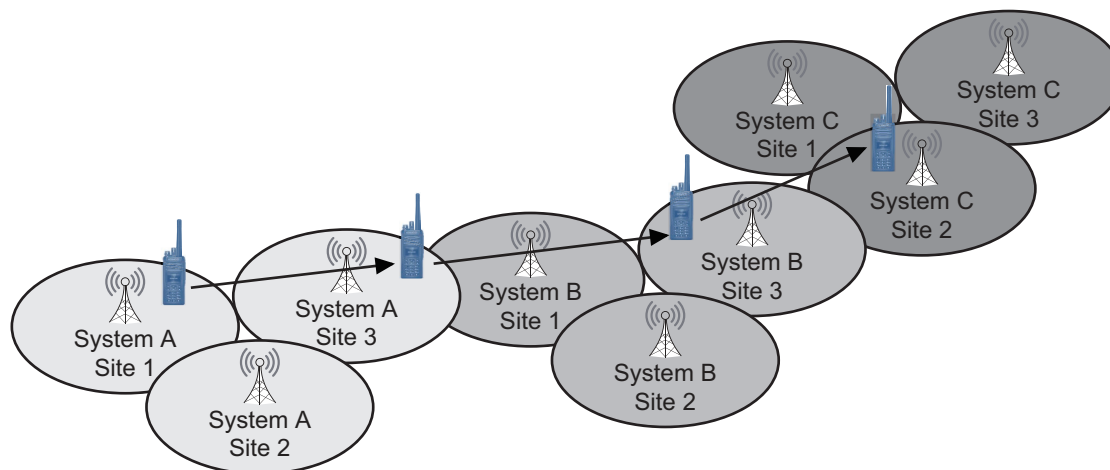


Figure 3-11 Multi-System Roaming

The transceivers that belong to the same system (hereinafter referred to as “Home System”) can communicate with each other. For a system other than the system to which the transceiver belongs (hereinafter referred to as “Roaming System”), the transceiver is basically operated in the Home System configuration just by using the system temporarily. However, the number of network configurations and the number of System Keys each need to be the same as the number of systems to be roamed to enter a Roaming System.

The Home System has a single NXDN Trunking system configuration, which includes the network and System Key configurations of the Home System and the network and System Key configurations of a Roaming System. The Home System can have a maximum of 23 Roaming Systems.

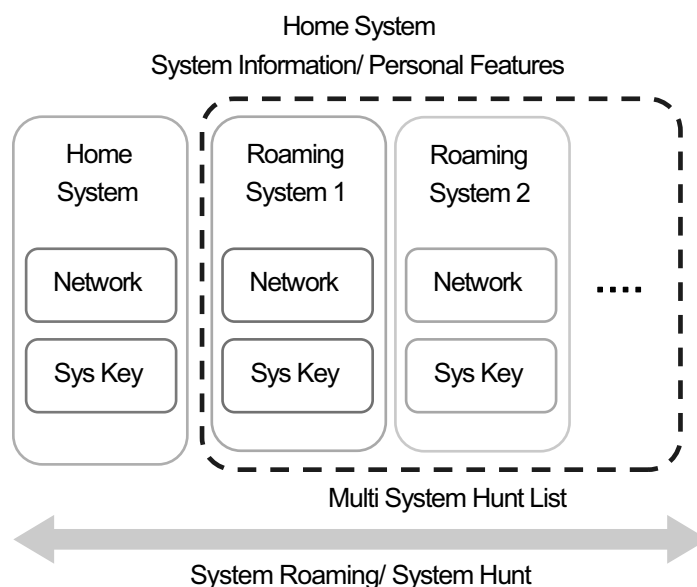


Figure 3-12 System Roaming/ System Hunt

Note

- In a Roaming System, Failsoft and the GPS data transmission functions other than the following functions do not function:
 - GPS data transmission in Advanced GPS Report Mode
 - GPS data transmission by Send the GPS Data
 - GPS data transmission by the receipt of a GPS Data Single Polling Request
- In a Roaming System, the following configurations of **NXDN Network** and **System Information** for the system configured as a Roaming System are not used. The configurations of the Home System are used for these configurations.
 - Last Control Channel
 - ID Range
 - Unit ID
 - Global ID
 - Over-the-Air Alias
 - Unit ID Name
 - Global ID Name

Multi-System Hunt

Multi-System Hunt is the function to roam among the systems configured in **Multi-System Hunt List**.

If this function is enabled, the Multi-System Hunt is started according to the configuration in **Trigger**.

Table 3-17 Trigger

Configuration	Description
After Standard Hunt	If the transceiver becomes outside the communication area and the hunt sequence ends in the current system, the Multi-System Hunt is started in the order of systems configured in Multi-System Hunt List .
Timer	If the transceiver becomes outside the communication area and the length of time configured in Timer elapses, the Multi-System Hunt is started in the order of systems configured in Multi-System Hunt List. This configuration is used to prevent the transceiver from being migrated to a different system erroneously even if the transceiver temporarily enters an area with a weak signal and becomes outside the communication area. Note • The length of time configured in Timer counts down from when the transceiver becomes outside the communication area until the Multi-System Hunt is started.

Configuration using KPG-D3/ D3N

- Configuring **Multi-System Hunt** to be enabled or disabled ( **See** Radio Configuration > System Properties > Systems > NXDN Trunking > Multi-System Roaming > General)
- Configuring **Trigger** ( **See** Radio Configuration > System Properties > Systems > NXDN Trunking > Multi-System Roaming > General)
- Configuring **Time** (Radio Configuration > System Properties > Systems > NXDN Trunking > Multi-System Roaming > General)

Multi-System Hunt List

Multi-System Hunt List is the list in which systems targeted for roaming are configured.

If the transceiver is outside the communication area, the systems configured in **Multi-System Hunt List** are the targets for roaming by the **Background Hunt** function. (Refer to [Executing the Background Hunt in Different Systems \(Background Hunt\)](#).)

If the transceiver is outside the communication area, the Multi-System Hunt is executed by switching systems in the order configured in **Multi-System Hunt List**.

In a multi-system, the systems are automatically switched. In the switched system, the same hunt sequence as the hunt sequence of a single system is executed.

Configuration using KPG-D3/ D3N

Configuring **Multi-System Hunt List** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Multi-System Roaming > Multi-System Hunt List)

Transceiver Behavior When Executing the Multi-System Hunt

Transceiver behavior immediately after turning the transceiver ON

If the transceiver is turned ON, the transceiver starts the Multi-System Hunt on the control channel of the system last used when the transceiver was last turned OFF.

If the transceiver executes the Multi-System Hunt and all hunt sequences end without acquiring a control channel, the transceiver migrates to the Home System and starts the Multi-System Hunt. Hereafter, the transceiver continues the Multi-System Hunt by switching systems in the order configured in **Multi-System Hunt List**.

The transceiver behavior varies as follows depending on the configuration in **Last Control Channel**. (Refer to [Retaining the Information of the Control Channel Used When the Transceiver Is Turned OFF \(Last Control Channel\)](#).)

- **If Last Control Channel is enabled:**

If the system last used when the transceiver was last turned OFF is the Home System, the transceiver starts the Multi-System Hunt on the control channel of the Home System. When all hunt sequences end without acquiring a control channel, the transceiver starts the Multi-System Hunt by switching systems in the order configured in **Multi-System Hunt List**.

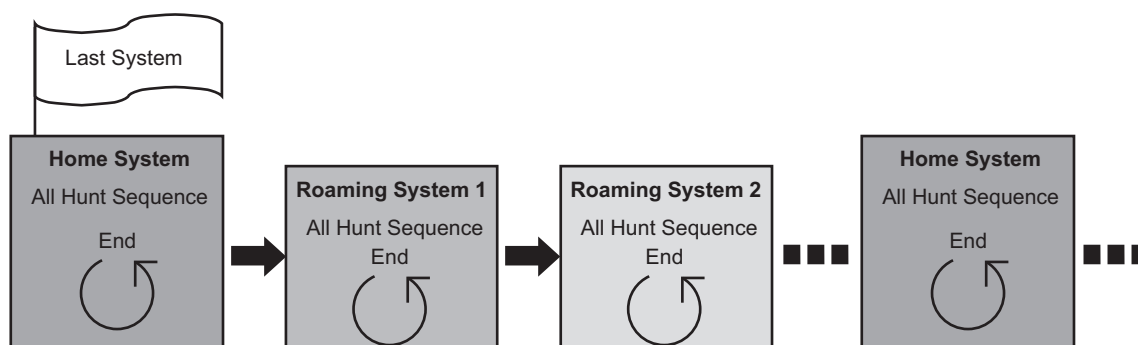


Figure 3-13 Multi-System Hunt 1

If the system last used when the transceiver was last turned OFF is a system other than the Home System, the transceiver starts the Multi-System Hunt on the control channel of the system. When all hunt sequences end without acquiring a control channel, the transceiver migrates to the Home System and starts the Multi-System Hunt. Hereafter, the transceiver continues the Multi-System Hunt by switching systems in the order configured in **Multi-System Hunt List**.

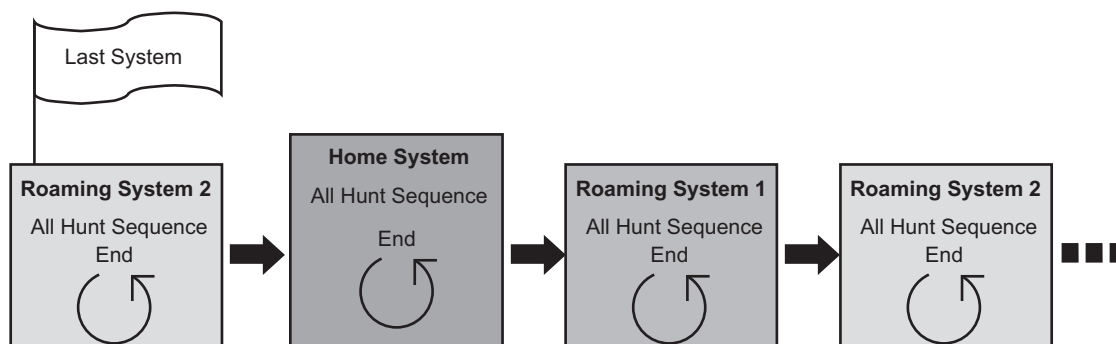


Figure 3-14 Multi-System Hunt 2

- **If Last Control Channel is disabled:**

The transceiver always starts the Multi-System Hunt on the control channel of the Home System. When all hunt sequences end without acquiring a control channel, the transceiver starts the Multi-System Hunt by switching systems in the order configured in **Multi-System Hunt List**.

Transceiver behavior when the transceiver becomes outside the communication area

If the transceiver becomes outside the communication area, the transceiver starts the Multi-System Hunt in the current system.

If the transceiver executes the Multi-System Hunt and all hunt sequences end without acquiring a control channel, the transceiver continues the Multi-System Hunt by switching systems in the order configured in **Multi-System Hunt List**.

The transceiver behavior varies as follows depending on the configuration in **Trigger**. (Refer to [Multi-System Hunt](#).)

- **If “After Standard Hunt” is configured in Trigger:**

If the transceiver becomes outside the communication area in the Home System, the transceiver starts the Multi-System Hunt on the control channel of the Home System. When all hunt sequences end without acquiring a control channel, the transceiver starts the Multi-System Hunt by switching systems in the order configured in **Multi-System Hunt List**.

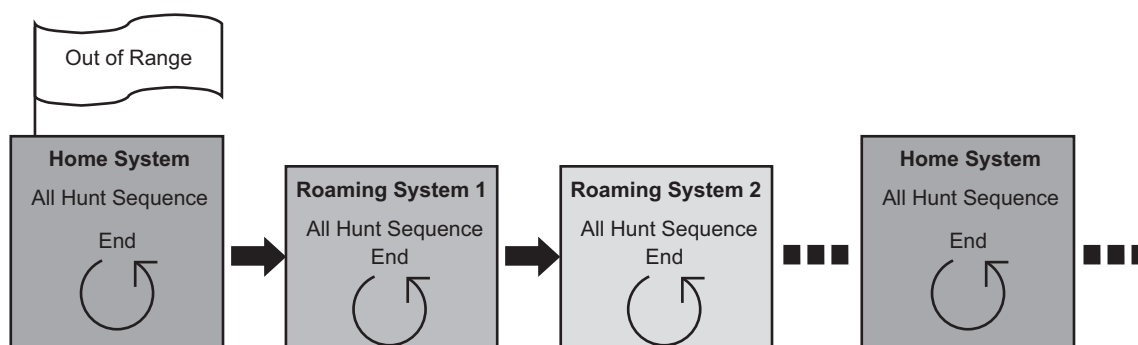


Figure 3-15 Multi-System Hunt 3

If the transceiver becomes outside the communication area in any system other than the Home System, the transceiver starts the Multi-System Hunt on the control channel of this system. When all hunt sequences end without acquiring a control channel, the transceiver migrates to the Home System and starts the Multi-System Hunt. Hereafter, the transceiver continues the Multi-System Hunt by switching systems in the order configured in **Multi-System Hunt List**.

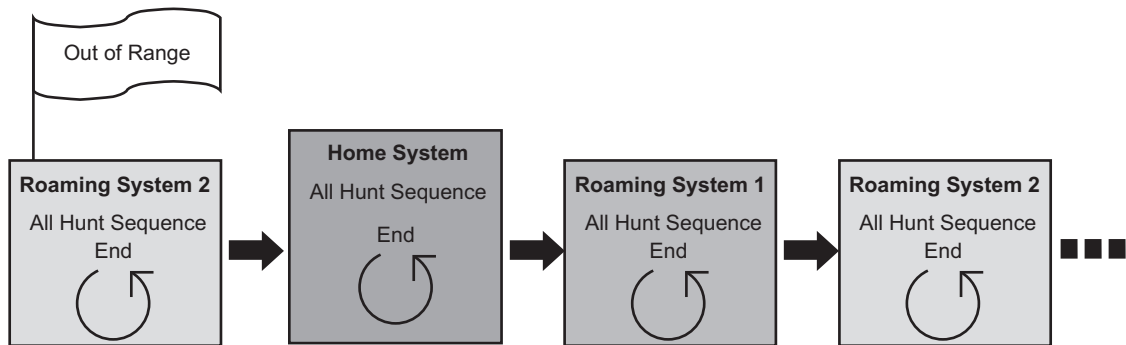


Figure 3-16 Multi-System Hunt 4

● If “Timer” is configured in Trigger:

If the transceiver becomes outside the communication area in the Home System, the transceiver starts the Multi-System Hunt on the control channel of the Home System. When the length of time configured in **Timer** elapses, the transceiver starts the Multi-System Hunt by forcibly switching systems in the order configured in **Multi-System Hunt List**.

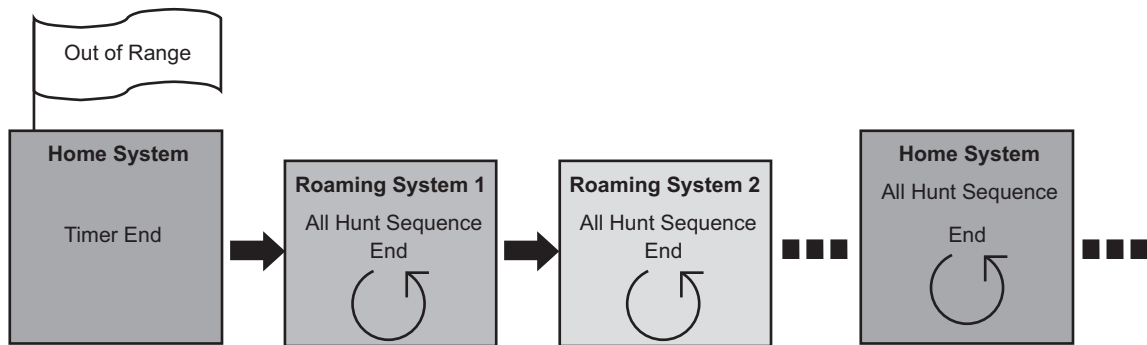


Figure 3-17 Multi-System Hunt 5

If the transceiver becomes outside the communication area in any system other than the Home System, the transceiver starts the Multi-System Hunt on the control channel of this system. If the length of time configured in **Timer** elapses, the transceiver forcibly migrates to the Home System and starts the Multi-System Hunt. Hereafter, the transceiver continues the Multi-System Hunt by switching systems in the order configured in **Multi-System Hunt List**.

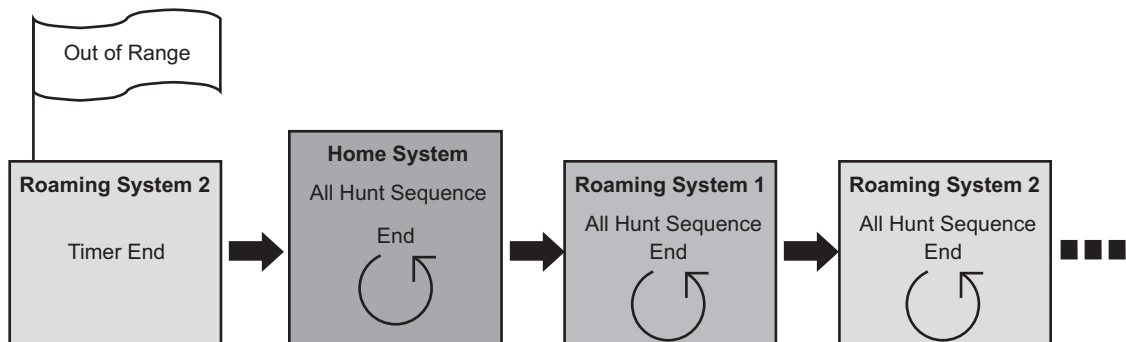


Figure 3-18 Multi-System Hunt 6

Transceiver behavior when Forced Search is executed

If Forced Search is executed in an NXDN Trunking system with **Multi-System Hunt** enabled, the Multi-System Hunt is executed for each system configured in **Multi-System Hunt List**. (Refer to [Starting the Control Channel Hunt Manually \(Forced Search\)](#).)

When all hunt sequences end without acquiring a control channel in a system, the transceiver starts the Multi-System Hunt by switching systems in the order configured in **Multi-System Hunt List**. If all hunt sequences end without acquiring a control channel in the Roaming System registered last in **Multi-System Hunt List**, the transceiver returns to the Home System and starts the Multi-System Hunt. Hereafter, the transceiver repeats this behavior until the transceiver acquires a control channel.

If Forced Search is executed in the Home System, the transceiver starts the Multi-System Hunt on the control channel of the Home System. When all hunt sequences end without acquiring a control channel, the transceiver starts the Multi-System Hunt by switching systems in the order configured in **Multi-System Hunt List**.

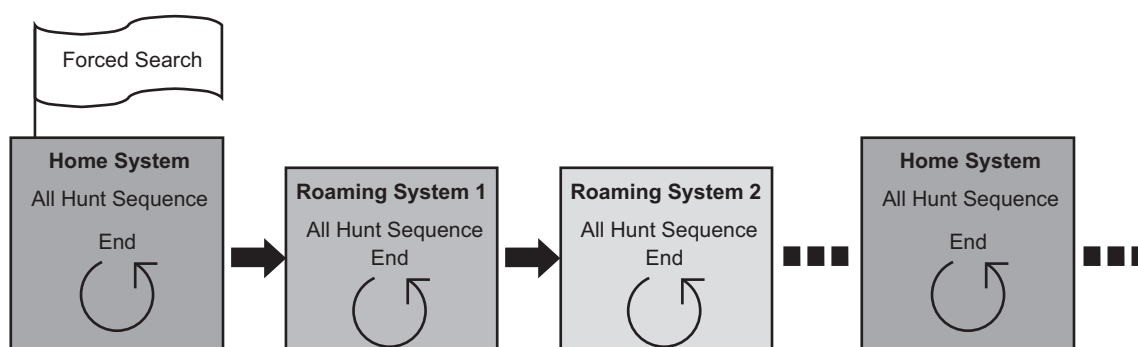


Figure 3-19 Multi-System Hunt 7

If the transceiver becomes outside the communication area in any system other than the Home System, the transceiver starts the Multi-System Hunt on the control channel of this system. When all hunt sequences end without acquiring a control channel, the transceiver migrates to the Home System and starts the Multi-System Hunt. Hereafter, the transceiver continues the Multi-System Hunt by switching systems in the order configured in **Multi-System Hunt List**.

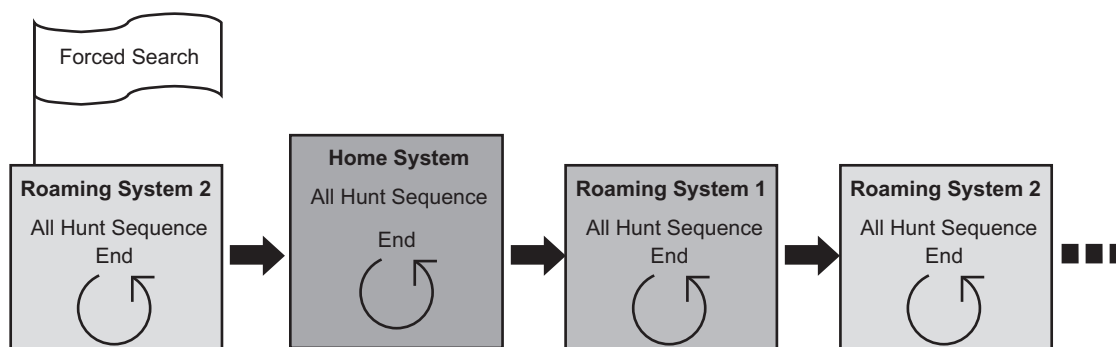


Figure 3-20 Multi-System Hunt 8

Using the System Auto Select Function (System Auto Select)

System Auto Select is the function to make the system in operation the search target.

If this function is enabled and the transceiver becomes outside the communication area, after all Multi-System Hunts of all systems configured in **Multi-System Hunt List** are executed, the transceiver switches to a system in operation that uses the **System Auto Select** function and starts **System Auto Select**. In **System Auto Select**, the search target system preconfigured in the transceiver is searched sequentially, and the transceiver automatically switches to an available system when the system is found. If **System Auto Select** is configured in the Home System, the **System Auto Select** behavior starts after the System Selection Wait Time elapses. (Refer to [Automatically Switching the System \(System Auto Select\)](#).)

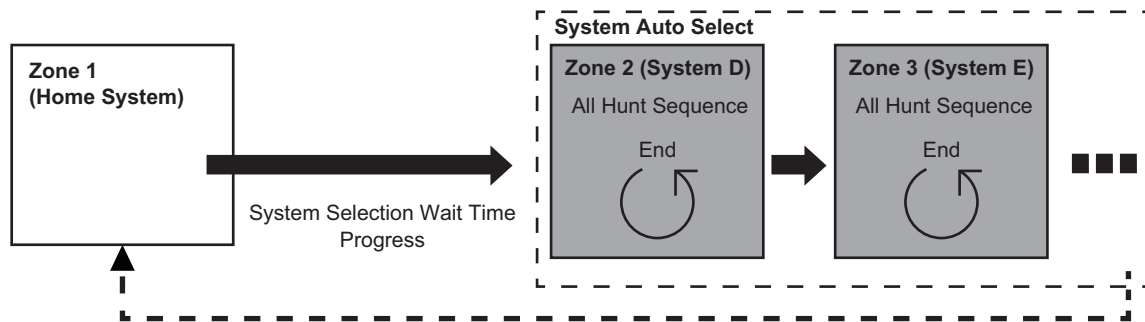


Figure 3-21 System Auto Select

Executing the Background Hunt in Different Systems (Background Hunt)

Background Hunt is the function to execute the Background Hunt in systems configured in **Multi-System Hunt List**.

By using this function, the transceiver can automatically acquire a control channel providing better conditions than the currently acquired control channel by expanding the range to other systems as well as the same system, while the transceiver is in the standby state after acquiring a control channel. The target system of **Background Hunt** is a system configured in **Multi-System Hunt List**. To use this function, the target system of **Background Hunt** needs to be specified in the channel information of an adjacent site (**Adjacent Site Information**) in the system.

Also, for **Background Hunt**, the Home System can have the most preferentially searched channel (**Preferential Hunt Control Channel**). (Refer to [Control Channel Hunt \(Control Channel Hunt\)](#).)

Note

- In **Background Hunt**, the following configurations of each system are commonly used:
 - Search Interval Time (Refer to [Control Channel Hunt \(Control Channel Hunt\)](#).)
 - System Search Policy (Refer to [System Search Policy](#).)
- By using **Direct Frequency Assignment (DFA)**, the transceiver can roam by **Background Hunt** even for a newly added system. The transceiver can roam even if a frequency is not configured in the transceiver to operate in the newly added system. However, the newly added system needs to be registered as the Roaming System in **Multi-System Hunt List** beforehand. (Refer to [Using a Frequency Added to a System without Changing the Transceiver Configuration \(Direct Frequency Assignment\)](#).)

Signal strength level when Background Hunt is initiated

The signal strength levels when **Background Hunt** is initiated on the control channel of the Home System or Roaming System can each be configured.

Table 3-18 Level Margin

Configuration	Description
Roaming System Level Margin	This is the signal strength level when Background Hunt is initiated on the control channel of the Roaming System. If the signal strength level of the control channel to be newly acquired of the Roaming System is greater than the signal strength level of the currently acquired control channel of the Home System or Roaming System by the level equal to or higher than the level configured in Roaming System Level Margin, Background Hunt is initiated on the control channel to be newly acquired of the Roaming System. To remain in the Home System as much as possible, configure this value as a large value.
Home System Level Margin	This is the signal strength level when Background Hunt is initiated on the control channel of the Home System. If the signal strength level of the control channel to be newly acquired of the Home System is greater than the signal strength level of the currently acquired control channel of the Roaming System by the level equal to or higher than the level configured in Home System Level Margin, Background Hunt is initiated on the control channel to be newly acquired of the Home System. To return to the Home System as much as possible, configure this value as a small value.

Conditions for Background Hunt to function

The conditions for **Background Hunt** to function are as follows:

Table 3-19 Conditions for Background Hunt to Function

Channel Information of the Adjacent Site (Candidate as the Control Channel to Be Acquired)		Currently Acquired Control Channel		
		Home System		Roaming System
		Priority 1/ Priority 2	Other Than Priority 1/ Priority 2	Other Than Priority 1/ Priority 2
Home System	Priority 1/ Priority 2	Multi-System Background Hunt does not function because the system is the same.	Multi-System Background Hunt does not function because the system is the same.	Because the control channel to be newly acquired has a higher priority level than the currently acquired control channel, the transceiver migrates to the new control channel and enters the standby state after executing the acquisition of the control channel, regardless of the configuration in Home System Level Margin .
	Other Than Priority 1/ Priority 2	Multi-System Background Hunt does not function because the system is the same.	Multi-System Background Hunt does not function because the system is the same.	If the signal strength level of the control channel to be newly acquired is greater than the signal strength level of the currently acquired control channel by the value equal to or greater than the value configured in Home System Level Margin , the transceiver migrates to the new control channel and enters the standby state after executing the acquisition of the control channel.
Roaming System	Other Than Priority 1/ Priority 2	The Roaming System cannot have the most preferentially searched channel. (Preferential Hunt Control Channel). Also, Multi-System Background Hunt does not function because a control channel with higher priority than the currently acquired control channel does not exist.	If the signal strength level of the control channel to be newly acquired is greater than the signal strength level of the currently acquired control channel by the value equal to or greater than the value configured in Roaming System Level Margin , the transceiver migrates to the new control channel and enters the standby state after executing the acquisition of the control channel.	If the system is the same: Multi-System Background Hunt does not function. If the system is different: If the signal strength level of the control channel to be newly acquired is greater than the signal strength level of the currently acquired control channel by the value equal to or greater than the value configured in Roaming System Level Margin, the transceiver migrates to the new control channel and enters the standby state after executing the acquisition of the control channel.

 Note

- If the System Lock or Site Lock is enabled, **Background Hunt** does not function. (Refer to [Locking the System to Be Used \(System Lock/ System Select\)](#).)
- Refer to “[Out of Range Indicator](#)” for the display and the configuration of the behavior when no available control channel is found after searching for a control channel.

Configuration using KPG-D3/ D3N

- Configuring **Background Hunt** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Multi-System Roaming > Background Hunt)
- Configuring **Roaming System Level Margin** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Multi-System Roaming > Background Hunt)
- Configuring **Home System Level Margin** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Multi-System Roaming > Background Hunt)

3.27 Locking the System to Be Used (System Lock/ System Select)

System Lock is the function to lock the system to be used as the current system and prevent the transceiver from roaming to other systems by operating the transceiver buttons in a system that uses Multi-System Roaming. If this function is enabled, the transceiver is locked in the current system and cannot roam.

If the transceiver enters Menu Mode by pressing the **System Lock** button or the **Menu** button and “System Lock” is selected, the System Lock is enabled for the selected system.

The System Lock can also be enabled by selecting a system in System Select Mode. Also, selecting a system by using the **Selector** or **PF** buttons can enable the System Lock.

The following functions need to be assigned to the **Selector** and **PF** buttons in order to select the system to enable the System Lock by using the **Selector** or **PF** buttons:

Table 3-20 System Lock/ System Select

Button	Function	Reference
Selector *1	System Up/Down System Select	Common Function Part Available Functions for the Selector (Portable only)
PF button	System Up System Up (Continuous) System Down System Down (Continuous)	Common Function Part Available Functions for the PF Buttons

*1 Portable only

Note

- This function functions only if a channel in an NXDN Trunking system with **Multi-System Hunt** enabled is selected. (Refer to [Multi-System Hunt](#).)

Operating the transceiver

● Enabling or disabling the System Lock

1 Press the **System Lock** button while System Lock is disabled.

The “” icon appears and a Button Beep A (1 beep) sounds from the transceiver. The system name of the system in use appears on the display for 2 sec and the System Lock becomes enabled.



2 Press the **System Lock** button while System Lock is disabled.

The “” icon disappears and the System Lock becomes disabled.

Note

- Transceiver operation is identical even if “System Lock” is selected after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

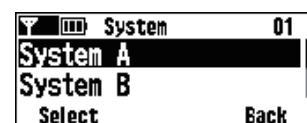
● Using System Select Mode

1 Press and hold the **System Lock** button.

A Button Beep A (1 beep) sounds from the transceiver and the transceiver enters System Select Mode. The system list is displayed.

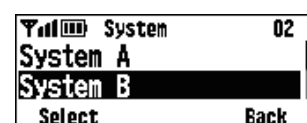


- If “System Select” is selected after the transceiver enters Menu Mode by pressing the **Menu** button, the transceiver can also enter System Select Mode. (Refer to Common Function Part [Using Menu Mode.](#))



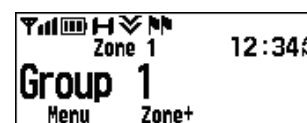
2 Press the **[▲]** or **[▼]** button to select a system for which the System Lock is to be enabled.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **Menu** (**[□]**) or **[*]** button.

The “**■**” icon appears and a Button Beep B (2 beeps) sounds from the transceiver. The System Lock becomes enabled for the selected system.

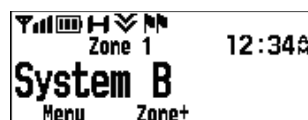


● Using the Selector (Portable only) or the PF button

Select one of the following operations:

- Press the **System Up** or **System Down** button to select a system for which the System Lock is to be enabled.
- Turn the **Selector** (System Up/Down) to select a system for which the System Lock is to be enabled.
- Turn the **Selector** (System Select) to select a system for which the System Lock is to be enabled.

The “**■**” icon appears and a Button Beep A (1 beep) sounds from the transceiver. The system name of the system in use appears on the display for 2 sec and the System Lock becomes enabled.



 Note

- If the Site Lock is disabled, the transceiver can roam between sites in the system even if the System Lock is enabled for the system in use.
- Because the site is fixed even if the System Lock is disabled if the Site Lock is enabled, the transceiver becomes unable to roam to other systems.
- If the Site Lock is enabled while the “” icon appears, the “” icon disappears and the “” icon appears. In this case, if the Site Lock is disabled, the “” icon disappears and the “” icon appears again.
- The status of the System Lock, either enabled or disabled, is retained in the transceiver.
- If the System Lock is enabled, **Background Hunt** does not function. (Refer to [Executing the Background Hunt in Different Systems \(Background Hunt\)](#).)
- The System Lock does not become disabled even if the transceiver cannot receive signals from a control channel while the System Lock is enabled.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( **See** Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the **Selector** ( **See** Radio Configuration > Global Options > Button Assignment > General > Selector)

3.28 Indoor Location (NXDN Trunking)

Supported Models: Portable

Refer to “[Indoor Location \(NXDN\)](#)” in 2 NXDN CONVENTIONAL SYSTEM.

This section describes the function for Indoor Location available only in an NXDN Trunking system.

Selecting the Transmission Method of BLE Data (BLE Report Channel Type (Indoor Location))

BLE Report Channel Type is the function to configure the transmission method of BLE data during operation on an NXDN Trunking system.

This is useful when you want to reduce the traffic of the control channel by BLE data communication.

BLE Report Channel Type is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with GPS Report Channel Type. GPS Report Channel Type and BLE Report Channel Type function with the same configuration.

BLE Report Channel Type is the function enabled for Polling and BLE Auto Report.

The following behaviors occur according to the configuration in **BLE Report Channel Type**:

Table 3-21 BLE Report Channel Type

Configuration	Description
Control Channel	BLE data is sent on the control channel of the site currently in operation.
Traffic Channel	BLE data is sent as a Long Data Message on the traffic channel of the site currently in operation.
Conventional Channel	In BLE Data System-personality, BLE data is sent by using the Channel/ personality of the Conventional Group configured for the site currently in operation.

When the transceiver sends BLE data, the transceiver automatically moves to the **BLE Data System-personality** configured for the current site and sends the data. Registration Clear is not performed at this time. Then, after sending the BLE data, the transceiver returns to the original channel. Registration is not performed at this time.

During audio transmission, the transceiver multiplexes BLE data on the audio and sends the data, except when “Conventional Channel” is configured in **BLE Report Channel Type**

This function is disabled for the **Send the Location Data** button and BLE Combination.

When a Conventional Channel is configured, if **BLE Report on Data System-personality** is configured, BLE data is sent by using the Data System-personality configured for the system.

When a Polling request is received, BLE data is sent with this function disabled only at the timing of the first Polling request reception. If BLE data transmission continues thereafter, this function is enabled with the BLE data transmission automatically sent.

Configuration using KPG-D3/ D3N

- Configuring **GPS/BLE Report Channel Type** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)
- Configuring **GPS/BLE Data System-personality** in an NXDN Trunking system ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)

BLE Data System-personality (Indoor Location)

The **BLE Data System-personality** is the channel in a Conventional Group that is used for sending BLE data in an NXDN Trunking system.

BLE Data System-personality is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with GPS Data System-personality. GPS Data System-personality and BLE Data System-personality function with the same configuration.

BLE Data System-personality can be configured only when “Conventional Channel” is configured in **BLE Report Channel Type**. Only a Conventional channel whose Channel Type is NXDN can be configured.

Configuration using KPG-D3/ D3N

- Configuring **GPS/BLE Report Channel Type** in an NXDN Trunking system ( See Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)
- Configuring **GPS/BLE Data System-personality** in an NXDN Trunking system ( See Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)

Sending BLE Data Preferentially While Receiving a Group Call (BLE Report Priority over Group Call (Indoor Location))

BLE Report Priority over Group Call is the function that interrupts reception and prioritizes transmission of BLE data when automatic BLE data transmission including transmission by receiving a Polling request is performed during a Group Call. This function is used to avoid restricting automatic BLE data transmission by the frequent receipt of Group Calls.

BLE Report Priority over Group Call is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with GPS Report Priority over Group Call. GPS Report Priority over Group Call and BLE Report Priority over Group Call function with the same configuration.

Table 3-22 BLE Report Priority over Group Call

Configuration	Description
Enabled	If BLE Report Priority over Group Call is enabled, even if the transceiver is on a traffic channel due to Group Call reception, the transceiver returns to the control channel and starts sending BLE data at the timing of BLE automatic transmission.
Disabled	If BLE Report Priority over Group Call is disabled, automatic BLE transmission is canceled while a Group Call is being received. If Trunking Type is Message Trunked (Enhanced), this function is disabled and automatic BLE transmission is canceled while a Group Call is being received.

For operation by a mixed control channel, this function is disabled and automatic BLE transmission is canceled while a Group Call is being received.

Configuration using KPG-D3/ D3N

- Configuring **GPS/BLE Report Priority over Group Call** in an NXDN Trunking system to be enabled or disabled ( See Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)
- Configuring **GPS/BLE Data System-personality** in an NXDN Trunking system ( See Radio Configuration > System Properties > Systems > NXDN Trunking > GPS/BLE)

Emergency is the function to be used for the transceiver to transmit and receive for emergency purposes. This function is used for a user to immediately contact the base station in emergency situations.

The transceiver behaves according to the configurations in Emergency Mode when the transceiver is placed in Emergency Mode. The base station transceiver can notice an occurrence of an emergency situation in the transmitting transceiver upon receipt of a call by use of Emergency.

4.1 Placing the Transceiver in Emergency Mode

One of the following operations can place the transceiver in Emergency Mode:

● Emergency button

Pressing and holding the **Emergency** button for longer than the time configured in **Hold Delay** causes the transceiver to enter Emergency Mode.

For Portable, “Emergency” can be assigned to the **AUX** button or the **PF 1** button of the speaker microphone only as the function when the button is held.

For Mobile, “Emergency” can be assigned to the **AUX** button only as the function when the button is held.

Also, “Emergency” can be assigned to the AUX Input port for Mobile. In this case, the transceiver enters Emergency Mode if the AUX Input port to which “Emergency” is assigned goes low level. (Refer to Common Function Part [Available Functions for AUX Input Ports](#).)

● Lone Worker

If **Lone Worker** is used, the transceiver can automatically enter Emergency Mode and notify the base station of the emergency status when the transceiver becomes disabled from operating due to an accident.

When the time configured in **Lone Worker Interval** elapses and then the time configured in **Duration of Lone Worker Tone** elapses while the transceiver is in Lone Worker Mode, the transceiver enters Emergency Mode. (Refer to [Placing the Transceiver in Emergency Mode Using the Lone Worker Function](#).)

● Activity Detection

If **Activity Detection** is used, the transceiver automatically enters Emergency Mode and notifies the base station of the emergency status when the transceiver is detected to be in tilted, stationary, or shaking state for a certain period of time due to an accident. **Man-down Detection**, **Stationary Detection**, and **Motion Detection** are the functions available in **Activity Detection**. (Refer to [Using the Activity Detection Function to Place the Transceiver in Emergency Mode](#).)

● Heart Rate Service/ Automatic Injury Detection Service

The transceiver enters Emergency Mode if the transceiver is connected to a Bluetooth-compatible device which supports **Heart Rate Service** or **Automatic Injury Detection Service** and the transceiver is in any of the following statuses: (Refer to Common Function Part [Activation of Emergency](#), [Notifying of Damage on a Bluetooth-compatible Device to the Transceiver \(Automatic Injury Detection Service\)](#).)

- When the status where the heart rate notified from a Bluetooth-compatible device goes higher than Upper Threshold continues while Delay Time is activated
- When the status where the heart rate notified from a Bluetooth-compatible device goes lower than Lower Threshold continues while Delay Time is activated
- When a notification of injury is received from a Bluetooth-compatible device

4.1 Placing the Transceiver in Emergency Mode

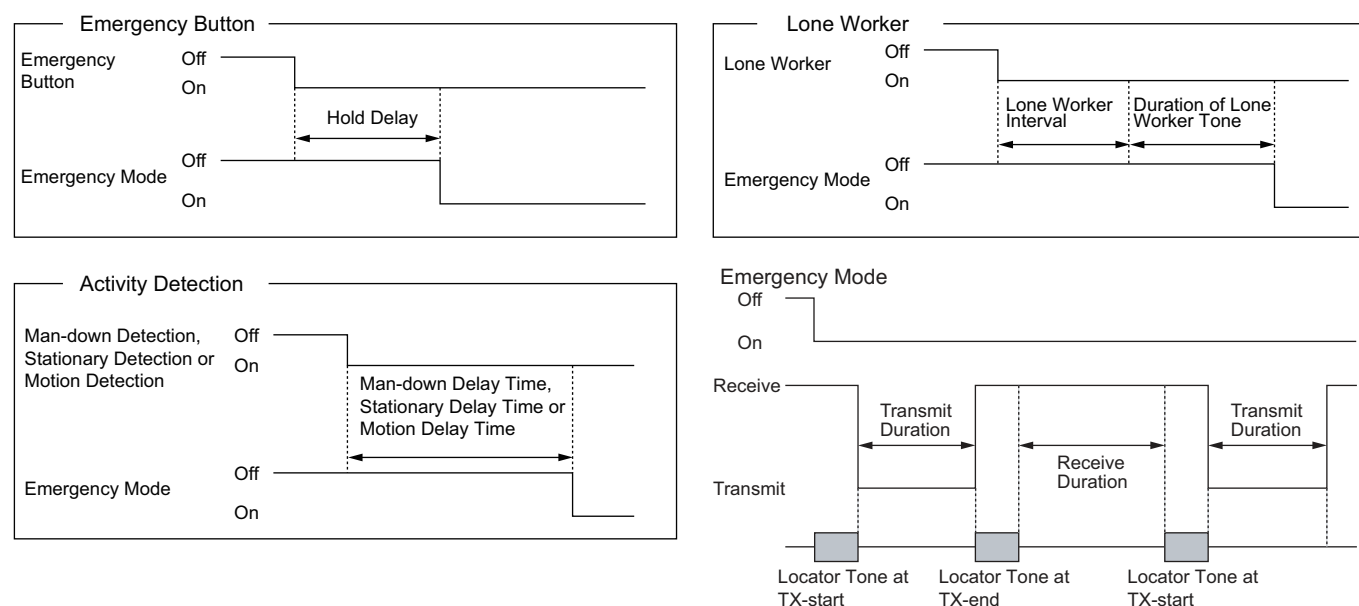


Figure 4-1 Emergency Mode

If Emergency Mode is activated by pressing the **Emergency** button or by the Lone Worker function, Emergency Mode will be exited when the **Emergency** button is pressed longer than the time configured in **Hold Delay** or when the transceiver is turned OFF.

If Emergency Mode is activated by the Activity Detection function, Emergency Mode will be exited when the transceiver is turned OFF.

However, if **Suspended Power-off** is enabled, the transceiver will not be turned OFF and remains in Emergency Mode even if the transceiver is operated to be turned OFF while in Emergency Mode. (Refer to [Suspended Power-off](#).)

Note

- If the transceiver enters Emergency Mode during a scan, Emergency behaves according to the configuration in **Emergency Profile** for the selected channel.
- The **PTT** switch can be used even if the transceiver is in Emergency Mode. The transceiver reverts to automatic receive mode when the transceiver completes transmitting by releasing the **PTT** switch.
- In Emergency Mode, the microphone sensitivity is determined by the configuration in **Emergency Microphone Sense**. (Refer to [Emergency Microphone Sense](#).)
- The transceiver does not decode the Stun Code and Optional Signaling in Emergency Mode.
- The transceiver exits Emergency Mode if receiving an Emergency Termination Status (NXDN: 226) while in Emergency Mode.
- While the transceiver is under the following conditions, the transceiver does not enter Emergency Mode:
 - In the Stun state
 - If the transceiver is in Transceiver Password entry state
 - When "Selected" is configured in **Emergency Channel Type** and the selected channel is an error channel
- When in Emergency Mode, the transceiver controls the mute in the same behavior as with "RAN" configured in Audio Control on a channel in an NXDN Conventional system.
- The following functions are disabled while the transceiver is in Emergency Mode:
 - **Lone Worker** button
 - Lone Worker Channel (if "Preset" is configured in **Lone Worker Type**)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)

4.2 Configuration Related to Transmission and Reception in Emergency Mode

The transceiver can have a maximum of 8 configurations related to transmission and reception in Emergency Mode as the Emergency Profile. By allocating **Emergency Profile** to each zone or channel, the Emergency behavior of the transceiver can vary depending on the zone or channel.

The functions that can be configured as an **Emergency Profile** are as follows:

- Emergency Channel Type
- Emergency Zone-channel
- Emergency Mode Type
- LCD Brightness
- Emergency Cycle
- Locator Tone at TX-start
- Transmit Duration
- Locator Tone at TX-end
- Receive Duration
- TX/RX LED in Emergency

The common functions in Emergency Mode are as follows. One configuration from below is available for the transceiver:

- Emergency Display
- Emergency Microphone Sense
- Emergency Text
- Background Tone Transmission
- Emergency Channel Lock
- Suspended Power-off
- Remain Surveillance Mode
- Functions related to Lone Worker
- Functions related to Activity Detection
- Functions related to Bluetooth

Emergency Profile can be configured for each zone or channel. If “Zone Common” is configured in **Emergency Profile** for a channel, the transceiver executes the Emergency behavior by using **Emergency Profile Number** configured for the zone of the channel.

Also, an **Emergency ID** (NXDN Conventional) can be configured for each separate NXDN Conventional system. (Refer to [ID Sent When Emergency Mode is Activated](#).)

In an NXDN Trunking system, **Emergency ID** (NXDN Trunking) and **Emergency Status on Control Channel** can be configured for each system. (Refer to [ID Sent When Emergency Mode is Activated](#), [Sending an Emergency Status on the Control Channel \(Emergency Status on Control Channel\)](#).)

Configuration using KPG-D3/ D3N

- Configuring each function of **Emergency Profile** ( [See](#) Radio Configuration > Global Options > Emergency > Profiles)
- Configuring Common Functions for **Emergency Mode** ( [See](#) Radio Configuration > Global Options > Emergency > General)

4.3 Zone-channel Functioning in Emergency Mode

The channel to be used when the transceiver enters Emergency Mode can be configured.

Emergency Channel Type

Emergency Channel Type is the type of a channel used when the transceiver is placed in Emergency Mode.

Table 4-1 Emergency Channel Type

Configuration	Description
Selected Channel	When the transceiver enters Emergency Mode, the transceiver resets the migration state of channels, such as Home Channel, and then the transceiver executes Emergency on the previously selected channel.
Preset Channel	After entering Emergency Mode, the transceiver migrates to the Zone-channel configured in Emergency Zone-channel and then executes the Emergency behavior.

The transceiver behaves as below according to the configuration for **Emergency Channel Type**:

● Selected Channel

- **If a channel in an NXDN Conventional system is selected:**

The transceiver behaves according to the **ID Type** (NXDN Conventional) configuration.

Table 4-2 ID Type (NXDN Conventional)

Configuration	Description
None	The transceiver transmits only using the RAN code.
NXDN Group ID	The transceiver initiates a Group Call using the Group ID configured for NXDN ID .
NXDN Unit ID	The transceiver initiates an Individual Call using the Unit ID configured for NXDN ID .

- **If a channel in an NXDN Trunking system is selected:**

The transceiver behaves according to the **ID Type** (NXDN Trunking) configuration.

Table 4-3 ID Type (NXDN Trunking)

Configuration	Description
Group ID	The transceiver initiates a Group Call using the Group ID configured for NXDN ID . When receiving a Group Call, the transceiver also uses the Group ID configured for the NXDN ID .
Unit ID	The transceiver initiates an Individual Call using the Unit ID configured for NXDN ID . When receiving a Group Call, the transceiver uses the currently selected Group ID.

● Preset Channel

- If a channel in the **NXDN Conventional system** is configured to an **Emergency Zone-channel**:

The transceiver behaves according to the **ID Type** (NXDN Conventional) configuration.

Table 4-4 ID Type (NXDN Conventional)

Configuration	Description
None	The transceiver transmits only using the RAN code.
NXDN Group ID	The transceiver initiates a Group Call using the Group ID configured for NXDN ID .
NXDN Unit ID	The transceiver initiates an Individual Call using the Unit ID configured for NXDN ID .

- If a channel in the **NXDN Trunking system** is configured to an **Emergency Zone-channel**:

The transceiver behaves according to the **ID Type** (NXDN Trunking) configuration.

Table 4-5 ID Type (NXDN Trunking)

Configuration	Description
Group ID	The transceiver initiates a Group Call using the Group ID configured for NXDN ID . When receiving a Group Call, the transceiver also uses the Group ID configured for the NXDN ID .
Unit ID	The transceiver initiates an Individual Call using the Unit ID configured for NXDN ID . When receiving a Group Call, the transceiver uses the Group ID configured for Emergency Zone-channel .

Note

- If “Preset Channel” is configured in **Emergency Channel Type**, a channel with “Site Roaming” or “Site Roaming with RAN” configured cannot be configured in **Emergency Zone-channel**.
- If the transceiver executes the Emergency behavior on a channel in an NXDN Trunking system, the transceiver executes the Hunt behavior when the transceiver is outside of the coverage area for the channel, and automatically acquires a control channel available in the system.
- If Preset Channel is configured in **Emergency Channel Type**, and if a channel of an NXDN Trunking system is configured in **Emergency Zone-Channel**, the transceiver executes the Hunt behavior in the same manner as the normal zone change when **Emergency** is pressed in a zone other than an NXDN Trunking system, and the transceiver automatically acquires a control channel available in the system.

Configuration using KPG-D3/ D3N

- Configuring **Emergency Channel Type** ( See Radio Configuration > Global Options > Emergency > Profiles > Emergency Channel)
- Configuring **ID Type (NXDN Conventional)**
( See Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Emergency)
( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Emergency)
- Configuring **ID Type (NXDN Trunking)** ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Emergency)

Emergency Zone-channel

Emergency Zone-channel is the Zone-channel used in Emergency Mode if “Preset Channel” is configured in **Emergency Channel Type**.

Configuration using KPG-D3/ D3N

Configuring **Emergency Zone-channel** ( See Radio Configuration > Global Options > Emergency > Profiles > Emergency Channel)

4.4 Automatically Transmitting and Receiving in Emergency Mode

The number of times for which the transceiver toggles between transmission and reception, or the duration for a single session of automatic transmission or reception for emergency in Emergency Mode can be configured. Also, the microphone sensitivity can be changed and the Background Tone (1 beep) can be multiplexed on the audio to be transmitted in Emergency Mode.

Emergency Cycle

Emergency Cycle is the number of times that the transceiver toggles between transmission and reception for an emergency in Emergency Mode.

Table 4-6 Emergency Cycle

Configuration	Description
1 to 200	The transceiver repeats automatic transmission and automatic reception for the configured number of times, and then the transceiver exits Emergency Mode.
Infinite	The transceiver continues to alternate between automatic transmission and reception until the Emergency button is pressed again or the transceiver is turned OFF.
Off	The transceiver does not automatically transmit and receive in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Cycle** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

Locator Tone at TX-start

Locator Tone at TX-start is the duration to emit an Alert Tone which notifies that the transceiver will start transmission before the transceiver starts automatic transmission in Emergency Mode.

The transceiver automatically repeat transmitting and receiving in Emergency Mode. When the transceiver switches from reception to transmission, an Emergency Locator Tone (2 beeps) sounds from the transceiver for the length of the time configured for **Locator Tone at TX-start**.

When the tone sounds, a user can easily recognize without viewing the transceiver that the transceiver is about to automatically transmit in Emergency Mode. This tone can also be used to locate a user who is in emergency situations.

Note

- This function is enabled if “Audible” is configured for **Emergency Mode Type**.
- For Portable, when a Bluetooth-compatible speaker or an external speaker is connected, an Emergency Locator Tone (2 beeps) is emitted from the transceiver’s speaker regardless of the configurations of **Bluetooth Speaker** and **External Speaker**. Received audio is emitted according to the configurations of **Bluetooth Speaker** and **External Speaker**. (Refer to Common Function Part [Switching the Speaker to Emit Audio \(Bluetooth Speaker\)](#).)
- For Mobile, where an Emergency Locator Tone (2 beeps) and received audio are emitted from depends on the configuration in **External Speaker**.

Configuration using KPG-D3/ D3N

Configuring **Locator Tone at TX-start** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

Locator Tone at TX-end

Locator Tone at TX-end is the duration to emit an Alert Tone which notifies that the transceiver has completed an automatic transmission in Emergency Mode, and starts receiving.

The transceiver automatically repeat transmitting and receiving in Emergency Mode. When the transceiver switches from transmission to reception, an Emergency Locator Tone (2 beeps) sounds from the transceiver for the length of the time configured for **Locator Tone at TX-end**.

When the tone sounds, a user can easily recognize without viewing the transceiver that the transceiver ends to automatically transmit in Emergency Mode. This tone can also be used to locate a user who is in emergency situations.

Note

- This function is enabled if “Audible” is configured for **Emergency Mode Type**.
- For Portable, when a Bluetooth-compatible speaker or an external speaker is connected, an Emergency Locator Tone (2 beeps) is emitted from the transceiver’s speaker regardless of the configurations of **Bluetooth Speaker** and **External Speaker**. Received audio is emitted according to the configurations of **Bluetooth Speaker** and **External Speaker**. (Refer to Common Function Part [Switching the Speaker to Emit Audio \(Bluetooth Speaker\)](#).)
- For Mobile, where an Emergency Locator Tone (2 beeps) and received audio are emitted from depends on the configuration in **External Speaker**.

Configuration using KPG-D3/ D3N

Configuring **Locator Tone at TX-end** ( [See](#) Radio Configuration > Global Options > Emergency > Profiles > Options)

Transmit Duration

Transmit Duration is the duration of a single automatic transmission cycle in Emergency Mode.

The transceiver switches to automatic reception for emergency when the time configured in **Transmit Duration** elapses after the transceiver starts automatic transmission for emergency.

The transceiver behaves as follows when “0” is configured in **Transmit Duration**:

● NXDN Conventional Channel

When “None” is configured in **ID Type**, the transceiver does not transmit during automatic transmission.

When **ID Type** is configured anything other than “None”, the transceiver only transmits the Emergency Status during automatic transmission.

● NXDN Trunking Channel

When **Emergency Status On Control Channel** is disabled, the transceiver does not transmit during automatic transmission.

When **Emergency Status On Control Channel** is enabled, the transceiver only transmits the Emergency Status on the control channel during automatic transmission.

Configuration using KPG-D3/ D3N

Configuring **Transmit Duration** ( [See](#) Radio Configuration > Global Options > Emergency > Profiles > Parameters > Behavior)

Receive Duration

Receive Duration is the duration for a single session of automatic reception for emergency in Emergency Mode.

The transceiver switches to automatic transmission for emergency when the time configured in **Receive Duration** elapses after the transceiver starts automatic reception for emergency.

Configuration using KPG-D3/ D3N

Configuring **Receive Duration** ( [See](#) Radio Configuration > Global Options > Emergency > Profiles > Options)

Emergency Microphone Sense

Emergency Microphone Sense is the function used to adjust the microphone input sensitivity in Emergency Mode.

In **Emergency Microphone Sense**, the microphone sensitivity can be configured within the following range:

6 dB, 4 dB, 2 dB, 0 dB, -2 dB, -4 dB, -6 dB, -8 dB, -10 dB, -12 dB, -14 dB, -16 dB, -18 dB, -20 dB

The appropriate level of microphone sensitivity for normal operation is 0 dB. Based on this level, the parameter of the microphone sensitivity can be configured.

Note

- The microphone sensitivity of the headset connected via Bluetooth also functions according to the configuration in **Emergency Microphone Sense** while the transceiver is in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Microphone Sense** ( [See](#) Radio Configuration > Global Options > Emergency > General > Common)

Background Tone Transmission

Background Tone Transmission is the function to multiplex a Background Tone (1 beep) on the transmitted audio when the transceiver transmits in Emergency Mode. Background Tone (1 beep) is multiplexed every second while the transceiver is transmitting audio data.

The audio signal is not muted since the Background Tone is transmitted with lower deviation than normal. The receiving transceiver can easily recognize that the transmitting transceiver is in Emergency Mode if the tone is multiplexed while initiating a voice call.

Note

- A Background Tone is not emitted from the speaker of the transmitting transceiver.

Configuration using KPG-D3/ D3N

Configuring **Background Tone Transmission** ( [See](#) Radio Configuration > Global Options > Emergency > General > Common)

4.5 Indication and Sound in Emergency Mode

Functions related to the tone that sounds from the transceiver when the automatic transmission starts or ends in Emergency Mode, and display and the LED notification in Emergency Mode can be configured.

Locator Tone

An Emergency Locator Tone (2 beeps) sounds from the transceiver before the automatic transmission starts or when the automatic transmission completes in Emergency Mode.

In Emergency Mode, the transceiver repeats an automatic communication only the number of times configured in **Emergency Cycle**. (Refer to [Automatically Transmitting and Receiving in Emergency Mode](#).)

Emergency Display

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Emergency Display is the function to display the channel configured in **Emergency Zone-channel** when in Emergency Mode or to retain the display appearance before the transceiver enters Emergency Mode.

Table 4-7 Emergency Display

Configuration	Description
Selected Channel	The previously selected channel is retained on the display even if the transceiver enters Emergency Mode.
Emergency Channel	A channel configured in Emergency Zone-channel appears when the transceiver enters Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Display** ( [See](#) Radio Configuration > Global Options > Emergency > General > Common)

Emergency Text

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Emergency Text is the function to display the text on the transceiver display while in Emergency Mode.

If this function is enabled, the text configured in **Text** appears on the display when the transceiver enters Emergency Mode.

Display example:

Emergency Zone-channel: Zone 1, Channel 1

Emergency Display: Emergency Channel

Text: "Emergency"



Configuration using KPG-D3/ D3N

- Configuring **Emergency Text** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > General > Common)
- Configuring **Text** ( [See](#) Radio Configuration > Global Options > Emergency > General > Common)

Emergency Mode Type

Emergency Mode Type is the function to determine whether the received audio or various tones are muted while the transceiver is in Emergency Mode.

Table 4-8 Emergency Mode Type

Configuration	Description
Silent	The transceiver mutes the received audio and various tones while in Emergency Mode.
Audible	The transceiver emits the received audio and various tones in the same manner as in normal mode even while in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Mode Type** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

LCD Brightness (Emergency Mode)

Supported Models: Mobile

In **LCD Brightness** (Emergency Mode), whether the configuration of **LCD Brightness** and the configuration of **LCD Brightness** changed by operating a **PF** button are applied in Emergency Mode can be configured. (Refer to Common Function Part [Changing the Brightness of the Backlight \(LCD Brightness\)](#).)

Table 4-9 LCD Brightness (Emergency Mode)

Configuration	Description
Current	The configuration of LCD Brightness is applied in Emergency Mode as well.
Off	The configuration of LCD Brightness is not applied in Emergency Mode. In Emergency Mode, LCD Brightness of the transceiver is disabled.

Configuration using KPG-D3/ D3N

Configuring **LCD Brightness** (Emergency Mode) ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

TX/RX LED in Emergency

TX/RX LED in Emergency is the function to light the Transmit LED when the transceiver transmits in Emergency Mode and light the Busy LED when the transceiver receives in Emergency Mode.

The transceiver behaves as follows depending on the **TX/RX LED in Emergency** configuration.

● If the TX/RX LED in Emergency is enabled:

- While in Emergency Mode, the Transmit LED is on during data transmission, and the Busy LED is on during data receipt.
- For Portable, if “Audible” is configured in **Emergency Mode Type**, the backlight lights while the transceiver is in Emergency Mode.
- The Busy LED lights even though the received audio is not output due to the output of the Locator Tone while the transceiver is on the traffic channel.
- For Portable, if the transceiver enters Emergency Mode while the backlight is lit, the backlight continues to light. However, when “Silent” is configured in **Emergency Mode Type**, the backlight turns off when entering Emergency Mode.
- For Mobile, regardless of the configuration in **TX/RX LED in Emergency** and the configuration in **Emergency Mode Type**, the state of the **LCD Brightness** when the transceiver enters Emergency Mode does not change.

● If TX/RX LED in Emergency is disabled:

- While in Emergency Mode, the Transmit LED is off during data transmission, and the Busy LED is off during data receipt.
- For Portable, the backlight does not light while the transceiver is in Emergency Mode.
- For Portable, if the transceiver enters Emergency Mode while the backlight is lit, the backlight turns off.
- For Mobile, regardless of the configuration in **TX/RX LED in Emergency** and the configuration in **Emergency Mode Type**, the state of the **LCD Brightness** when the transceiver enters Emergency Mode does not change.

Configuration using KPG-D3/ D3N

Configuring **TX/RX LED in Emergency** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

Remain Surveillance Mode

Remain Surveillance Mode is the function to continue the Surveillance function as enabled even if the transceiver enters Emergency Mode while the Surveillance function is enabled.

While the Surveillance function is enabled, the transceiver does not emit a tone or light the backlight even when the transceiver functions.

The Surveillance function is used when the change of the transceiver status needs to be kept unnoticed, such as while on a Public Safety operation.

The transceiver behaves as follows according to the configuration in **Remain Surveillance Mode**:

● If Remain Surveillance Mode is enabled

Even if the transceiver enters Emergency Mode while the Surveillance function is enabled, the Surveillance function remains enabled, and the transceiver does not emit a tone and the backlight and LED do not light. The Surveillance function remains enabled even if the transceiver exits Emergency Mode.

● If Remain Surveillance Mode is disabled

The Surveillance function is disabled if the transceiver enters Emergency Mode while the Surveillance function is enabled. The transceiver behaves according to the various configurations in Emergency when the transceiver is placed in Emergency Mode. The Surveillance function remains disabled even if the transceiver exits Emergency Mode.

Note

- While in Emergency Mode, the Surveillance function cannot be toggled between enabled and disabled by operating the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Remain Surveillance Mode** to be enabled or disabled ( See Radio Configuration > Global Options > Emergency > General > Common)

4.6 Sending an Emergency Status on the Control Channel (Emergency Status on Control Channel)

The **Emergency Status on Control Channel** is a function in the NXDN Trunking system to send an Emergency Status on a control channel, where normally it is sent on a traffic channel.

When this function is enabled, notification of an Emergency situation can be transmitted even when all traffic channels are in use.

Table 4-10 Emergency Status on Control Channel

Configuration	Description
Enabled	If transmission is executed by Emergency Mode automatic transmission or the PTT switch, an Emergency voice call is initiated after the Emergency Status is sent on the control channel. At this time, an Emergency Status is also sent on the traffic channel. When an Emergency Status is sent on the control channel, the transceiver does not wait for an ACK.
Disabled	If transmission is executed by Emergency Mode automatic transmission or the PTT switch, an Emergency voice call is initiated without sending the Emergency Status on the control channel. The Emergency Status is sent on the traffic channel when communication is established.

Note

- This function can be used only in an NXDN Trunking system.
- If **Emergency Status on Control Channel** is enabled, it takes longer to start voice transmission because a Voice Call is executed after an Emergency Status is sent on a control channel.
- If the **Emergency Status on Control Channel** is enabled, but the communication channel is changed due to communication from the transceiver sending the Emergency Status or the Console, the receiver cannot receive the Emergency Status sent by the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Emergency Status on Control Channel** to be enabled or disabled ( **See** Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Emergency)

4.7 ID Sent When Emergency Mode is Activated

The Emergency ID can be sent each time the transceiver starts automatic transmission and reception in Emergency Mode.

ID Type

ID Type is the type of NXDN ID used for automatic transmission while the transceiver is in Emergency Mode in an NXDN Conventional system.

Table 4-11 ID Type (NXDN Conventional)

Configuration	Description
None	The transceiver transmits and receives according to the RAN configuration for the Zone-channel used for Emergency Mode.
NXDN Group ID	The transceiver initiates a Group Call using the Group ID configured for NXDN ID .
NXDN Unit ID	The transceiver initiates an Individual Call using the Unit ID configured for NXDN ID .

Note

- If an analog channel is configured in **Emergency Zone-channel**, a DTMF code or FleetSync ID can be sent each time the transceiver starts automatic transmission or reception in Emergency Mode. Refer to Analog Function Part “[ID Sent When Emergency Mode is Activated](#)” for details.

Configuration using KPG-D3/ D3N

Configuring **ID Type**

( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Emergency)

( [See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Emergency)

ID Type

ID Type is the type of NXDN ID used for automatic transmission while the transceiver is in Emergency Mode in an NXDN Trunking system.

“Group ID” or “Unit ID” can be configured for **ID Type** in each system.

Configuration using KPG-D3/ D3N

Configuring **ID Type** ( [See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Emergency)

NXDN ID

The **NXDN ID** is the NXDN ID used for transmissions and receptions while the transceiver is in Emergency Mode in an NXDN Conventional system or NXDN Trunking system.

● NXDN Conventional system

If “NXDN Unit ID” is configured for **ID Type**, the Unit ID used for initiating an Individual Call in Emergency Mode can be configured for each system.

If “NXDN Group ID” is configured for **ID Type**, the Group ID used for initiating a Group Call in Emergency Mode can be configured for each system.

● NXDN Trunking system

If “Unit ID” is configured for **ID Type**, the Unit ID used for initiating an Individual Call in Emergency Mode can be configured for each system.

If “Group ID” is configured for **ID Type**, the Group ID used for initiating a Group Call in Emergency Mode can be configured for each system.

Configuration using KPG-D3/ D3N

● Configuring **NXDN ID** in NXDN Conventional

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Emergency)

( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > Emergency)

● Configuring **NXDN ID** in NXDN Trunking (**See** Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > Emergency)

4.8 Other Functions in Emergency Mode

Emergency Channel Lock and **Suspended Power-off** are other available functions in Emergency Mode.

Emergency Channel Lock

Emergency Channel Lock is the function to disable changing a zone or channel while the transceiver is in Emergency Mode.

If this function is enabled, a zone or channel cannot be changed while the transceiver is in Emergency Mode.

If this function is disabled, a zone or channel can be changed while the transceiver in Emergency Mode is not transmitting.

Configuration using KPG-D3/ D3N

Configuring **Emergency Channel Lock** to be enabled or disabled ( See Radio Configuration > Global Options > Emergency > General > Common)

Suspended Power-off

Suspended Power-off is the function to disable the transceiver to be turned OFF and retain the transceiver to be in Emergency Mode even if the transceiver is operated to be turned OFF while in Emergency Mode.

For Mobile, the transceiver behavior varies as below depending on the configuration in **Emergency Mode Type**:

- **If “Silent” is configured in Emergency Mode Type:**

The transceiver will not be turned OFF and remains in Emergency Mode even if the **Power** switch is pressed while the transceiver is in Emergency Mode. In this case, the LCD is tuned off and the transceiver appears to be turned OFF. The LED behaves according to the configuration in **TX/RX LED in Emergency** while **Suspended Power-off** is enabled.

- **If “Audible” is configured in Emergency Mode Type:**

The transceiver will not be turned OFF and remains in Emergency Mode even if the **Power** switch is pressed while the transceiver is in Emergency Mode. In this case, the LCD display does not change. The LED behaves according to the configuration in **TX/RX LED in Emergency** while **Suspended Power-off** is enabled.

For Portable, the transceiver will not be turned OFF and remains in Emergency Mode even if the transceiver is operated to be turned OFF while in Emergency Mode. In this case, the LCD display does not change. The LED behaves according to the configuration in **TX/RX LED in Emergency** while **Suspended Power-off** is enabled.

If **Suspended Power-off** is enabled, the transceiver cannot be turned OFF until the transceiver exits Emergency Mode.

Note

- If Emergency Mode is activated by the Activity Detection function or Bluetooth function, **Suspended Power-off** does not function.
- If Emergency Mode is activated by the Lone Worker function, **Suspended Power-off** functions.
- If Emergency is activated by the Activity Detection function or Bluetooth function while **Suspended Power-off** functions, the transceiver switches to Emergency Mode while **Suspended Power-off** continues to function.

Configuration using KPG-D3/ D3N

Configuring **Suspended Power-off** to be enabled or disabled ( See Radio Configuration > Global Options > Emergency > General > Common)

4.9 Placing the Transceiver in Emergency Mode Using the Lone Worker Function

Lone Worker is the function that automatically places the transceiver in Emergency Mode if the transceiver is not operated for a certain period of time.

If the transceiver is placed in Lone Worker Mode while the user has a task at a dangerous place, for instance, the transceiver automatically enters Emergency Mode and notifies a base station of the emergency status because a user cannot operate the transceiver due to an accident.

Since the Lone Worker Tone (2 beeps) sounds from the transceiver prior to entering Emergency Mode if the transceiver is in the Lone Worker Mode, the Lone Worker function can also be used to warn a user.

Enabling the Transceiver in Lone Worker Mode/Disabling Lone Worker Mode

The transceiver enters or exits Lone Worker Mode by a user operating the buttons on the transceiver.

Operating the transceiver

● Placing the Transceiver in Lone Worker Mode/ Exiting Lone Worker Mode

1 Do either of the following operations while the transceiver is not in Lone Worker Mode:

- Press the **Lone Worker** button.
- Select a channel where **Lone Worker** is enabled.
- Press the **Menu** button to enter Menu Mode, select “Lone Worker”, and then select “On”.

The “” icon appears, the transceiver enters Lone Worker Mode, and then **Lone Worker Interval** is activated. The Button Beep A (1 beep) sounds from the transceiver when the **Lone Worker** button is pressed.



2 Do either of the following operations while the transceiver is in Lone Worker Mode:

- Press the **Lone Worker** button.
- Select a channel where **Lone Worker** is disabled.
- Press the **Menu** button to enter Menu Mode, select “Lone Worker”, and then select “Off”.

The “” icon disappears and the transceiver exits Lone Worker Mode.

The Button Beep B (2 beeps) sounds from the transceiver when the **Lone Worker** button is pressed.



If no button is pressed after **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in **Lone Worker Interval** elapses. The Lone Worker Tone (2 beeps) sounds for the duration configured in **Duration of Lone Worker Tone**. If no button is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, and if the time configured in **Duration of Lone Worker Tone** elapses, the transceiver enters Emergency Mode.

The transceiver behaves according to the configuration of Emergency after the transceiver enters Emergency Mode.

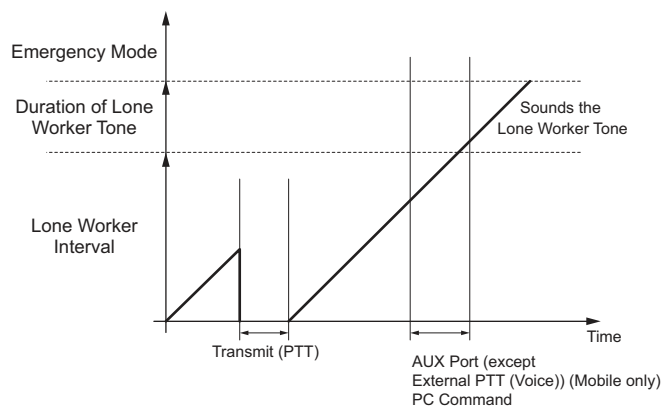


Figure 4-2 Lone Worker Mode

Note

- If “TX/RX Inhibit” is configured in **Lone Worker Type**, Lone Worker cannot be turned On or Off in Menu Mode. (Refer to [Lone Worker Type](#).)
- Lone Worker cannot be activated while the transceiver is in the Stun state or while in Transceiver Password Mode.
- For Mobile, if the AUX Input port to which “Emergency” is assigned becomes active for the time configured in **Emergency Delay Time** while the transceiver is in Lone Worker Mode, the transceiver enters Emergency Mode.
- Lone Worker can be activated even if the Button Lock state is activated while the transceiver is in Lone Worker Mode.
- If the transceiver migrates from Lone Worker Mode to Emergency Mode, the transceiver exits Emergency Mode if the **Emergency** button is pressed for a length of time greater than the length of time configured in **Hold Delay**.
- If a scan initiates while the transceiver is in Lone Worker Mode, the scan initiates with Lone Worker Mode enabled. If the scan starts while the transceiver is in a mode other than Lone Worker mode, the scan starts with Lone Worker Mode disabled.
- If “TX/RX Inhibit” is configured in **Lone Worker Type**, though the transceiver functions to receive when an Individual Call or Telephone Call to the own transceiver is received while in Lone Worker Mode in a zone in an NXDN Trunking System, the transceiver cannot reply, cancel the reception state, or exit Lone Worker Mode. Lone Worker Mode can be disabled if Incoming Reset Time of the receiving transceiver elapses, if the transmitting transceiver cancels the transmission, or if Initiating Reset Time of the transmitting transceiver elapses.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Lone Worker (NXDN Conventional)** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > General > Emergency)
- ([See](#) Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > Emergency)
- Configuring **Lone Worker (NXDN Trunking)** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > NXDN Trunking > Personalities > General > Emergency)

Functions in Lone Worker Mode

The transceiver enters or exits Lone Worker Mode by a user operating the buttons on the transceiver.

The following functions are relevant to Lone Worker Mode.

- Lone Worker Type
- Lone Worker Interval
- Duration of Lone Worker Tone

Lone Worker Type

Lone Worker Type allows you to configure how the transceiver behaves in Lone Worker Mode.

The transceiver behaves as below while in Lone Worker Mode according to the configuration in **Lone Worker Type**:

Table 4-12 Lone Worker Type

Configuration	Description
Normal	Lone Worker Mode can be enabled or disabled by a user pressing the Lone Worker button. A user can transmit and receive using the transceiver in the same manner as normal even if the transceiver enters Lone Worker Mode and while the time configured in Lone Worker Interval is counted. The status of Lone Worker Mode, either enabled or disabled by a user pressing the Lone Worker button, is retained in the transceiver. The status of Lone Worker Mode, either enabled or disabled, is also retained in the transceiver even if the channel is changed or the transceiver is turned ON or OFF.
TX/RX Inhibit	Lone Worker Mode can be enabled or disabled by a user pressing the Lone Worker button. A user cannot transmit or receive using the transceiver while the time configured in Lone Worker Interval is counted after the transceiver enters Lone Worker Mode. Only the following PF buttons can be used while the transceiver is in Lone Worker Mode: • Lone Worker button • Emergency button • Function button • Backlight button • LCD Brightness button • Zeroize button • Battery Status button The status of Lone Worker Mode, either enabled or disabled by a user pressing the Lone Worker button, is retained in the transceiver. The status of Lone Worker Mode, either enabled or disabled, is also retained in the transceiver even if the channel is changed or the transceiver is turned ON or OFF.
Preset	If a channel is selected, Lone Worker Mode is enabled or disabled depending on the configuration in Lone Worker for the selected channel. Also, Lone Worker Mode can be enabled or disabled by a user pressing the Lone Worker button. A user can transmit and receive using the transceiver in the same manner as normal even if the transceiver enters Lone Worker Mode and while the time configured in Lone Worker Interval is counted. The status of Lone Worker Mode, either enabled or disabled by a user pressing the Lone Worker button, is not retained in the transceiver.

Lone Worker Type can be configured using KPG-D3/ D3N depending on the usage of the transceiver. The transceiver behavior varies as below depending on the configuration in **Lone Worker Type**:

Table 4-13 Lone Worker Type

Transceiver Behavior	Configuration in Lone Worker Type		
	Normal	TX/RX Inhibit	Preset
Toggling Lone Worker Mode between enabled and disabled when a channel is changed	No	No	Yes
Toggling the Lone Worker Mode between enabled and disabled by a user pressing the Lone Worker button	Yes	Yes	Yes
Retaining the status of Lone Worker Mode, either enabled or disabled, in the transceiver	Yes	Yes	No
Transmitting and receiving by operating the transceiver in the same manner as normal mode	Yes	No	Yes

Yes: Available

No: Unavailable

Configuration using KPG-D3/ D3N

Configuring **Lone Worker Type** ( See Radio Configuration > Global Options > Emergency > General > Lone Worker)

Lone Worker Interval

Lone Worker Interval is the interval time from when the transceiver enters Lone Worker Mode until the Lone Worker Tone (2 beeps) sounds from the transceiver.

If no button is pressed after the transceiver enters Lone Worker Mode and then **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in **Lone Worker Interval** elapses. For the time configured in **Duration of Lone Worker Tone**, the Lone Worker Tone (2 beeps) sounds from the transceiver.

If any button is pressed before the time configured in **Lone Worker Interval** elapses, **Lone Worker Interval** is reset and then restarts counting down from the beginning. Also, if the **Lone Worker** button is pressed before the time configured in **Lone Worker Interval** elapses, Lone Worker Mode becomes disabled and then the transceiver reverts to the normal mode.

Configuration using KPG-D3/ D3N

Configuring **Lone Worker Interval** ( See Radio Configuration > Global Options > Emergency > General > Lone Worker)

Duration of Lone Worker Tone

Duration of Lone Worker Tone is the length of time that the Lone Worker Tone (2 beeps) sounds from the transceiver.

If no button is pressed after the transceiver enters Lone Worker Mode and then **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in **Lone Worker Interval** elapses. For the time configured in **Duration of Lone Worker Tone**, the Lone Worker Tone (2 beeps) sounds from the transceiver. If no button is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, and if the time configured in **Duration of Lone Worker Tone** elapses, the transceiver enters Emergency Mode.

If any button is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, the Lone Worker Tone (2 beeps) stops sounding, and **Lone Worker Interval** is reset, and then restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

Configuring **Duration of Lone Worker Tone** ( See Radio Configuration > Global Options > Emergency > General > Lone Worker)

4.10 Using the Activity Detection Function to Place the Transceiver in Emergency Mode

Supported Models: Portable

Activity Detection is the function to detect the status of the transceiver by analyzing the behavior of the transceiver using the acceleration sensor and tilt sensor embedded in the transceiver, and to automatically place the transceiver in Emergency Mode.

Using this function, if the transceiver detects that the transceiver is tilted, remains stationary, or moves vigorously for a certain period of time due to an accident, the transceiver automatically enters Emergency Mode and notifies the base station of the emergency status.

To use this function, **Activity Detection** must be enabled.

Operating the transceiver

● Enabling Activity Detection/ Disabling Activity Detection

1 Do either of the following operations while Activity Detection is disabled:

- Press the **Activity Detection** button.
- Select a channel where **Activity Detection** is enabled.
- Press the **Menu** button to enter Menu Mode, and select “Activity Detection” and then select “On”.

The “” icon appears and **Activity Detection** will be enabled.

If **Activity Detection** is enabled by using the **Activity Detection** button or the **Menu** button, the Button Beep A (1 beep) sounds from the transceiver.



2 Do either of the following operations while Activity Detection is disabled:

- Press the **Activity Detection** button.
- Select a channel where **Activity Detection** is disabled.
- Press the **Menu** button to enter Menu Mode, and select “Activity Detection” and then select “Off”.

The “” icon disappears and Activity Detection will be disabled.

If **Activity Detection** is disabled by using the **Activity Detection** button or the **Menu** button, the Button Beep B (2 beeps) sounds from the transceiver.



Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)
- Configuring **Activity Detection (NXDN Conventional)** to be enabled or disabled
( See Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > General > Emergency)
( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > Emergency)
- Configuring **Activity Detection (NXDN Trunking)** to be enabled or disabled
( See Radio Configuration > System Properties > Systems > NXDN Trunking > Personalities > General > Emergency)

Man-down Detection

Man-down Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver becomes tilted and continues this position even after the time configured in **Man-down Delay Time** elapses.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when a user falls due to an accident.

If **Man-down Pre-alert** is configured, a Man-down Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode. The transceiver does not enter Emergency Mode if the transceiver returns from the tilted position before the time configured in **Man-down Delay Time** elapses.

The threshold value of the tilt angle (**Man-down Angle**) to be used to detect that the transceiver is tilted can be configured to 45 °, 60 °, or 75 °.

Note

- Pressing the **PTT** switch while the time configured in **Man-down Delay Time** elapses pauses the **Man-down Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** button resets the **Man-down Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

- Configuring **Man-down Detection** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > General > Man-down)
- Configuring **Man-down Delay Time** ( [See](#) Radio Configuration > Global Options > Emergency > General > Man-down)
- Configuring **Man-down Pre-alert** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > General > Man-down)
- Configuring **Man-down Angle** ( [See](#) Radio Configuration > Global Options > Emergency > General > Man-down)

Stationary Detection

Stationary Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver becomes stationary and continues this position even after the time configured in **Stationary Delay Time** elapses.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when a user cannot operate the transceiver due to an accident.

If **Stationary Pre-alert** is configured, a Stationary Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode. The transceiver does not enter Emergency Mode if the transceiver returns from the stationary state before the time configured in **Stationary Delay Time** elapses.

Note

- Pressing the **PTT** switch while the time configured in **Stationary Delay Time** elapses pauses the **Stationary Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** button resets the **Stationary Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

- Configuring **Stationary Detection** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > General > Stationary)
- Configuring **Stationary Delay Time** ( [See](#) Radio Configuration > Global Options > Emergency > General > Stationary)
- Configuring **Stationary Pre-alert** ( [See](#) Radio Configuration > Global Options > Emergency > General > Stationary)

Motion Detection

Motion Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver receives strong shocks by being strongly shaken or swung and continues this state for the time configured in **Motion Delay Time**.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when the transceiver repeatedly receives powerful shocks due to an accident.

If **Motion Pre-alert** is configured, a Motion Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode.

The transceiver does not enter Emergency Mode if the severe movement of the transceiver stops before the time configured in **Motion Delay Time** elapses.

Note

- Pressing the **PTT** switch while the time configured in **Motion Delay Time** elapses pauses the **Motion Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** button resets the **Motion Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

- Configuring **Motion Detection** to be enabled or disabled ( See Radio Configuration > Global Options > Emergency > General > Motion)
- Configuring **Motion Delay Time** ( See Radio Configuration > Global Options > Emergency > General > Motion)
- Configuring **Motion Pre-alert** ( See Radio Configuration > Global Options > Emergency > General > Motion)

Using Man-down Detection and Stationary Detection Simultaneously (Man-down with Stationary)

Man-down with Stationary is the function to detect emergency using both the **Man-down Detection** and **Stationary Detection** functions.

If this function is enabled, the transceiver detects emergency using both the **Man-down Detection** and **Stationary Detection** functions. If both **Man-down Detection** and **Stationary Detection** enter the detection state, **Man-down Delay Time** is activated. If the time configured in **Man-down Delay Time** elapses while the transceiver continues to be in the state, the transceiver enters Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Man-down with Stationary** to be enabled or disabled ( See Radio Configuration > Global Options > Emergency > General > Man-down)

4.11

Transceiver Behavior When the Transceiver Receives an Emergency Status

An Alert Tone can sound when the transceiver receives an NXDN Emergency Status. This behavior can be configured for **Emergency Status Response**.

Refer to “[Emergency Status Response](#)” for details of Emergency Response.

Encryption is the function that enhances secrecy in communications on the NXDN digital channels by encrypting voice data or user data such as a Short Message and a Long Message.

The following Encryption function can be used in an NXDN Conventional system:

- Bit scramble encryption type
- AES/ DES encryption type (AES/DES Advanced Encryption)

To transmit or receive a signal, the communication data can be encrypted or decrypted using the encryption key data configured in the transceiver.

The following are the types of user data and whether the various user data can be encrypted or not:

Table 5-1 Encryptable User Data

User Data	Bit scramble encryption type	AES/ DES Encryption Type (AES/DES Advanced Encryption)/ DES Dedicated Encryption Type (DES Encryption)
Status Message	No	No
Short Message	Yes	Yes
Long Message	Yes	Yes
Transparent	Yes	No
GPS Data	Yes	Yes
GPS Combination	Yes	Voice: Yes, Data: No
Data with Voice	Yes	Voice: Yes, Data: No
BLE Data	Yes	Yes
BLE Combination	Yes	Voice: Yes, Data: No

Yes: Encryptable, No: Not encryptable

Note

- “Key Fail” appears on the display when the status of the transceiver changes as follows: The transceiver cannot transmit when in the Key Fail status.
 - A channel is changed.
 - Encryption is changed from disabled to enabled.
 - A display reverts to the channel display from Function Mode.
 - Encryption key data is deleted by Key Delete or Zeroize.
 - Emergency Mode is exited.

5.1 Bit scramble encryption type

The bit scramble encryption type is the Encryption function embedded in the transceiver.

To transmit or receive a signal, the communication data can be encrypted or decrypted using the encryption key data configured in the transceiver. By means of bit scramble, the transceiver can encrypt audio data only.

Transmit Behavior

If Encryption is enabled, the transceiver encrypts and then sends voice data or user data such as a Short Message or a Long Message. If Encryption is disabled, the transceiver transmits communication data without encryption.

Operating the transceiver

Press the **PTT** switch while Encryption is enabled.

The transceiver encrypts various communication data and then sends the data.



Note

- The “◆” icon appears if Encryption is enabled.

Receive Behavior

Upon receipt of the encrypted communication data, the transceiver behaves as follows according to the Encryption status (enabled or disabled) and the configuration for **NXDN Encryption Type**:

If Encryption is enabled:

Depending on the configuration of **Key ID Scan (NXDN)** whether Key IDs in **Multi-key List** are scanned or not can be decided.

● If Key ID Scan (NXDN) is enabled:

The transceiver scans Key IDs (0 to 63) in Multi-key List if the transceiver receives an encrypted signal.

For audio data, if the Key ID included in the encryption key data of the received signal matches the Key ID included in the encryption key data configured for the transceiver, the transceiver uses this encryption key data to decrypt the data. If the data is properly decrypted, the received audio sounds from the speaker. If the data is decrypted incorrectly, the received audio sounds incompletely from the speaker. The transceiver mutes the speaker if the Key IDs do not match.

Data is decrypted by the same method when user data such as Short Message and Long Message is received. If data is correctly decrypted, the data receiving behavior is executed. If data is not correctly decrypted, the data is canceled.

● If Key ID Scan (NXDN) is disabled:

For audio data, if the transceiver receives an encrypted signal, the transceiver does not scan Key IDs in Multi-Key List but uses the encrypt key data corresponding to the Multi-key List Number configured for the channel on which the transceiver waited for the call to decrypt the data. If the data is properly decrypted, the received audio sounds from the speaker. If the data is decrypted incorrectly, the received audio sounds incompletely from the speaker.

Data is decrypted by the same method when user data such as Short Message and Long Message is received. If data is correctly decrypted, the data receiving behavior is executed. If data is not correctly decrypted, the data is canceled.

If Encryption is disabled:

The following are the transceiver behaviors that may vary depending on the configuration for **NXDN Encryption Type** (Type 1 or Type 2):

● Type 1

The transceiver behaves in the same manner as a transceiver with Encryption enabled.

However, if the transceiver receives an encrypted signal on the channel with Encryption disabled, no received audio sounds from the speaker.

● Type 2

No received audio sounds from the speaker.



Note

- When unencrypted communication data is received, the transceiver emits the received audio from the speaker according to the audio control conditions regardless of the Encryption status (enabled or disabled) or configuration for **NXDN Encryption Type**.

Transceiver behavior

Receives an encrypted signal.

The “◆” icon blinks if all of the following codes and IDs match:

- If “None” is configured for Optional Signaling:
 - RAN
 - Key ID
- If “NXDN ID” is configured for Optional Signaling:
 - RAN
 - Key ID
 - Group ID (upon receipt of a Group Call)
 - Unit ID (upon receipt of an Individual Call)
- For an NXDN Trunking system
 - Key ID
 - Group ID (upon receipt of a Group Call)
 - Unit ID (upon receipt of an Individual Call/ Telephone Call)



Configuration using KPG-D3/ D3N

- Configuring **Key ID Scan (NXDN)** to be enabled or disabled (See Radio Configuration > Global Options > Security > Scrambler/Encryption > NXDN)
- Configuring **Encryption Type** (See Radio Configuration > Global Options > Security > Scrambler/Encryption > NXDN)

About the Configuration of Encryption Key Data

The encryption key data that is used for the Encryption function by means of bit scramble can be configured by up to 32 entries in the Multi-key List by using KPG-D3/ D3N.

The Encryption status (to be enabled or disabled) and the Multi-key List Number with the encryption key data can be configured for each channel. (Refer to [Multi-key List](#).)

Also, the Encryption status (enabled or disabled) and the encryption key data used for communication can be changed by operating the transceiver. (Refer to [Toggling the Encryption during Transmission between Enabled and Disabled](#), [Configuring the Encryption Key Data Used for Communications](#).)

5.2 AES/ DES Encryption Type (AES/DES Advanced Encryption)

The AES/ DES encryption type is the Encryption function that encrypts user data, such as audio data, Short Message, or Long Message, by using AES-256 bit/ DES-56 bit.

The encryption function for the AES/ DES encryption type is a Software Option. To use this function, the **AES/DES Advanced Encryption** (KWD-3503AE) function needs to be enabled for the transceiver with KPT-300LMC.

Transmit Behavior

If Encryption is enabled, the transceiver encrypts and then sends voice data or user data such as a Short Message or a Long Message. If Encryption is disabled, the transceiver transmits communication data without encryption.

Operating the transceiver

Press the **PTT** switch while Encryption is enabled.

The transceiver encrypts various communication data and then sends the data.



Note

- The “” or “” icon appears if Encryption is enabled.

Receive Behavior

Upon receipt of the encrypted communication data, the transceiver behaves as follows according to the Encryption status (enabled or disabled) and the configuration for **NXDN Encryption Type**:

If Encryption is enabled:

For audio data, regardless of the configuration for **NXDN Encryption Type**, the received audio sounds from the speaker according to the audio control conditions and the configuration in the Multi-key List.

For user data such as a Short Message and a Long Message, the data receiving behavior is executed according to the registration status of Multi-key List.

The transceiver scans Key IDs (0 to 63) in the transceiver if the transceiver receives an encrypted signal.

If the Algorithm (AES or DES) and Key ID included in the encryption key data used for encryption of the received communication data match the Algorithm and Key ID included in the encryption key data configured in the transceiver, the transceiver uses the encryption key data to decrypt the data. If the data is properly decrypted, the received audio sounds from the speaker. If the data is decrypted incorrectly, the received audio sounds incompletely from the speaker. The transceiver mutes the speaker if the parameters for Algorithm do not match or if the Key IDs do not match.

Data is decrypted by the same method when user data such as Short Message and Long Message is received. If data is correctly decrypted, the data receiving behavior is executed. If data is not correctly decrypted, the data is canceled.

If Encryption is disabled:

The following are the transceiver behaviors that may vary depending on the configuration for **NXDN Encryption Type** (Type 1 or Type 2):

● Type 1

The transceiver behaves in the same manner as a transceiver with Encryption enabled.

However, if the transceiver receives an encrypted signal on the channel with Encryption disabled, no received audio sounds from the speaker.

● Type 2

No received audio sounds from the speaker.



- When unencrypted communication data is received, the transceiver emits the received audio from the speaker according to the audio control conditions regardless of the Encryption status (enabled or disabled) or configuration for **NXDN Encryption Type**.

Transceiver behavior

Receives an encrypted signal.

The “” or “” icon blinks if all of the following codes and IDs match:

● If “None” is configured for Optional Signaling:

- RAN
- Key ID

● If “NXDN ID” is configured for Optional Signaling:

- RAN
- Key ID
- Group ID (upon receipt of a Group Call)
- Unit ID (upon receipt of an Individual Call)

● For an NXDN Trunking system

- Key ID
- Group ID (upon receipt of a Group Call)
- Unit ID (upon receipt of an Individual Call/ Telephone Call)



About the Configuration of Encryption Key Data

A maximum of 256 entries of AES/ DES encryption key data can be configured in the transceiver. The AES/ DES encryption key data is written to the transceiver by using Software Key Loader (KPG-AE1/ KPG-DE1).

The Encryption status (to be enabled or disabled) and the Multi-key List Number with the encryption key data can be configured for each channel. (Refer to [Multi-key List](#).)

Also, the Encryption status (enabled or disabled) and the encryption key data used for communication can be changed by operating the transceiver. (Refer to [Toggling the Encryption during Transmission between Enabled and Disabled](#), [Configuring the Encryption Key Data Used for Communications](#).)

About writing AES encryption key data

To write AES encryption key data to the transceiver, the Encryption Library corresponding to the firmware of the transceiver needs to be written to the transceiver by using Kenwood Firmware Loader (KFL).

Note

- The version of Encryption Library can be confirmed in Transceiver Information Mode. (Refer to Common Function Part [Checking the Firmware Version \(Transceiver Information Mode\)](#).)
- If the Encryption Library written to the transceiver does not correspond to the firmware version of the transceiver, “Enc Lib Ver Er” appears on the display when the transceiver is turned ON.
- Encryption Library can be deleted by executing Cancellation of **AES/DES Advanced Encryption** (KWD-3503AE) with KPT-300LMC. In this case, AES encryption key data is deleted when the transceiver is turned ON again.
- Encryption Library can be deleted with Kenwood Firmware Loader (KFL). In this case, AES encryption key data is deleted at the same time.

Behavior When the Transceiver Is Turned ON

When the transceiver is turned ON, The following procedures are executed until the transceiver migrates to the standby status:

- 1) Self Test
- 2) Key Retention (Timed)
- 3) External Zeroize (Mobile only)
- 4) Zeroize when data changed

Transceiver behavior

1 The transceiver is turned ON.

Self Test and Key Retention of Encryption Library are executed.

2 Various procedures end.

When various procedures end, the transceiver turns ON in user mode.





- The Following messages appear on the display for 2 sec depending on the result of the procedures:

Table 5-2 Display When the Transceiver Is Turned ON

Display	Description
Enc Lib Ver Er	The version of Encryption Library does not correspond to the firmware version of the transceiver. In this case, encrypted communications by means of AES/DES are not available.
Selftest Error	The result of Self Test is an error. In this case, encrypted communications by means of AES/DES are not available.
Key Erased	Zeroize is executed due to the following causes: - Timed Key Retention - FPU Key Retention - External Zeroize (Mobile only)

Protection Function of Encryption Key Data (Key Retention)

Key Retention is the function to delete the encryption key data information stored in the transceiver according to the configuration using KPG-D3/ D3N.

Using this function, the encryption key data can automatically be deleted, for instance, in case the transceiver is stolen or the transceiver has been left unused.

The transceiver behaves as follows according to the configuration in Key Retention:

Table 5-3 Key Retention

Configuration	Description
Infinite	The encryption key data is not deleted.
Timed Portable (Full Key Model/ Standard Key Model)/ Mobile only	If the transceiver is turned OFF for a duration longer than the duration configured by using KPG-D3/ D3N, the encryption key data is deleted. For the duration that can be configured by using KPG-D3/ D3N, 1, 3, 7, 10, or 30 (days) can be selected. By directly editing the memory map, a value other than the values above can also be configured. In addition to when the transceiver is turned OFF, in consideration that the battery pack may be removed, the date and time history of when the transceiver is turned OFF is backed up once an hour while the transceiver behaves in user mode.



- The AES/ DES encryption key data is not deleted even if **AES/DES Advanced Encryption** is changed from enabled to disabled using KPG-D3/ D3N while the AES/ DES encryption key data is configured in the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Key Retention** (See Radio Configuration > Global Options > Security > Scrambler/Encryption > Key Retention)
- Configuring **Duration** (See Radio Configuration > Global Options > Security > Scrambler/Encryption > Key Retention)

Deleting Encryption Key Data (Key Delete)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Key Delete is the function to delete the encryption key data configured in the transceiver by Software Key Loader. The transceiver needs to enter Key Delete Mode in order to delete the encryption key data by using this function. Pressing the **Key Delete** button places the transceiver in Key Delete Mode.

The transceiver can also enter Key Delete Mode by pressing the **Menu** button to place the transceiver in Menu Mode and then selecting “Key Delete”. (Refer to Common Function Part [Using Menu Mode.](#))

Operating the transceiver

● Deleting one encryption key data

1 Press the **Key Delete** button.

Enters Key Delete Mode.

The following operations are identical even if the transceiver enters Key Delete Mode by pressing the **Menu** button.

2 Select the encryption key data from Multi-key List by pressing the [▲] or [▼] button.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

Note

- The encryption key data configured as follows in Multi-key List is not displayed:
Protocol: NXDN, **Type:** NXDN



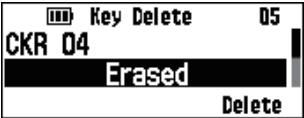
3 Press the **Back** ([↩]) or [#] button.

“Delete?” appears.



4 Press the **Menu** ([□]) or [*] button.

The selected encryption key data is deleted.



● Deleting all encryption key data

1 Press the **Key Delete** button.

Enters Key Delete Mode.

The following operations are identical even if the transceiver enters Key Delete Mode by pressing the **Menu** button.

2 Press the **Back** ([↩]) or **[#]** button.

“Delete?” appears.



3 Press the **Back** ([↩]) or **[#]** button.

“All Delete?” appears.



4 Press the **Menu** ([□]) or **[*]** button.

All encryption key data are deleted.



Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Deleting Encryption Key Data by Using the Zeroize Function

Zeroize is the function to delete all encryption key data configured in the transceiver by Software Key Loader.

The transceiver executes Zeroize in the following cases:

- 1) If Zeroize is executed by pressing the **Zeroize** button
 - Refer to [Executing the Zeroize process by using the Zeroize button](#).
- 2) If Zeroize is executed from Menu Mode
 - Refer to [Executing the Zeroize process by using the Menu Mode](#).
- 3) If Zeroize of the AUX Input port is executed on Mobile
 - Refer to [Executing the Zeroize process by using the AUX Input port](#).
- 4) If the transceiver has been turned OFF longer than the time configured in KPG-D3/ D3N when the transceiver is turned ON
 - Refer to [Protection Function of Encryption Key Data \(Key Retention\)](#).
- 5) If **Zeroize** is enabled when configuration data is written to the transceiver using KPG-D3/ D3N

If the configuration data is written to the transceiver by clicking on **Zeroize** of **Write Data List** in KPG-D3/ D3N, all encryption key data configured in the transceiver by Software Key Loader are deleted.
- 6) If Transceiver Password entry fails 15 times in a row

All encryption key data configured in the transceiver by Software Key Loader are deleted if an incorrect password is entered 15 times in a row when the transceiver is turned ON with the transceiver password configured. In this case, the user will not be notified that the encryption key data has been deleted. Therefore, "Key Erased" does not appear on the display.

Also, the number of failed times cannot be reset until the entered password matches the password configured in the transceiver even if the transceiver is turned OFF.
- 7) If deleting all encryption key data is executed in Key Delete Mode
 - Refer to [Deleting Encryption Key Data \(Key Delete\)](#).
- 8) If AES/DES Advanced Encryption (KWD-3503AE) is changed from permitted to not permitted in KPT-300LMC

The following describes the operation from 1) to 3):

Executing the Zeroize process by using the Zeroize button

1 Press the **Zeroize** button.

"Key Erasing" appears and Zeroize is executed.



2 Zeroize completes.

A Button Beep C (3 beeps) sounds from the transceiver, and "Key Erased" appears on the display for 2 sec.



Then, A Key Fail Alert Tone (6 beeps) sounds from the transceiver every 10 sec and displays "Key Fail" for 1 sec, and then the transceiver restores the channel display.



Executing the Zeroize process by using the Menu Mode

1 Press the **Menu** button to enter Menu Mode and then select “Zeroize”.

“Key Erasing” appears and Zeroize is executed.

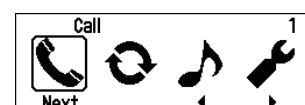
Key Erasing

2 Zeroize completes.

A Button Beep C (3 beeps) sounds from the transceiver, and “Key Erased” appears on the display for 2 sec.

Key Erased

Then, the transceiver returns to Menu Mode.



Executing the Zeroize process by using the AUX Input port

Supported Models: Mobile

The encryption key data can be deleted by assigning “Zeroize” to an AUX Input port and toggling the status of the port between High and Low.

All encryption key data configured in the transceiver by Software Key Loader are deleted if Low or High level is continuously detected for the time configured in **Zeroize Delay Time**.

Note

- If Active High is configured for the logic of the Zeroize port, and if High level is detected when the transceiver is turned ON, Zeroize is executed regardless of the configuration in **Zeroize Delay Time**.
- If the transceiver is in the following state, the Zeroize is not executed:
 - In the Transceiver Inhibit state
 - In the Transmit Inhibit state
 - In the Stun state
 - While transmitting Power-off Status
 - While executing Zeroize

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver (Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port (Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)
- Configuring **Zeroize Delay Time** (Radio Configuration > Global Options > External Device > Mobile AUX > AUX Input)
- Configuring **Zeroize** to be enabled or disabled (Read/Write > Write Configuration > Write Data List)

5.3 DES Dedicated Encryption Type (DES Encryption)

The DES dedicated encryption type is the Encryption function that encrypts user data, such as audio data or a Short Message, by using DES-56 bit. DES encrypted communication can be done even if the Encryption Library is not written to the transceiver.

The Encryption function for the DES dedicated encryption type is a Software Option. To use this function, the **DES Encryption** (KWD-3505DE) function needs to be enabled for the transceiver with KPT-300LMC.

The Encryption function for the DES dedicated encryption type is the same as the DES encryption type of the AES/ DES encryption type. Refer to “[AES/ DES Encryption Type \(AES/DES Advanced Encryption\)](#)” for details of the function.

5.4 Toggling the Encryption during Transmission between Enabled and Disabled

Pressing the **Scrambler/Encryption** button toggles the status of Encryption during transmission between enabled and disabled.

Or, Encryption during transmission can be toggled between enabled and disabled by pressing the **Menu** button to enter Menu Mode, and then selecting “Scrambler/Encryption”. (Refer to Common Function Part [Using Menu Mode](#).)

If Encryption is enabled, the transceiver encrypts and then sends voice data or user data such as a Short Message or a Long Message. If Encryption is disabled, the transceiver transmits communication data without encryption.

Note

- The Encryption status (to be enabled or disabled) can be configured for each channel, so the configured Encryption status applies only for the selected channel.
- If the status of Scrambler/Encryption (to be enabled or disabled) is switched for the channel where “Mixed” is configured in **Channel Type**, the status of Scrambler/Encryption (to be enabled or disabled) applies for a channel according to the mode (either Analog or NXDN) configured in **Transmit Mode** of the channel.

Operating the transceiver

● Configuring Encryption during transmission to be enabled

Press the **Scrambler/ Encryption** button while Encryption is disabled.

- For the bit scramble encryption type

The “◆” icon appears and then Encryption will be enabled.



- For the AES/ DES type

The “A◆” icon or “D◆” icon appears and Encryption is enabled.

Pressing the **PTT** switch encrypts and sends the audio data.



Note

- The “A◆” icon appears if the encryption type is AES, and the “D◆” icon appears if the encryption type is DES.

● Configuring Encryption during transmission to be disabled

Press the **Scrambler/ Encryption** button while Encryption is enabled.

- For the bit scramble encryption type
The “◆” icon disappears and Encryption will be disabled.
- For the AES/ DES type
The “A◆” icon or “D◆” icon disappears and Encryption is disabled.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

5.5

Configuring the Encryption Key Data Used for Communications

The encryption key data used for communications can be configured by selecting the encryption key data from the **Multi-key List**.

The encryption key data used for transmission can be configured for each channel by selecting the encryption key data from **Multi-key List** by using KPG-D3/ D3N. (Refer to [Multi-key List](#).)

To change the encryption key data, place the transceiver in Scrambler/Encryption Code Mode. In Scrambler/Encryption Code Mode, a **Multi-key List Number** corresponding to the encryption key data used for transmission can be selected from the **Multi-key List** configured for the transceiver.

Pressing the **Scrambler/Encryption Code** button causes the transceiver to enter Encryption Code Mode.

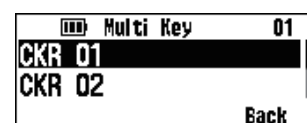
Or, the transceiver can also enter Scrambler/Encryption Code Mode by pressing the **Menu** button to place the transceiver in Menu Mode and then selecting “Scrambler/Encryption Code”. (Refer to Common Function Part [Using Menu Mode](#).)

Operating the transceiver

1 Press and hold the **Scrambler/ Encryption** button.

The transceiver enters Scrambler/Encryption Code Mode. The Multi-key configured for a channel appears.

The following operations are identical even if the transceiver enters Scrambler/Encryption Code Mode by pressing the **Menu** button.



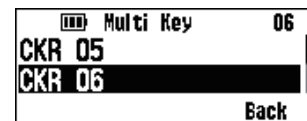
Note

- If Encryption is disabled, Encryption will be enabled when the transceiver enters Scrambler/Encryption Code Mode. Even after the transceiver exits from Scrambler/Encryption Code Mode, Encryption remains enabled.

2 Select the Multi-key by pressing the [▲] or [▼] button.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

Selecting “Preset” can restore the value preconfigured for the selected channel.



Note

- If the encryption key data corresponding to the selected Multi-key is not configured in the transceiver, or if the encryption key data is deleted from the transceiver, “Erased” appears (the AES/ DES encryption only).
- “Incorrect Key” appears if 64 or more Encryption Keys are configured in KEY ID when “NXDN” is configured in **Protocol** and “AES/ DES Advanced Encryption” is configured in **Type** of Multi-key List.

3 Press the Menu ([□]) or [*] button.

The Multi-key selected in step 2 is configured for the selected channel.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver (See Radio Configuration > Global Options > Button Assignment)

5.6 Multi-key List

Multi-key List is the list to configure the encryption key data used for the encryption and decryption of communication data. A maximum of 32 entries of encryption key data can be configured in the **Multi-key List** by using KPG-D3/ D3N. However, only one of the encryption key data can be used for transmission.

Multi-key List can be configured with encryption key data by means of bit scramble and encryption key data by means of AES/DES mixed.

The parameters that need to be configured vary depending on the encryption type to be used.

Common configuration

● Protocol

In **Protocol**, the type of the Encryption function can be configured. In an NXDN Conventional system, "NXDN" is configured in **Protocol**.

● Type

In **Type**, the encryption type can be configured.

Scrambler: Bit scramble encryption type

AES/ DES: AES/ DES encryption type

DES: DES dedicated encryption type

Bit scramble encryption type

● Key Data

In **Key Data**, the encryption key data in the range between 1 and 32767 can be configured.

● Key ID

Key ID is an ID code to identify the encryption key data. **Key ID** can be configured in the range between 0 and 63.

● Key Name

In **Key Name**, a name corresponding to the encryption key data can be configured by using a maximum of 14 alphanumeric characters and symbols.

AES/ DES encryption type

Key ID and Key Data are written to the transceiver by using Software Key Loader (KPG-AE1/ KPG-DE1).

In Multi-key List, a CKR ID, which is encryption key information used to associate it with encryption key data written in the transceiver, must be configured.

● CKR ID

CKR ID allows you to configure a CKR ID of the encryption key data configured in the transceiver by using Software Key Loader in the range between 1 and 4095.

● Key Name

In **Key Name**, a name corresponding to the encryption key data can be configured by using a maximum of 14 alphanumeric characters and symbols.

Configuration using KPG-D3/ D3N

Configuring **Multi-key List** ( See Radio Configuration > Global Options > Security > Encryption Multi-key List)

5.7 Radio Access Control

Radio Access Control is the function to eliminate unauthorized access to the repeater by the transceiver.

After configuring the Radio Access Control Key which is common to the repeater, the transceiver communicates by scrambling with the scrambled code generated from the configured common Radio Access Control Key.

If the Radio Access Control Key does not match between the transceiver and the repeater, communication becomes impossible because scrambling cannot be descrambled.

● Radio Access Control Key List

In **Radio Access Control Key List**, a Radio Access Control Key which is common to the repeater is configured.

● Key Data

In **Key Data**, 6 to 11 characters from “0” to “9”, “A” to “Z”, “a” to “z”, “-”, “_”, “\$”, and “#” are configured.

● Number on Radio Access Control Key List

From **Radio Access Control Key List**, a Radio Access Control Key is selected for each channel, and the Radio Access Control Key which is common to the repeater to be accessed is configured.

Note

- This function can be used only in an NXDN Conventional system and NXDN Site Roaming system.
- The JVCKENWOOD repeater that can use **Radio Access Control** is NXR-1700/ NXR-1800. Refer to NXR-1700/ NXR-1800 FUNC (In-depth Manual) “Radio Access Control” about the repeater configuration.
- To prevent the leakage of a Radio Access Control Key, **Key Data** cannot be read even if the configuration data is read from the transceiver.
- On a channel with **Radio Access Control** enabled, the transceiver transmits by scrambling, but for reception, the transceiver receives both the scrambled communication and the communication without scrambling.
- Even on a channel with **Radio Access Control** enabled, the transceiver transmits with Radio Access Control disabled if Talk Around is enabled.

Configuration using KPG-D3/ D3N

- Configuring **Radio Access Control Key List** ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional (NXDN Site Roaming/ NXDN Site Roaming with RAN) > Radio Access Control)
- Configuring **Number on Radio Access Control Key List** ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional (NXDN Site Roaming/ NXDN Site Roaming with RAN) > Personalities > Individually > NXDN)

5.8 Unencrypted Call Alert Tone

Unencrypted Call Alert Tone is the function used to notify a user with a short beep that the communication data is not encrypted when the transceiver starts transmitting without communication data being encrypted.

If this function is enabled, an Unencrypted Call Alert Tone (1 beep) sounds from the transceiver if Encryption of the channel is disabled when the transceiver transmits.

Note

- If both **Unencrypted Call Alert Tone** and **PTT Proceed Tone** are enabled, a Proceed Tone (3 beeps) sounds from the transceiver after an Unencrypted Call Alert Tone (1 beep) sounds.

Configuration using KPG-D3/ D3N

Configuring **Unencrypted Call Alert Tone** to be enabled or disabled ( See Radio Configuration > Global Options > Security > Scrambler/Encryption)

5.9 Retain Scrambler/Encryption Status

Retain Scrambler/Encryption Status is the function to retain the enabled or disabled status of the Encryption function for each channel and the configuration of a Multi-key for each channel.

If **Retain Scrambler/Encryption Status** is enabled, the stored configurations of the Encryption function status (enabled or disabled) and **Multi-key List Number** are read as defaults when data is read from the transceiver by using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

Configuring **Retain Scrambler/Encryption Status** ( See Radio Configuration > Global Options > Security > Scrambler/Encryption)

5.10 About the Behavior of the LED (Secure Indicator) (NXDN Trunking System Only)

Secure Indicator is the function to flash the LED green when the transceiver receives an encrypted voice call in an NXDN Trunking system.

If this function is enabled, the LED of the transceiver flashes green when the transceiver receives an encrypted voice call on a communication channel.

The following is the relationship between **Busy LED** and **Secure Indicator**:

Table 5-4 Secure Indicator

Configuration using KPG-D3/ D3N		Encryption status of the received signal	
Secure Indicator	Busy LED	Clear	Secure
Check	Check	Lights	Flashes
	Uncheck	Disappears	Flashes
Uncheck	Check	Lights	Lights
	Uncheck	Disappears	Disappears

Configuration using KPG-D3/ D3N

Configuring **Secure Indicator** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > NXDN Trunking > Other Options > RX Options)

Scan is the function to check whether the transceiver receives a call from other transceivers.

The transceiver sequentially searches for availability of signal on each channel, and the transceiver receives on the channel where the signal is detected.

Three methods are available for Scan as shown below.

● Single Scan

The transceiver scans target channels in the same zone.

● List Scan

The transceiver scans the Zone-channel registered as a member in a Scan List.

● Multi-Zone Scan (NXDN Conventional system only)

The transceiver scans all target channels in the target zones.



Note

- In an NXDN Conventional system, because Site Roaming is executed for a channel with “Site Roaming” or “Site Roaming with RAN” configured in **Protocol**, the configuration in **Scan Type** is disabled. Refer to “[Migrating Automatically to the Site Providing Better Radio Environment \(Site Roaming\)](#)” for instructions on scanning by Site Roaming in an NXDN Conventional system.

6.1

Starting the Scan

Scan can be started by one of the following methods:

● Operating the PF buttons

- Pressing the **Scan** button starts or stops scanning.
- Pressing the **Scan Normal** button starts or stops scanning.
- Even if the Priority Channel is configured, pressing the **Scan Normal** button disables the Priority Channel and mandatorily executes Non-Priority Scan.
- Executing “Scan” or “Scan Normal” after pressing the **Menu** button to enter Menu Mode starts or stops scanning.

● Status changes of the AUX Input port (Mobile only)

When the AUX Input port where “Scan” is assigned goes low level, the scan starts. When the AUX Input port where “Scan” is assigned goes high level, the scan stops.

● Turning the transceiver ON

If **Power-on Scan** is enabled, the scan starts when the transceiver is turned ON. (Refer to [Power-on Scan](#).)

● Selecting a channel

The scan starts if a channel with **Auto Scan** enabled is selected. (Refer to [Auto Scan](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port ([See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)

6.2 Scanning in One Zone (Single Scan)

The transceiver scans using Single Scan all the added channels in the zone where the transceiver starts scanning.

If a scan starts in the zone where “Single-Zone” is configured in **Scan Type**, Single Scan is executed. Or, if the transceiver migrates during the scan to the zone where “Single-Zone” is configured in **Scan Type**, Single Scan is executed.

The target channel for scan is either the channel with **Scan Add** enabled by using KPG-D3/ D3N or the channel with **Scan Add** enabled by using the **Scan Delete/Add** button.

Operating the transceiver

1 Press the **Scan** button.

The scan starts after a Button Beep A (1 beep) sounds from the transceiver.

The “” icon appears.

If **Revert Channel Display** is enabled, Revert Channel is displayed.



Note

- The transceiver behaves in the same manner even if the scan is started by other method. (Refer to [Starting the Scan.](#))

2 Press the **Scan** button during the scan.

The scan completes after a Button Beep B (2 beeps) sounds from the transceiver and the “” icon disappears.



Note

- Single Scan functions only in the zone consisting of channels of the same system. Also, Single Scan functions even when the zone includes Conventional channels of other systems or channels of an LTR Trunking system. However, Single Scan does not function when the zone includes channels of NXDN Trunking system and Conventional channels of other systems or channels of an LTR Trunking system.
- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to [Selected Channel Scan.](#))
- If All Group IDs are selected in the channel of an NXDN Trunking system and even if the All Group IDs are excluded from the target for scanning, those are scanned.
- For Portable, if a zone is changed by using the **Selector** with “Zone Select” configured during Single Scan and if the zone is not configured, the “” icon blinks and the scan pauses.
- If another zone is selected during the Single Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Scan Add** in NXDN Conventional to be enabled or disabled ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone-channel Information > NXDN Conventional > Channel Information > Scan)
- Configuring **Scan Add** in NXDN Trunking to be enabled or disabled ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone-channel Information > NXDN Trunking > Channel Information > Scan)
- Configuring **Scan Type** ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan)
- Configuring **Revert Channel Display** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > General > Indicator)

Conditions to Activate the Scan (Single Scan)

One of the following conditions must be satisfied for the transceiver to start the Single Scan:

- **For an NXDN Conventional system:**
 - Two or more channels exist in the zone where the transceiver scans.
 - A channel to be scanned and a Priority Channel exist in the zone.
 - Even if no channel to be scanned exists, Priority Channel 1 and Priority Channel 2 exist in the zone.
- **For an NXDN Trunking system:**
 - Two or more channels to be scanned exist in the zone.
 - One channel to be scanned and one Group ID configured in Priority Monitor ID exist in the zone.
 - Two Group IDs configured in Priority Monitor ID exist in the zone even if a channel to be scanned does not exist in the zone.

Conditions to Resume the Scan (Single Scan)

One of the following conditions must be satisfied to resume the scan while the transceiver pauses the scan:

- Two or more channels exist in the zone where the transceiver scans.
- A channel to be scanned and a Priority Channel to be scanned exist in the zone.
- Even if no channel to be scanned exists, Priority Channel 1 and Priority Channel 2 to be scanned exist in the zone.

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (Single Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the Revert Channel. Upon elapse of the time configured in **Dwell Time** after completion of the transmission, the transceiver reverts to the selected channel, and the scan does not resume.

6.3 Scan by Registering Multiple Target Channels for Scan in the List (List Scan)

Using the List Scan enables the transceiver to scan the Zone-channels registered as a member in a Scan List.

If a scan starts in a zone where “List” is configured in **Scan Type** or on a channel where a Scan List number is configured, List Scan is executed. Or, if the transceiver is in the zone where “List” is configured in **Scan Type** and migrates to the channel where a Scan List number is configured during the scan, List Scan is executed.

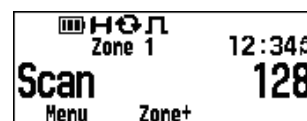
Operating the transceiver

1 Press the **Scan** button.

The scan starts after a Button Beep A (1 beep) sounds from the transceiver.

The “” icon appears.

If **Revert Channel Display** is enabled, Revert Channel is displayed.



Note

- The transceiver behaves in the same manner even if the scan is started by other method. (Refer to [Starting the Scan](#).)

2 Press the **Scan** button during the scan.

The scan completes after a Button Beep B (2 beeps) sounds from the transceiver and the “” icon disappears.



Note

- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to [Selected Channel Scan](#).)
- If another zone is selected during the List Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Scan List** ( [See](#) Radio Configuration > Global Options > Scan > List Scan > List)
- Configuring a Scan List number in NXDN Conventional ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone-channel Information > NXDN Conventional > Channel Information > Scan)
- Configuring a Scan List number in NXDN Trunking ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone-channel Information > NXDN Trunking > Channel Information > Scan)
- Configuring **Scan Type** ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan)
- Configuring **Revert Channel Display** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > General > Indicator)

Conditions to Activate the Scan (List Scan)

- **For an NXDN Conventional system:**

For the transceiver to start the List Scan, 2 or more Zone-channels must be registered as members in a Scan List.

- **For an NXDN Trunking system:**

One of the following conditions must be satisfied for the transceiver to start the List Scan:

- If the zone channel is registered as a member in the Scan List
- If two or more Group IDs configured in Priority Monitor ID exist

 Note

- A Priority Channel is always registered as a member in a Scan List. However, if “Selected” is configured for the type of the Priority Channel (**Type**), the selected channel becomes the Priority Channel and target channel for scan, regardless of the configuration in **Selected Channel Scan** or whether the selected channel is registered as a member in a Scan List. (Refer to [Priority Channel Type \(Type\)](#).)
- If **Selected Channel Scan** is enabled, the scan can be initiated even if only a single Zone-channel is configured as a member in a Scan List because the selected channel also becomes the target channel for scan.

Conditions to Resume the Scan (List Scan)

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

- **For an NXDN Conventional system:**

For the transceiver to resume the List Scan, 2 or more Zone-channels to be scanned must be registered as members in a Scan List.

- **For an NXDN Trunking system:**

One of the following conditions must be satisfied to resume the List Scan while the transceiver pauses the scan:

- If the zone channel is registered as a member in the Scan List
- If two or more Group IDs configured in Priority Monitor ID exist

 Note

- If a channel is temporarily excluded from the target channels for scanning by the **Temporary Delete/Add** function, the channel is not scanned even if the channel is registered as a member in Scan List.
- If **Selected Channel Scan** is enabled, the scan can be resumed even if only a single Zone-channel is configured as a member in a Scan List because the selected channel also becomes the target channel for scan.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (List Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the Revert Channel. Upon elapse of the time configured in **Dwell Time** after completion of the transmission, the transceiver reverts to the selected channel, and the scan does not resume.

Scan List

In order to use List Scan, target members for List Scan must be registered in a Scan List. A maximum of 128 Scan Lists can be configured. In each Scan List, a maximum of 31 Zone-channels can be registered as target members for List Scan.

Scan Type (List Scan)

In order to register a target member for List Scan, **Scan Type (List Scan)** must be configured.

Table 6-1 Scan Type (List Scan)

Configuration	Description
Conventional	A Zone-channel in a system where “Analog Conventional” or “NXDN Conventional” is configured in Protocol can be registered as a member for List Scan. Configuring a Priority Channel enables Priority Scan.
NXDN Trunking	A Zone-channel in a system where “NXDN Trunking” is configured in Protocol selected in System Number can be registered as a member for List Scan.
LTR and Conventional	A Zone-channel in a system where “LTR Trunking”, “Analog Conventional”, “NXDN Conventional”, or “DMR Conventional” is configured in Protocol can be registered as a member for List Scan.

Scan List number (Channel)

List Scan is executed according to the Scan List number configured for the channel where scan is initiated. According to the configuration in **Scan List**, List Scan is executed as follows:

Table 6-2 Scan List (Channel)

Configuration	Description
Zone Common	List Scan is executed by referring to the Scan List number configured for the zone.
1 to 128	List Scan is executed according to the list number in the corresponding Scan List.
None	List Scan is not executed.

Configuration using KPG-D3/ D3N

- Configuring **Scan List** ( **See** Radio Configuration > Global Options > Scan > List Scan > List)
- Configuring a Scan List number (Zone Common) ( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > List Scan)
- Configuring a Scan List number (Channel) in NXDN Conventional ( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone-channel Information > NXDN Conventional > Channel Information > Scan)
- Configuring a Scan List number (Channel) in NXDN Trunking ( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone-channel Information > NXDN Trunking > Channel Information > Scan)

Changing the Scan List (Scan Program)

A desired Zone-channel can be registered as a member for List Scan in the Scan List by operating the transceiver. Also, a registered member in the Scan List can be deleted from the list.

The Scan List can be edited in Scan Program Mode.

Pressing the **Scan Program** button places the transceiver in Scan Program Mode.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “Scan Program” places the transceiver in Scan Program Mode. (Refer to Common Function Part [Using Menu Mode.](#))

Operating the transceiver

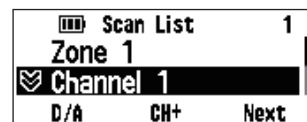
● Adding a member for List Scan

1 Select the channel for which the Scan List to be edited is configured and then press the **Scan Program** button.

A Button Beep A (1 beep) sounds from the transceiver.

The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are the same even if the transceiver enters Scan Program Mode by pressing the **Menu** button.



Note

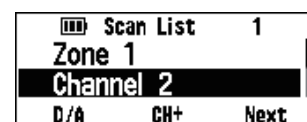
- If the selected channel is registered in the Scan List, the “✓” icon appears on the left of the channel name.

2 Select a Zone-channel to add to the Scan List.

Pressing the [▲] or [▼] button selects a channel.

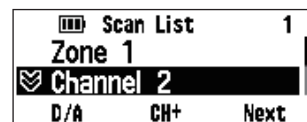
Pressing the [◀] or [▶] button selects a zone.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **Menu** ([□]) or [*] button.

A Button Beep A (1 beep) sounds from the transceiver, and then the Zone-channel selected in step 2 is added to the Scan List. The “✓” icon appears on the left of the channel name.



Note

- In the following cases, a member cannot be added to a Scan List:
 - If the zone channel to be added to a Scan List is already configured as a member in the Scan List
 - If a channel which is inappropriate for the configuration in **Scan Type (List Scan)**, such as a channel in an NXDN Trunking system, is selected for the Scan List with “Conventional” configured in **Scan Type (List Scan)**

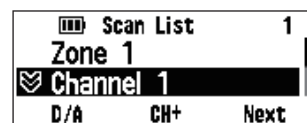
● Deleting a member from List Scan

1 Select the channel for which the Scan List to be edited is configured and then press the **Scan Program** button.

A Button Beep A (1 beep) sounds from the transceiver.

The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are the same even if the transceiver enters Scan Program Mode by pressing the **Menu** button.



Note

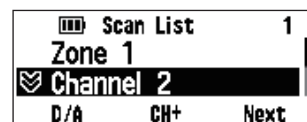
- If the selected channel is registered in the Scan List, the “✓” icon appears on the left of the channel name.

2 Select a Zone-channel to be deleted from the Scan List.

Pressing the [▲] or [▼] button selects a channel.

Pressing the [◀] or [▶] button selects a zone.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

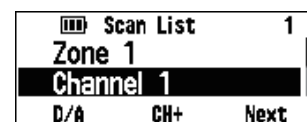


3 Press the **Menu** ([□]) or [*] button.

A Button Beep B (2 beeps) sounds from the transceiver, and then the Zone-channel selected in step 2 is deleted from the Scan List. The “✓” icon disappears from the left of the channel name.

Note

- In the following cases, a member cannot be deleted from the Scan List:
 - If the zone channel to be deleted from the Scan List is a Priority Channel
 - If the number of members registered in the Scan List is zero



Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)

6.4 Scanning All Target Zones for Scanning (Multi-Zone Scan)

In an NXDN Conventional system, by using Multi-Zone Scan, the transceiver can scan all channels to be scanned in the target zones.

If a scan starts in the zone where “Multi-Zone” is configured in **Scan Type**, Multi-Zone Scan is executed. Or, if the transceiver migrates during the scan to the zone where “Multi-Zone” is configured in **Scan Type**, Multi-Zone Scan is executed.

The target zone for scanning is either the zone with **Zone Add** enabled by using KPG-D3/ D3N or the zone with **Zone Add** enabled by using the **Zone Delete/Add** button.

The target channel for scan is either the channel with **Scan Add** enabled by using KPG-D3/ D3N or the channel with **Scan Add** enabled by using the **Scan Delete/Add** button.

Operating the transceiver

1 Press the **Scan** button.

The scan starts after a Button Beep A (1 beep) sounds from the transceiver.

The “” icon appears.

If **Revert Channel Display** is enabled, Revert Channel is displayed.



Note

- The transceiver behaves in the same manner even if the scan is started by other method. (Refer to [Starting the Scan.](#))

2 Press the **Scan** button during the scan.

The scan completes after a Button Beep B (2 beeps) sounds from the transceiver and the “” icon disappears.



Note

- “Multi-Zone” can be configured in **Scan Type** only for the zones structured with the following systems:
 - Protocol = Analog Conventional
 - Protocol = NXDN Conventional
 - Protocol = LTR Trunking

Even if these systems exist in the same zone, “Multi-Zone” can be configured in **Scan Type**. In this case, “Single-Zone” can also be configured in **Scan Type**, and starting Multi-Zone Scan can also scan the zones with “Single-Zone” configured in **Scan Type**.

- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to [Selected Channel Scan.](#))
- For Portable, if a zone is changed by using the **Selector** with “Zone Select” configured during Multi-Zone Scan and if the zone is not configured, the “” icon blinks and the scan pauses.
- If another zone is selected during the Multi-Zone Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)
- Configuring **Scan Add** to be enabled or disabled ( See Radio Configuration > Zone/Channel > Zone/Channel > Zone-channel Information > NXDN Conventional > Channel Information > Scan)
- Configuring **Zone Add** to be enabled or disabled ( See Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Multi-Zone Scan)
- Configuring **Scan Type** ( See Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan)
- Configuring **Revert Channel Display** to be enabled or disabled ( See Radio Configuration > Global Options > Scan > General > Indicator)

Conditions to Activate the Scan (Multi-Zone Scan)

One of the following conditions must be satisfied for the transceiver to start the Multi-Zone Scan:

- When a total of two or more channels targeted to be scanned exists in the zone targeted to be scanned
- When only one target zone exists, and when one target channel exists in the target zone and a Priority Channel exists in the target zone or another zone
- When Priority Channel 1 and Priority Channel 2 exist in another zone, even if no zone to be scanned exists

Conditions to Resume the Scan (Multi-Zone Scan)

One of the following conditions must be satisfied to resume the Multi-Zone Scan while the transceiver pauses the scan:

- When a total of two or more channels targeted to be scanned exists in the zone targeted to be scanned
- When only one target zone exists, and when one target channel exists in the target zone and a Priority Channel exists in the target zone or another zone
- When Priority Channel 1 and Priority Channel 2 exist in another zone, even if no zone to be scanned exists

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (Multi-Zone Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the Revert Channel. Upon elapse of the time configured in **Dwell Time** after completion of the transmission, the transceiver reverts to the selected channel, and the scan does not resume.

6.5 Scanning the Specific Channel Preferentially (Priority Scan)

Priority Scan is the function to prioritize and scan the target channels.

This function can be used for Single Scan, Multi-Zone Scan, or List Scan in a Conventional channel.

● Single Scan

A maximum of 2 Priority Channels can be configured in each zone.

● Multi-Zone Scan

A maximum of 2 Priority Channels can be configured.

● List Scan

A maximum of 2 Priority Channels can be configured in each Scan List.

If a Priority Channel is configured, the transceiver monitors Priority Channel by executing Lookback even when receiving on a normal channel.

On the channel where Priority 1 has the highest priority, Lookback is not executed while receiving on Priority 1.

Priority 2 is the channel prioritized next to Priority 1; therefore, Lookback is executed on Priority 1 while receiving on Priority 2.

Priority Channel Type (Type)

Priority Channel Type can be selected from “None”, “Fixed”, “Selected” and “Operator Selectable”.

Table 6-3 Type

Configuration	Description
None	No Priority Channel is configured.
Fixed	The channel configured using KPG-D3/ D3N is configured as the Priority Channel. The Priority cannot be changed by operating the transceiver.
Selected	The channel selected on the Transceiver is configured as the Priority Channel.
Operator Selectable	The channel configured by a user in Priority-channel Select Mode (Single Scan/ Multi-Zone Scan) or Scan Program (List Scan) is configured as the Priority Channel. (Refer to Changing the Priority Channel , Changing the Scan List (Scan Program) .)

Transceiver behavior

- If the Zone-channel configured for the Priority 1 is selected, or if the scan is paused on the Zone-channel configured for the Priority 1

The “P1” icon appears. When Priority Scan is paused, the “P1” icon blinks.



- If the Zone-channel configured for the Priority 2 is selected, or if the scan is paused on the Zone-channel configured for the Priority 2

The “**P2**” icon appears. When Priority Scan is paused, the “” icon blinks.



- If the same Zone-channel is selected for Priority 1 and the Priority 2, or if the scan is paused on the same Zone-channel configured for Priority 1 and the Priority 2

The “**P1**” icon with higher priority appears. When Priority Scan is paused, the “” icon blinks.



Note

- If **Priority-channel Stop Tone** is enabled, a Priority-channel Tone (1 beep) sounds from the transceiver when the scan is paused and the speaker is unmuted on the Priority Channel.
- The Priority Channel is scanned even if the Priority Channel is excluded from the target channels for scan. However, the Priority Channel can be temporarily excluded from the target channels for scan by using the **Temporary Delete/Add** function.
- If the same channel is selected for **Priority 1** and **Priority 2**, and if **Temporary Delete/Add** of either **Priority 1** or **Priority 2** is permitted, **Temporary Delete/Add** is executed only on the permitted Priority Channel when the **Scan Delete/Add** button is pressed.
- Pressing the **Home Channel** button during the scan does not change the Priority Channel even if “Selected” is configured in **Type**.
- The transceiver behaves as follows if one of the **Direct Channel 1** to **Direct Channel 5** buttons is pressed during the scan:
 - If **Return** is disabled, Direct Channel 1 to Direct Channel 5 become the Priority Channels if Direct Channel 1 to Direct Channel 5 are Conventional channels.
 - If **Return** is enabled, the Priority Channel does not change.
- If Over-the-Air Alias or AES/ DES is used in Priority Scan in an NXDN Conventional system, Lookback Time must be set longer, or the speaker may not be unmuted during the reception of a normal channel (not a priority channel). The table below shows standard time periods for detecting audio frames in the channel of an NXDN Conventional system. If Over-the-Air Alias or AES/ DES is used, it may take 1 to 2 seconds until the speaker is unmuted. Because of this, if Lookback is executed with Lookback Time set shorter than the time periods in the table, the speaker may not be unmuted.

Table 6-4 Behavior during Priority Scan

Function Used during Priority Scan	Standard Time Period for Detecting Audio Frame
Over-the-Air Alias	960 ms
AES/ DES	1280 ms
Over-the-Air Alias and AES/ DES	1920 ms

Configuration using KPG-D3/ D3N

- Configuring **Priority Scan** (Single Scan) ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan > Priority Scan > Priority1,2)
- Configuring **Priority Scan** (Multi-Zone Scan) ( [See](#) Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters > Priority Scan > Priority 1,2)
- Configuring **Priority Scan** (List Scan) ( [See](#) Radio Configuration > Global Options > Scan > List Scan > Parameters > Priority Scan > Priority 1,2)
- Configuring **Priority-channel Stop Tone** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > General > Indicator)

Changing the Priority Channel

The Priority Channel can be changed by operating the transceiver.

● Single Scan/ Multi-Zone Scan

The Priority Channel can be changed in Priority-channel Select Mode.

Pressing the **Priority-channel Select** button places the transceiver in Priority-channel Select Mode.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “Priority-channel Select” places the transceiver in Priority-channel Select Mode. (Refer to Common Function Part [Using Menu Mode.](#))

The transceiver can enter Priority-channel Select Mode only if “Operator Selectable” is configured in either **Priority 1** or **Priority 2**.

● List Scan

The Priority Channel can be changed on the Priority Channel edit screen in Scan Program Mode.

Pressing the **Scan Program** button places the transceiver in Scan Program Mode.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “Scan Program” places the transceiver in Scan Program Mode. (Refer to Common Function Part [Using Menu Mode.](#))

Pressing the **Back** () or **[#]** button in the Scan Program Mode displays the Priority Channel edit screen.

The transceiver can enter the Priority Channel edit screen only if “Operator Selectable” is configured in either **Priority 1** or **Priority 2**.

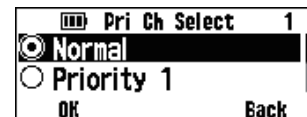
Operating the transceiver

● Changing the Priority Channel in Priority-channel Select Mode (Single Scan/ Multi-Zone Scan)

1 Press the **Priority-channel Select** button after selecting the channel to be configured as the Priority Channel.

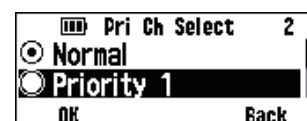
The transceiver enters Priority-channel Select Mode.

The following operations are identical even if the transceiver enters Priority-channel Select Mode by pressing the **Menu** button.



2 Select the priority of a channel by pressing the [▲] or [▼] button.

Priority can be selected from “Normal”, “Priority 1”, “Priority 2”, and “Priority 1&2”.



3 Press the **Menu** ([□]) or [*] button.

After a Button Beep B (2 beeps) sounds from the transceiver, the transceiver exits Priority-channel Select Mode and restores the previous channel display.



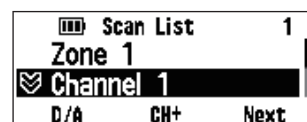
● Changing the Priority Channel in Scan Program Mode (List Scan)

1 Press the **Scan Program** button after selecting the channel to be configured as the Priority Channel.

A Button Beep A (1 beep) sounds from the transceiver.

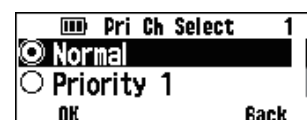
The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are the same even if the transceiver enters Scan Program Mode by pressing the **Menu** button.



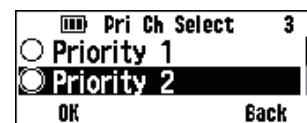
2 Press the **Back** ([↩]) or [#] button.

The transceiver enters the Priority Channel edit screen.



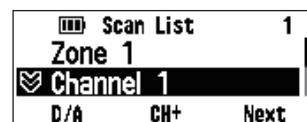
3 Select the priority of a channel by pressing the [▲] or [▼] button.

Priority can be selected from “Normal”, “Priority 1”, “Priority 2”, and “Priority 1&2”.



4 Press the Menu ([M]) or [*] button.

After a Button Beep B (2 beeps) sounds, the transceiver exits Scan Program Mode and restores the Scan List edit screen.



Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Lookback

Lookback is the function to periodically checks for a Priority Channel if a Priority Channel is configured for the transceiver and the transceiver receives on a normal channel (a channel which is not Primary Channel).

Either **Lookback Time A** or **Lookback Time B** is applied for the interval to initiate checking for a signal on a Priority Channel according to the receiving status of the Priority Channel.

Lookback Time A

Lookback Time A is the interval time to check during a Priority Scan for a signal on a Priority Channel without a carrier while the transceiver receives a signal on a normal channel whose carrier is different from the carrier of the Priority Channel. Since the transceiver may receive a call on the Priority Channel, the time configured in **Lookback Time A** must be shorter than the time configured in **Lookback Time B**.

Lookback Time B

Lookback Time B is the interval time to check during a Priority Scan for a signal on a Priority Channel which does not match the QT/DQT in an Analog Conventional system or a Priority channel which does not match the RAN in an NXDN Conventional system even though a carrier exists, while the transceiver receives a signal on a normal channel whose carrier is different from the carrier of the Priority Channel.

Note

- The transceiver does not execute Lookback of the Priority Channel while 5-tone Encode Format or Digital Encode Format is being executed.

Configuration using KPG-D3/ D3N

- Configuring **Lookback Time A/ Lookback Time B** (Single Scan) ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan)
- Configuring **Lookback Time A/ Lookback Time B** (Multi-Zone Scan) ( [See](#) Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters)
- Configuring **Lookback Time A/ Lookback Time B** (List Scan) ( [See](#) Radio Configuration > Global Options > Scan > List Scan > Parameters)

Temporary Delete/Add

A Priority Channel is always scanned regardless of the Scan Delete/Add configuration. If this function is enabled, pressing the **Scan Delete/Add** button temporarily deletes a Priority Channel from the target channels for scan when the scan pauses on the Priority Channel during the scan.

Configuration using KPG-D3/ D3N

- Configuring **Temporary Delete/Add** (Single Scan) to be enabled or disabled ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan > Priority Scan > Priority1,2)
- Configuring **Temporary Delete/Add** (Multi-Zone Scan) to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters > Priority Scan > Priority 1,2)
- Configuring **Temporary Delete/Add** (List Scan) to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > List Scan > Parameters > Priority Scan > Priority 1,2)

Scan Normal Channel

Scan Normal Channel is the function to execute the scan by disabling the Priority Channel configuration even if a Priority Channel is configured.

Even if the Priority Channel is configured, pressing the **Scan Normal** button disables the configuration and mandatorily executes Scan Normal Channel.

This operation is also applied to Priority Monitor ID in an NXDN Trunking system. (Refer to [Receiving a High-priority Call \(Priority Monitor ID\)](#).)

Note

- The condition for Scan Normal Channel to start is that two or more channels to be scanned need to exist in the same way as the normal scan.
In an NXDN Conventional system, because a priority channel is treated as a normal channel, the priority channel is not the target for scanning if Scan Delete is executed for the priority channel.
In an NXDN Trunking system, because a Group ID configured in Priority Monitor ID is treated as a normal Group ID, the Group ID configured in Priority Monitor ID is not the target for scanning if Scan Delete is executed for the Group ID.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

6.6 Transceiver Behavior during the Scan

This section describes various behaviors of the transceiver during the scan.

Note

- The length of time from when the transceiver pauses the scan for transmission or reception until the transceiver resumes the scan can be configured using **Dropout Delay Time** and **Dwell Time**. (Refer to [Dropout Delay Time](#), [Dwell Time](#).)

Transceiver Behavior When a Zone-channel Is Changed during the Scan

If a Zone-channel is changed manually during the scan, the transceiver pauses the scan on a new channel. After a second elapses, the scan resumes.

If a Zone-channel is changed manually while the scan pauses for reception, and if the channel where the scan is paused is different from the selected channel, the scan pauses on the selected channel.

Reception Behavior during the Scan in an NXDN Conventional System

The following are the reception behaviors during the scan in an NXDN Conventional system:

● RAN behavior

The transceiver receives an RAN code in each channel, and pauses the scan if it matches the RAN code preconfigured for the transceiver. If the matching state of the RAN codes becomes inconsistent, **Dropout Delay Time** is activated. After the time configured in **Dropout Delay Time** elapses, the transceiver resumes the scan.

● RAN - Optional Signaling AND behavior

The transceiver receives an RAN code and pauses the scan if it matches the RAN code preconfigured for the transceiver. The transceiver does not emit the received audio and then waits to receive Optional Signaling (DTMF/ 2-tone/ NXDN ID).

The transceiver resumes scanning after the amount of time configured in **Dropout Delay Time** elapses if the RAN code matching state becomes inconsistent while waiting to receive the Optional Signaling.

The transceiver starts Alert and others to emit the received audio when the received Optional Signaling matches the Optional Signaling preconfigured for the transceiver while waiting to receive the Optional Signaling. The transceiver stands by on the channel when the Optional Signaling matches.

Reception Behavior during the Scan in an NXDN Trunking System

While the transceiver scans in an NXDN Trunking system, the transceiver will receive as follows:

- The transceiver pauses scanning when the decoded Group ID matches the Group ID to be scanned.
- The transceiver pauses scanning when the decoded Unit ID matches the Unit ID preconfigured for the transceiver.

6.7 Scan Function

The following functions are relevant to the scan.

- Scan Delete/Add
- Zone Delete/Add
- Revert Channel
- Dropout Delay Time
- Dwell Time
- Channel Recall
- Priority-channel Stop Tone
- Auto Scan
- Selected Channel Scan
- Power-on Scan
- Off-hook Scan (Mobile Only)
- Scan Stop Tone
- Preamble Length

Adding or Deleting a Channel to/from the Target Channels for Scan (Scan Delete/Add)

Scan Delete/Add is the function to add a channel to be scanned to the Scan List or delete a channel to be scanned from the Scan List.

This function is used to reliably receive a call from a primary channel by deleting unnecessary channels to increase the scan speed.

The following are the transceiver behavior:

● When Scan is disabled

For a zone with “Single-Zone” or “Multi-Zone” configured in Scan Type:

Pressing the **Scan Delete/Add** button can add the selected channel to the target channels for scan or delete the selected channel from the target channels for scan. The Scan Delete/ Add information is retained in the transceiver.

For a zone with “List” configured in Scan Type:

Pressing the **Scan Delete/Add** button can add the selected channel as a member to the Scan List configured for the selected channel, or delete the channel from the Scan List configured for the selected channel. The Scan Delete/ Add information is retained in the transceiver.

● When the scan is paused

For a zone with “Single-Zone” or “Multi-Zone” configured in Scan Type:

Pressing the **Scan Delete/Add** button can add the selected channel temporarily to the target channels for scan or delete the selected channel temporarily from the target channels for scan (Temporary Delete/ Add). This status is retained until the scan is terminated by operations such as pressing the **Scan** button, and the status is cleared when the scan completes.

For a zone with “List” configured in Scan Type:

Pressing the **Scan Delete/Add** button temporarily deletes a selected channel if the selected channel is registered as a member of Scan List, and pressing the **Scan Delete/Add** button again restores the selected channel (Temporary Delete/ Add). This status is retained until the scan is terminated by operations such as pressing the **Scan** button, and the status is cleared when the scan completes.

● During the scan

Pressing the **Scan Delete/Add** button causes a Button-entry Error Tone (1 beep) to sound from the transceiver but the transceiver does not respond at all.

Note

- The operation above is enabled even if the transceiver enters Menu Mode by pressing the **Menu** button and then executes “Scan Delete/Add”. (Refer to Common Function Part [Using Menu Mode](#).)
- For the zone with “List” configured in **Scan Type**, a target channel for scan can also be added or deleted in Scan Program Mode. (Refer to [Changing the Scan List \(Scan Program\)](#).)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Adding or Deleting a Zone to or from the Target Zones for Scanning (Zone Delete/Add)

Zone Delete/Add is the function to add a zone to the target zones for scanning or delete a zone from the target zones for scanning when using Single Scan or Multi-Zone Scan.

For Multi-Zone Scan, this function is used to increase the scan speed and reliably receive a call from a primary zone by deleting unnecessary zones.

Pressing the **Zone Delete/Add** button adds or deletes a zone to or from the target zones for scanning.

Or, a zone can be added to or deleted from the target zones for scanning by executing “Zone Delete/Add” after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

Note

- For Single Scan, only zones structured with a Conventional system or an LTR Trunking system can be added to or deleted from the target zones for scanning.
- If there is only one target zone left while Multi-Zone Scan pauses, the zone cannot be deleted from the target zones even if Zone Delete/Add is executed.
- Even if Zone Delete/Add is executed while the scan other than Multi-Zone Scan pauses, the selected zone cannot be deleted from the target zones.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Revert Channel

Revert Channel is the Zone-channel which is used when the transceiver transmits by pressing the **PTT** switch during the scan.

Table 6-5 Revert Channel

Configuration	Description
Last Called + Selected	The transceiver transmits on the last-called Zone-channel by pressing the PTT switch during the scan. The transceiver transmits on the Zone-channel where the transceiver pauses the scan by pressing the PTT switch during the scan. If the Zone-channel is changed, the transceiver transmits using the new channel after the Zone-channel is changed until the transceiver receives another call.
Selected	The transceiver transmits on the new channel after the Zone-channel is changed regardless of the scan status.
Selected + Talkback	During the scan, the transceiver transmits on the new Zone-channel after the zone-channel is changed. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.

Configuration	Description
Priority 1	The transceiver transmits on a Priority 1 regardless of the scanning status.
Priority 1 + Talkback	The transceiver transmits on a Priority 1 during the scan. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.
Priority 2	The transceiver transmits on a Priority 2 regardless of the scanning status.
Priority 2 + Talkback	The transceiver transmits on a Priority 2 during the scan. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.

Note

- If **Revert Channel Display** is enabled, a Revert Channel always appears on the transceiver display during the scan.
- For a scan with "NXDN Trunking" in Scan Type of Scan List, Priority 1/ Priority 1 + Talkback/ Priority 2/ Priority 2 + Talkback cannot be configured in **Revert Channel**.
- For Single Scan in a zone in an NXDN Trunking system, Priority 1/ Priority 1 + Talkback/ Priority 2/ Priority 2 + Talkback cannot be configured in **Revert Channel**.
- If Home Channel is activated, the transceiver transmits on the Home Channel regardless of the configuration in **Revert Channel**.
- If the Direct Channel function (Return = Check) is activated, the transceiver transmits on the Direct Zone-Channel regardless of the configuration in **Revert Channel**.

Configuration using KPG-D3/ D3N

- Configuring **Revert Channel** (Single Scan) ( See Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan)
- Configuring **Revert Channel** (Multi-Zone Scan) ( See Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters)
- Configuring **Revert Channel** (List Scan) ( See Radio Configuration > Global Options > Scan > List Scan > Parameters)

Dropout Delay Time

Dropout Delay Time is the time from when the transceiver finishes receiving signals until the transceiver resumes scanning. The transceiver pauses scanning when the transceiver receives a call during the scan. The transceiver resumes the scan when the time configured in **Dropout Delay Time** elapses after the transceiver finishes receiving.

The following are conditions to resume scanning:

- There is no signal to receive.
- The matching state of the RAN becoming inconsistent

The transceiver activates Talkback according to the configuration in **Revert Channel** while the time configured in **Dropout Delay Time** elapses.

If the scan is paused while the time configured in **Dropout Delay Time** elapses, and if the channel is not the Priority Channel 1 or Priority Channel 2, the Priority Channel 1 and Priority Channel 2 are monitored by executing Lookback.

Configuration using KPG-D3/ D3N

Configuring **Dropout Delay Time** ( See Radio Configuration > Global Options > Scan > General > Timer)

Dwell Time

During the scan, the scan pauses when the **PTT** switch is pressed to transmit. **Dwell Time** is the time from when the transceiver completes transmitting until the transceiver resumes scanning.

The transceiver activates Talkback according to the configuration in **Revert Channel** while the time configured in **Dwell Time** elapses.

If the scan is paused while the time configured in **Dwell Time** elapses, and if the channel is not the Priority Channel 1 or Priority Channel 2, the Priority Channel 1 and Priority Channel 2 are monitored by executing Lookback.

Configuration using KPG-D3/ D3N

Configuring **Dwell Time** ( See Radio Configuration > Global Options > Scan > General > Timer)

Channel Recall

Channel Recall is the function to migrate to the last called Zone-channel by pressing the **Channel Recall** button during the scan.

Even if a user is away from the transceiver, the user can notice later that the transceiver has received a call during the scan.

Note

- If the **Channel Recall** button is pressed while no signal is received after scan starts, the transceiver migrates to the channel from which the transceiver started scanning.
- If **Channel Recall** is enabled, the transceiver does not resume the scan even if the time configured in **Dropout Delay Time** or **Dwell Time** elapses.
- **Channel Recall** is disabled if the channel is changed while **Channel Recall** is enabled. The transceiver resumes scanning after the Key Delay Time elapses (1 sec).
- The transceiver does not execute Lookback while **Channel Recall** is enabled.
- If the scan is paused with **Channel Recall** and **Scan Stop Tone** enabled, the Scan Stop Tone (2 beeps) sounds from the transceiver at 30-sec intervals.
- The channel to which the transceiver migrated using **Channel Recall** is not configured as the Selected Channel.
- Even if **Channel Recall** is enabled, the transmission using GPS Auto is executed by **Revert Channel**.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Priority-channel Stop Tone

Priority-channel Stop Tone is the function to emit a Priority-channel Tone (1 beep) from the transceiver when the scan pauses upon receipt of a signal and the speaker is unmuted on a Priority Channel during the scan.

Configuration using KPG-D3/ D3N

Configuring **Priority-channel Stop Tone** to be enabled or disabled ( See Radio Configuration > Global Options > Scan > General > Indicator)

Auto Scan

Auto Scan is the function to start the scan automatically by selecting the channel with **Auto Scan** enabled.

Whether to enable or disable **Auto Scan** can be configured for each channel. The scan on a channel where **Auto Scan** is enabled cannot be stopped. The scan starts unconditionally if the transceiver migrates to a channel with **Auto Scan** enabled.

Note

- Whether to enable or disable **Auto Scan** can be configured for each Personality.
- When the transceiver migrates to a channel where **Auto Scan** is enabled, the scan pauses if the conditions for starting the scan are not satisfied.
- If the transceiver migrates to a channel where **Auto Scan** is enabled after the scan is started by pressing the **Scan** button, the scan cannot be terminated even if the **Scan** button is pressed.
- In a zone where "None" is configured in Scan Type, the scan does not start even if the transceiver migrates to a channel with **Auto Scan** enabled.

Configuration using KPG-D3/ D3N

- Configuring **Auto Scan** (NXDN Conventional) to be enabled or disabled
( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > General)
- Configuring **Auto Scan** (NXDN Trunking) to be enabled or disabled
( **See** Radio Configuration > System Properties > Systems > NXDN Trunking > Personalities > General)

Selected Channel Scan

Selected Channel Scan is the function to add the selected channel to the target channels for scan even if the channel is excluded from the target.

Configuration using KPG-D3/ D3N

Configuring **Selected Channel Scan** to be enabled or disabled ( **See** Radio Configuration > Global Options > Scan > General > Option)

Power-on Scan

Power-on Scan is the function to start the scan automatically when the transceiver is turned ON.

Portable

If “Zone Select” is configured in **Selector**, the transceiver starts the scan according to the configuration in **Scan Type** for the zone number indicated by the pointer of **Selector** when the transceiver is turned ON. If the zone number indicated by the pointer of the **Selector** is not configured for the transceiver, the scan does not start.

If anything other than “Zone Select” is configured in **Selector**, the transceiver starts the scan according to the configuration in **Scan Type** for the zone selected when the transceiver is turned ON.

Mobile

The transceiver starts the scan according to the configuration in **Scan Type** for the zone selected when the transceiver is turned ON.

Configuration using KPG-D3/ D3N

Configuring **Power-on Scan** to be enabled or disabled ( See Radio Configuration > Global Options > Scan > General > Option)

Starting Scanning by Linking with the Microphone (Off-hook Scan)

Supported Models: Mobile

Off-hook Scan is the function to start scanning regardless of the microphone hook status.

The transceiver scans as follows according to the configuration in **Off-hook Scan**:

Table 6-6 Off-hook Scan

Configuration	Description
Enabled	Pressing the Scan button causes the transceiver to start scanning regardless of the microphone on- or off-hook state.
Disabled	If the microphone is in the on-hook state, pressing the Scan button causes the transceiver to start scanning; however if the microphone is in the off-hook state, the transceiver cannot start scanning. If the microphone changes from the on-hook state to off-hook state in Scan Mode, the scan pauses on the Revert Channel. When the microphone goes to on-hook state, the transceiver resumes scanning. However, if the microphone goes to on-hook state when the audio sounds, the transceiver continues the audio output status without resuming the scan. Thereafter, the transceiver resumes the scan when the signal disappears and the time configured in Dropout Delay Time elapses.

Note

- On-hook indicates the state that the microphone is hooked. Off-hook indicates the state that the microphone is not hooked.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Scan** to be enabled or disabled ( See Radio Configuration > Global Options > Scan > General > Option)

Scan Stop Tone

Scan Stop Tone is the function to emit the Scan Stop Tone (2 beeps) from the transceiver while the scan pauses, for example, while the transceiver migrates to a Home Channel or Direct Channel.

The transceiver pauses scanning if the conditions to start the scan are not satisfied, such as while the transceiver is migrating to a Home Channel or Direct Channel, and then a Scan Stop Tone (2 beeps) sounds from the transceiver at 30-sec intervals.

Note

- The Scan Stop Tone (2 beeps) does not sound while the transceiver is transmitting or while the speaker is unmuted for reception.

Configuration using KPG-D3/ D3N

Configuring **Scan Stop Tone** to be enabled or disabled ( See Radio Configuration > Global Options > Scan > General > Indicator)

Preamble Length (NXDN Conventional System only)

Preamble Length is the function to extend time for sending a preamble when the NXDN frame is sent.

Extending the time for sending a preamble at the beginning of transmission makes the receiving transceiver easier to receive a call and reduces missing of the beginning of the audio during the scan.

The range is from 0 to 254.

Configuration using KPG-D3/ D3N

Configuring **Preamble Length**

( See Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > NXDN Parameters)

( See Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > NXDN > NXDN Parameters)

Data communications are available for the transceiver by using the various functions of NXDN, or using an external device connected to the transceiver.

7.1 Prioritizing Data Communications Using an External Device (Data Override)

Data Override is the function that allows prioritization of data communication using an external device even if the communication is made by a user operating the transceiver.

This function is used to send GPS data periodically even during reception.

The transceiver behaves as follows according to the configuration in **Data Override**:

Table 7-1 Data Override

Configuration	Description
Enabled	Data communications using an external device has a high priority level. Data Override is activated when the following AUX Input ports (Mobile only) are activated and when the transceiver receives a PC command from the serial port: • External PTT (Data) • Data PTT • DTC • Channel Select A to Channel Select D When Data Override is activated, the transceiver automatically exits the following statuses: • Function Mode • Public Address Mode (Mobile only) • The state when the transceiver temporarily migrates to a channel by pressing one of the Direct Channel 1 to Direct Channel 5 buttons, Home Channel button, or Channel Recall button
Disabled	The transceiver key control has the priority. The transceiver suspends the transmission even if the transceiver receives the above data transmission request from an external device.

Note

- While the transceiver is under the following conditions, **Data Override** is not activated:
 - While the transceiver is transmitting
 - While transmitting with the Public Address function (Mobile only)
 - While External PTT (PA) is active (Mobile only)
 - While the transceiver is in Emergency Mode
 - In Transceiver Password Mode
 - In the Stun state

Configuration using KPG-D3/ D3N

- Configuring **Data Override** to be enabled or disabled ( See Radio Configuration > Global Options > External Device > General > Serial Interface)
- Configuring **Data Override** to be enabled or disabled ( See Radio Configuration > Global Options > External Device > Mobile AUX > AUX Input)

7.2 Restricting the Warning Display during Data Communications (Silent Report)

Silent Report is the function to configure whether the transceiver transmits in standby display state without emitting the Alert Tone and flashing or lighting the LED, when sending and receiving the status and GPS data.

This function is used to keep a user from noticing the data communication request from a base station and GPS data transmission.

If this function is enabled, the LCD display, the LED display, and emitting the Alert Tone during data communications can be restricted as follows:

- The display during data communications (such as “Send Data”, “Complete”, “Busy”, and “No Reply”) is not displayed.
- The LED does not light or flash during data transmission.
- The Alert Tone, Control Tone, or Warning Tone is not emitted.

This function can be used for the following communications in an NXDN system:

- AUX Input Status Message transmission (Mobile Only)
- Status transmission on receipt of Status Inquiry Message
- GPS transmission by GPS Combination (Status)
- BLE transmission by BLE Combination (Status)
- Automatic GPS data transmission
- Automatic BLE data transmission
- GPS transmission by GPS Polling reception
- BLE transmission by BLE Polling reception
- GPS transmission by GPS Distance Change (Automatic GPS transmission, GPS Combination (Status))
- GPS transmission on a GPS Report Channel (GRCH) in an NXDN Trunking system

Note

- **Silent Report** does not apply when the transceiver receives a Status Inquiry Message by **Radio Check** or receives GPS Polling.

Configuration using KPG-D3/ D3N

Configuring **Silent Report** to be enabled or disabled ( See Radio Configuration > Global Options > Basics > General > Data Communications)

7.3 Transparent

Transparent is the function that allows data communications using the NXDN protocol. This function can be used by connecting a PC, card reader or telemetry devices to the transceiver. Using this function, the transceiver can send or receive data without limiting the data type. This function can be used without operating the transceiver. All operations are controlled by data from other devices.

Using this function, a PC connected to the receiving transceiver can decode the transmitted bar-code data, for instance, while the bar-code reader is connected to a PC on the transmitting transceiver to transmit the bar-code data.

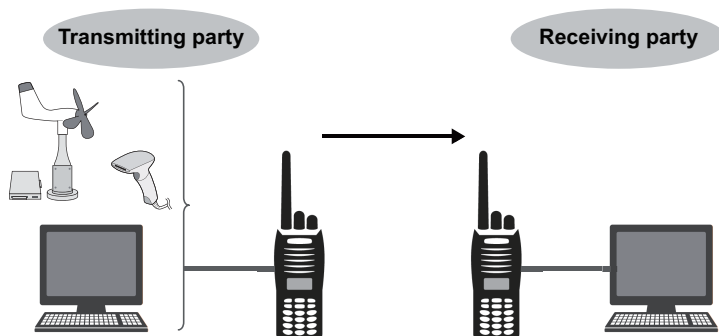


Figure 7-1 Image of Transparent

Data communications using Transparent can be used to send or receive the ASCII characters of 0x00 to 0xFF without any restriction.

In addition, data communications using Transparent supports baud rates of 1200 bps, 2400 bps, 4800 bps, 9600 bps and 19200 bps. (Refer to Common Function Part [COM Port Functions](#).)

Note

- To use this function, "Transparent (Digital)" must be assigned to the communication port connecting the transceiver and an external device by using KPG-D3/ D3N.

Transmitting Transceiver Behavior

The ASCII characters from 0x00 to 0xFF can be sent or received.

The communication port of the transceiver assigned "Transparent (Digital)" sends the received data automatically using the NXDN protocol if the received data size exceeds 314 bytes upon the receipt of data from an external device.

The transceiver automatically sends the received data if the transceiver does not receive any data for a duration sufficient to receive 16 characters after receiving the last data.

The transmitting transceiver transmits over the Air when the data time elapses in the following way:

- **If a baud rate of 19200 and 1 stop bit are configured for the PC and transmitting transceiver:**

When a duration equal to or more than $1/19200 \times 10 \times 16 = 8.3$ ms elapses

- **If a baud rate of 9600 and 2 stop bit are configured for the PC and transmitting transceiver:**

When a duration equal to or more than $1/9600 \times 11 \times 16 = 18.3$ ms elapses

Data is transmitted to the IDs configured in the Base ID Type and Base ID. In an NXDN Trunking system, data which is equal to or less than 80 bytes is sent on a control channel, and data which is more than 80 bytes is sent on a traffic channel.

The maximum data capacity for the receive buffer of the transmitting transceiver in order to receive data from a PC is limited to 2048 bytes. If the transmit speed and reception from a PC is unbalanced and the overflowing received data exceeds 2048 bytes, the excessive data may not be sent.

For Mobile, if the transceiver receives the 2048 bytes of data while the transceiver is configured for which the RTS and CTS ports are available, the transceiver starts the flow control to an external device. (Refer to Common Function Part [Available Functions for COM Port.](#))

The transceiver can control not to overflow from the buffer the data sent from the external device as soon as the transceiver has started the flow control, so that the transceiver can receive the 2048 bytes of data. In the RTS and CTS ports, the data communications with an external device are controlled as follows.

RTS:

When the buffer of the transceiver for serial communications becomes full, the status of the RTS port will be the low level*¹. (Portable: Pin No. 9 (14-pin universal connector), Mobile: Pin No. 8 (25-pin connector on the back panel))

CTS:

When the status of the CTS port becomes the low level*¹, the serial data will not be sent from the transceiver. (Portable: Pin No. 4 (14-pin universal connector), Mobile: Pin No. 9 (25-pin connector on the back panel))

*¹ Portable: 0 V, Mobile: -5 V

Transceiver behavior

A device sends data to the transceiver.

The communication port of the transceiver assigned “Transparent (Digital)” automatically starts transmitting if the received data size reaches 314 bytes.



“Complete” appears for 1 sec when the transmission completes, and the transceiver restores the previous display.



In an NXDN Trunking system, the transceiver display behaves as follows depending on the response message from the system when data is sent automatically:

Table 7-2 Trunking Format

Configuration	Description
If no traffic channel is available in the system and if the transceiver receives a response message indicating the queue state from the system:	The transceiver enters the standby state while “Send Data” remains displayed. No tone sounds.
If the transceiver receives a response message from the system indicating a busy state of the receiving transceiver:	The Busy Tone 2 (3 beeps) sounds from the transceiver, and “Busy” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a response message from the system indicating such as a temporary failure:	The System Busy Tone (3 beeps) sounds from the transceiver and “System Busy” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a response message from the system indicating no response from the receiving transceiver:	The No Reply Tone (4 beeps) sounds from the transceiver, and “No Reply” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a message from the system, such as a service invalid message:	The Call Invalid Tone (4 beeps) sounds from the transceiver, and “Invalid” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver does not receive any message from the system:	The Call Fail Tone (2 beeps) sounds from the transceiver, and “Fail” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.

Note

- In an NXDN Conventional system, if the transceiver cannot transmit because the channel is busy, the Busy Tone 2 (3 beeps) sounds from the transceiver, and “Busy” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.

Receiving Transceiver Behavior

The transceiver which receives the Transparent data from the transceiver for which “Transparent (Digital)” is assigned to its communication port sends the data received from the communication port to which “Transparent (Digital)” is assigned. If the Header function is enabled using KPG-D3/ D3N, the transmitting transceiver’s ID information is automatically added to the beginning of the transmission data. When another transceiver receives the data, the ID information can easily be identified. (Refer to [Transparent Header](#).)

Transceiver behavior

The transceiver receives data.



“Complete” appears for 1 sec when the reception completes, and then the transceiver restores the previous display.



Note

- In an NXDN Conventional system, if the transceiver cannot send an ACK, “Ack Error” appears on the display for 1 sec. Then, the transceiver restores the channel display and ends the reception of data.

Timing for Sending and Receiving Data

● Examples in an NXDN Conventional system

Example 1: If “Transparent” is assigned to a communication port

The following assumes that 250 bytes of Transparent Data are sent from a PC to the transmitting transceiver. The following is the block diagram if the parameters are configured as below.

Transmit Delay Time: 100 ms

Data Transmit Modulation Delay Time: 400 ms

Transparent Header: Enable

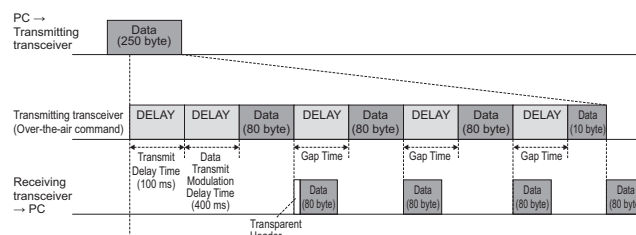


Figure 7-2 Transparent (NXDN Conventional)

The DELAY frame is placed for the amount of time configured for **Transmit Delay Time** and **Data Transmit Modulation Delay Time** before the transceiver begins transmitting, and it is also placed between blocks of data to be sent (Gap Time). The length of time configured for **Data Transmit Modulation Delay Time** applies to the Gap Time in an NXDN Conventional system. If the time configured for **Data Transmit Modulation Delay Time** is equal to or less than 80 ms, the Gap Time is a fixed value (80 ms).

Example 2: If “Transparent (Digital)” is assigned to a communication port

The following assumes that 950 bytes of Transparent Data are sent from a PC to the transmitting transceiver. The following is the block diagram if the parameters are configured as below.

Transmit Delay Time: 100 ms

Data Transmit Modulation Delay Time: 400 ms

Transparent Header: Enable

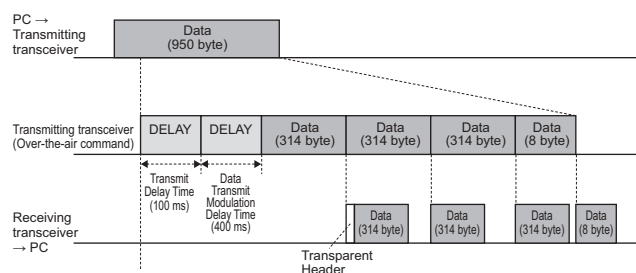


Figure 7-3 Transparent (NXDN Conventional)

The DELAY frame is placed for the amount of the time configured for **Transmit Delay Time** and **Data Transmit Modulation Delay Time**, and then the data is sent. There is no Gap Time between data blocks to be sent.

● Examples in an NXDN Trunking system

Example 1: If “Transparent” is assigned to a communication port

The following assumes that 250 bytes of Transparent Data are sent from a PC to the transmitting transceiver. The data is sent on a communication channel as shown in the block diagram below.

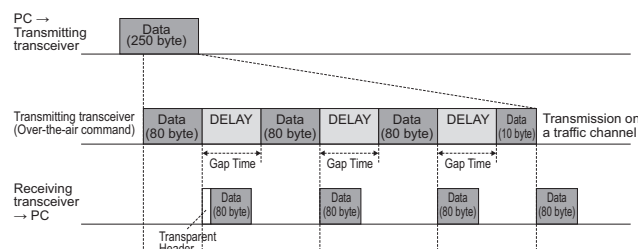


Figure 7-4 Transparent (NXDN Trunking)

The DELAY frame is placed between blocks of data to be sent (Gap Time) and the data is sent. 80 ms is fixed value for the Gap Time in an NXDN Trunking system.

Example 2: If “Transparent (Digital)” is assigned to a communication port

The following assumes that 950 bytes of Transparent Data are sent from a PC to the transmitting transceiver. The data is sent on a communication channel as shown in the block diagram below. There is no Gap Time between data blocks to be sent.

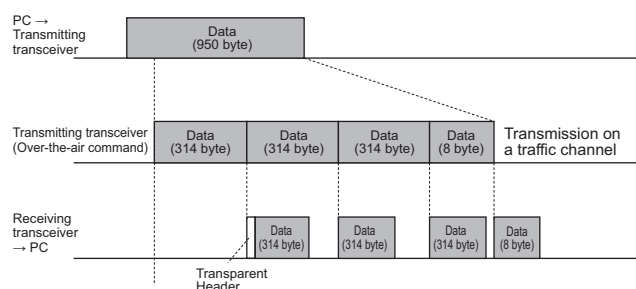


Figure 7-5 Transparent (NXDN Trunking)

Example 3: If “Transparent” or “Transparent (Digital)” is assigned to a communication port

The following assumes that 80 bytes of Transparent Data are transferred from a PC to the transmitting transceiver. The data is sent on a control channel as shown in the block diagram below.

In this example, there is no difference in sending data even if either “Transparent” or “Transparent (Digital)” is assigned to a communication port.

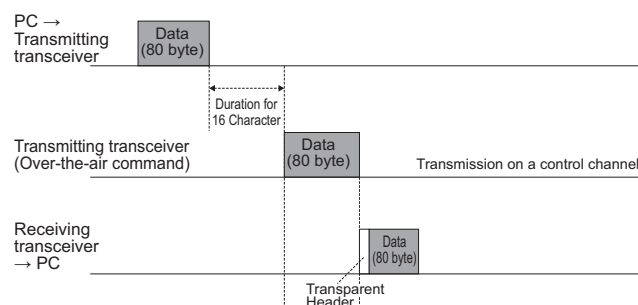


Figure 7-6 Transparent (NXDN Trunking)

Transparent

The following functions are relevant to data communications using Transparent:

- Transparent Header
- COM port Priority
- Transparent on Data System-personality
- Preamble Length

Transparent Header

Transparent Header is the function to send the KENWOOD proprietary sentence to an application which is used during data communications using Transparent.

The Header is sent for data sent first. Transparent Data is sent after sending the Header.

The application software may be able to recognize from where the data is sent by analyzing this Header information.

Configuration using KPG-D3/ D3N

Configuring **Transparent Header** ( See Radio Configuration > Protocol Options > NXDN > General > Common Options > Serial Output)

COM port Priority

The transceiver can make data communications if “Data”, “Data + GPS Data Output”, “Data + Location Data Output”, “Transparent”, or “Transparent (Digital)” is assigned to its communication port. COM port Priority can be used to improve the reliability of the communication between a PC and the transceiver.

Table 7-3 COM port Priority

Configuration	Description
Serial Data	Transparent Data sent from a PC has the higher priority level. If the PC that is connected using a serial port sends Transparent data while the transceiver is receiving data over the Air, the transceiver stops receiving data over the Air and then immediately start sending Transparent data.
Receiving Data	Receiving over the Air has the higher priority level. If the PC that is connected using a serial port sends Transparent data while the transceiver is receiving data over the Air, the transceiver does not send Transparent data until the transceiver completes receiving data over the Air.

Note

- Serial Data cannot be prioritized for a zone in an NXDN Trunking system. In a zone in an NXDN Trunking system, the transceiver functions in the same manner as if “Receiving Data” is configured for COM port Priority, even if “Serial Data” is configured for COM port Priority.

Configuration using KPG-D3/ D3N

Configuring **COM port Priority** ( See Radio Configuration > Global Options > External Device > General > Serial Interface)

Transparent on Data System-personality

Transparent on Data System-personality is the function that allows the transceiver to automatically change the channel to **Data System-personality** to send Transparent data.

The transceiver automatically changes the channel to the channel in an NXDN Conventional system configured in **Data System-personality** when transmitting Transparent data. When the transmission ends, the transceiver restores the Zone-channel used before sending the Transparent data. **Transparent on Data System-personality** can be used for data communications on a specific dedicated channel.



- This function can be only used in an NXDN Conventional system.

Configuration using KPG-D3/ D3N

- Configuring **Transparent on Data System-personality** (See Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Data System-personality)
- Configuring **Data System-personality** (See Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > Data Communications > Data System-personality)

Preamble Length

Preamble Length is the function to extend time for sending a preamble when the NXDN frame is sent.

Extending the time for sending a preamble at the beginning of transmission makes the receiving transceiver easier to receive a call and reduces missing of the beginning of the audio during the scan.

The extended time of a preamble is determined by using the following equation.

Very Narrow:

$$\text{Time [sec]} = 1/2400 \times 4 \times \text{Configuration value for Preamble Length}$$

Narrow:

$$\text{Time [sec]} = 1/4800 \times 8 \times \text{Configuration value for Preamble Length}$$



- This function can be only used in an NXDN Conventional system.

Configuration using KPG-D3/ D3N

Configuring **Preamble Length** (See Radio Configuration > System Properties > Systems > NXDN Conventional > NXDN > NXDN Parameters)

Digital Encode/ Decode Format is a function that controls the behavior of the transceiver using commands when calls are received via NXDN digital communication (NXDN Conventional system only).

The Decode Format that is executed when the following calls are received can be configured as a digital profile. A maximum of 16 digital profiles can be configured.

- Individual Call
- Individual Call Incoming
- Group Call
- Paging Call
- Status Message Call

By specifying a digital profile number for each Personality, the corresponding Decode Format will be executed when calls are received.

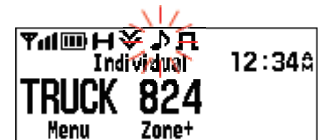
Transceiver behavior

Below is an example of the behavior when an Individual Call is received.

The transceiver stands by with the Personality that specifies the digital profile number for which Decode Format is configured in **Individual Call** of **Decode Format**.

1 The transceiver receives an Individual Call.

The “” icon blinks, and the ID Name of the transmitting transceiver appears.



2 The transceiver executes the Decode Format configured in Individual Call.

For example, if the following Decode Format is configured, the transceiver executes the **ENCA enc** command and executes the Encode Format specified in enc if the received ID matches with the ID configured on the transceiver. “Dec Individual” or “Individual call from Atlanta office” appears on the display.

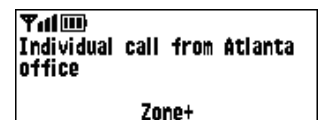
Decode Format:

CMP #C 824 ENCA ENC_TEXT

Encode Format (ENC_TEXT):

TEXT 'Dec Individual' (when the TEXT command is 14 characters or less)

TEXT 'Individual call from Atlanta office' (when the TEXT command is 15 characters or more)



 Note

- When Decode Format is configured for the different types of calls, the Tone Number that is configured for that call will not function.
- When the **Alert Tone Restriction from 2nd Call** configuration is enabled and the Decode Format command related to the following behavior is configured, the said command will not run if a call is received from the same ID for two consecutive times.
 - Alert Tone
 - Selectable Call Alert LED
 - Horn Alert
 - Caller ID Stack
- If Decode Format is configured, the following functions when receiving a call will be subject to restrictions, and the LED may flash or an Alert Tone may be emitted from the transceiver according to the configuration of the Decode Format.
 - Selective Call Alert LED
 - Caller ID Stack
 - Status Message Stack
 - Alert Tone
 - Horn Alert
 - Vibrator
 - Auto Backlight (ID/Message Reception)

Configuration using KPG-D3/ D3N

- Configuring the Digital Profile Number
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > Individually > NXDN)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > Table > Personality Table > NXDN)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > Individually > NXDN)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Site Roaming/NXDN Site Roaming with RAN > Personalities > Table > Personality Table > NXDN)
- Configuring the Decode Format to be Executed for Each Profile When a Call is Received ( **See** Radio Configuration > Special Settings > Digital Profiles > Profiles > Decode Format Assignment)

Auto Reset Timer

Auto Reset Timer in this section is the Auto Reset Timer to be configured in Digital Profile.

Auto Reset Timer is the time until the status of the sounding of an Alert Tone or the output status of the LCD, etc. executed by Digital Encode/ Decode Format is automatically reset. If the **AUTR** command is executed by Digital Encode/ Decode Format, the transceiver starts counting down by the Auto Reset Timer. Upon lapse of the time configured in Auto Reset Timer, the following command statuses executed by Digital Encode/ Decode Format are reset:

- ALERT num
- BEEP num
- DISPF
- LEDF
- LEDF2
- HORN

Auto Reset Timer can be configured by using KPG-D3/ D3N. Also, how the transceiver behaves after the length of time configured in **Auto Reset Timer** elapses can be configured.

Table 8-1 Auto Reset Timer Configuration

Configuration		Description
Auto Reset Timer	Off	Auto Reset Timer does not function. The transceiver behaves the same as when the AUTR command is not configured.
	0 sec to 300 sec	Upon lapse of the configured time, the statuses configured in the following are reset. If "0" is configured, the statuses configured in the following are reset at the same time as when the AUTR command is executed: • LCD • LED • Alert Tone Horn Alert activated by executing the HORN command does not depend on the configurations of above items. Horn Alert stops when the amount of time configured in Auto Reset Timer elapses.
LCD	Enabled	Upon lapse of the time configured in Auto Reset Timer , the blinking of the content displayed on the transceiver display executed by the DISPF command stops.
	Disabled	Even if the time configured in Auto Reset Timer elapses, the blinking of the content displayed on the transceiver display executed by the DISPF command continues.
LED	Enabled	Upon lapse of the time configured in Auto Reset Timer, the flashing of the LED executed by the following commands stops: • LEDF • LEDF2
	Disabled	Even if the time configured in Auto Reset Timer elapses, the flashing of the LED executed by the following commands continues: • LEDF • LEDF2
Alert Tone	Enabled	Upon lapse of the time configured in Auto Reset Timer, the Alert Tone and beep sounding intermittently by the following commands stop: • ALERT num • BEEP num
	Disabled	Even if the time configured in Auto Reset Timer elapses, the Alert Tone and beep sounding intermittently by the following commands continue: • ALERT num • BEEP num

Table 8-2 AUTR Command Configuration

Configuration Status	Description
Not Configured	If Digital Encode/ Decode Format is executed during the scan, the configuration statuses of the following continue when the transceiver resumes the scan: • LCD • LED • Alert Tone
Configured	If Digital Encode/ Decode Format is executed during the scan, the configuration statuses of the following do not continue when the transceiver resumes the scan: • LCD • LED • Alert Tone However, if “Off” is configured in Auto Reset Timer, the configuration statuses of the above continue. Also, even if anything other than “Off” is configured in Auto Reset Timer, the configuration statuses of the above continue if the above are disabled.

 Note

- The Auto Reset Timer of Optional Signaling and the Auto Reset Timer of Digital Encode/ Decode Format behave independently. The LCD display and the flashing of **Optional Signaling LED** (including the “” icon) executed by anything other than the Digital Encode/ Decode Format command function by the Auto Reset Timer in a NXDN system. (Refer to [Auto Reset Timer](#).)

Configuration using KPG-D3/ D3N

- Configuring **Auto Reset Timer** ( [See](#) Radio Configuration > Special Settings > Digital Profiles > Profiles > General > Auto Reset)
- Configuring **LCD** to be enabled or disabled ( [See](#) Radio Configuration > Special Settings > Digital Profiles > Profiles > General > Auto Reset)
- Configuring **LED** to be enabled or disabled ( [See](#) Radio Configuration > Special Settings > Digital Profiles > Profiles > General > Auto Reset)
- Configuring **Alert Tone** to be enabled or disabled ( [See](#) Radio Configuration > Special Settings > Digital Profiles > Profiles > General > Auto Reset)

8.1 Encode Format

Encode Format is a script that is used when executing the Decode Format. When Decode Format is executed, the Encode Format that is described in the Decode Format is being called and executed. The script for the Encode Format can be created using the following commands.



- This section explains the description of each command, the usage example, and the transceiver behavior. In addition, configuration range is also described for commands having a limit in its configuration range.

ALERT num

Description	When the ALERT num command is executed, the transceiver emits the Alert Tone configured for “num”. The Alert Tone can be configured by selecting from 8 types of Alert Tones configured for the transceiver. (Refer to Common Function Part Configuring the Alert Tone (Special Alert Tone) .)
Range	num: 1 to 8
Usage Example	Sample Script
	Decode Format: CMP #C 100 ENCA enc_alert
	Encode Format (enc_alert): LEDF ALERT 2
	Transceiver behavior When a call is received from a station whose Caller ID is 100, the transceiver executes Encode Format ‘enc_alert’. When ‘enc_alert’ is executed, the LED flashes in yellow color and the ALERT 2 tone is emitted from the transceiver.

AUTR

Description	When the AUTR command is executed, Auto Reset Timer is activated and then the timer for Auto Reset Timer starts counting down. The timer counts down the time configured in Auto Reset Timer. When the time configured in Auto Reset Timer elapses, the following enabled functions become disabled according to the configuration in Auto Reset Timer: - LCD - LED - Alert Tone Note Auto Reset Timer in this section is the Auto Reset Timer to be configured in Digital Profile.
Usage Example	Sample Script
	Decode Format: CMP #C 1000 ENCA ind_call
	Encode Format (ind_call): LEDF ALERT 1 DISPF AUTR
	Transceiver behavior When a call is received from a station whose Caller ID is 1000, the transceiver executes Encode Format ‘ind_call’. When ‘ind_call’ is executed, the LED flashes in yellow color and the ALERT 1 tone is emitted from the transceiver. The LCD display blinks, and the transceiver activates the Auto Reset Timer.

BEEP num

Description	When the BEEP num command is executed, the transceiver emits the beep tone configured for “num”. The beep can be configured by selecting from 48 types of beep patterns (0 to 47).
Range	num: 0 to 47
Usage Example	Sample Script
	Decode Format: CMP #C 110 ENCA enc_beep
	Encode Format (enc_beep): LEDF2 BEEP 10
	Transceiver behavior When a call is received from a station whose Caller ID is 110, the transceiver executes Encode Format ‘enc_beep’. When ‘enc_beep’ is executed, the LED flashes in blue color and the BEEP 10 tone is emitted from the transceiver.

BLTOF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Portable: When the BLTOF command is executed is executed, the display backlight goes off. Mobile: When the BLTOF command is executed, “Off” is configured in LCD Brightness .
Usage Example	Sample Script
	Decode Format: CMP #S 30 ENCA enc_bltoff
	Encode Format (enc_bltoff): BEEP 20 BLTOF
	Transceiver behavior When a call with Status ID 30 is received, the transceiver executes Encode Format ‘enc_bltoff’. When ‘enc_bltoff’ is executed, the BEEP 20 tone is emitted from the transceiver and the backlight goes off.

DEL xtime

Description	When the DEL xtime command is executed, the transceiver waits to execute the next command for the length of time configured for “xtime”. DEL stands for “Delay”.
Range	xtime: 0 ms to 7000 ms (in steps of 1 ms)
Usage Example	Sample Script
	Decode Format: CMP #S 200 ENCA auxa_act
	Encode Format (auxa_act): RAUXA1 DEL 1000 RAUXA0
	Transceiver behavior When a call with Status ID 200 is received, the transceiver executes Encode Format ‘auxa_act’. When ‘auxa_act’ is executed, the transceiver activates the AUX A port for 1000 ms and deactivates it again.

DELL ltime

Description	When the DELL ltime command is executed, the transceiver waits to execute the next command for the length of time configured for “ltime”. DELL stands for “Delay Long”.
Range	ltime: 0 sec to 255 sec (in steps of 1 sec)
Usage Example	Sample Script
	Decode Format: CMP #S 30 ENCA auxb_act
	Encode Format (auxb_act): RAUXB1 DELL 3 RAUXB0
	Transceiver behavior When a call with Status ID 30 is received, the transceiver executes Encode Format ‘auxb_act’. When ‘auxb_act’ is executed, the transceiver activates the AUX B port for 3 seconds and deactivates it again.

DISPF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the DISPF command is executed, the information on the transceiver display starts blinking.
Usage Example	Sample Script
	Decode Format: CMP #C 2000 ENCA call_2000
	Encode Format (call_2000): TEXT ‘CALL 2000’ DISPF
	Transceiver behavior When a call is received from a station whose Caller ID is 2000, the transceiver executes Encode Format ‘call_2000’. When ‘call_2000’ is executed, a blinking “CALL 2000” message appears on the display.

DISPS

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the DISPS command is executed, the blinking of the display by the execution of the DISPF command stops and the transceiver returns to the normal display.
Usage Example	Sample Script
	Decode Format: CMP #C 2000 ENCA call2_2000
	Encode Format (call2_2000): TEXT ‘CALL 2000’ DISPF DELL 3 DISPS
	Transceiver behavior When a call is received from a station whose Caller ID is 2000, the transceiver executes Encode Format ‘call2_2000’. When ‘call2_2000’ is executed, a blinking “CALL 2000” message appears on the display for 3 seconds after which the display returns to the illuminated state.

ENC enc

Description	When the ENC enc command is executed, the transceiver executes the Encode Format configured for “enc”. When the Encode Format is executed repeatedly with the “REP ~ RSML/ RSMS” command, Encode Format is executed when repeat ends.
Usage Example	Sample Script
	Decode Format: CMP #S 15 ENCA auxa_act
	Encode Format (auxa_act): RAUXA1 DELL 3 RAUXA0 ENC auxb_act
	Encode Format (auxb_act): RAUXB1 DELL 3 RAUXB0
	Transceiver behavior When a call with Status ID 15 is received, the transceiver executes Encode Format ‘auxa_act’. When ‘auxa_act’ is executed, the transceiver activates the AUX A port for 3 seconds and deactivates it again, followed by executing Encode Format ‘auxb_act’. When ‘auxb_act’ is executed, the transceiver activates the AUX B port for 3 seconds and deactivates it again.

KEYD

Description	When the KEYD command is executed, the transceiver locks all buttons, and all button operations become disabled. Using this command in combination with the Decode Format forbids button operation by the receiving transceiver.
Usage Example	Sample Script
	Decode Format: CMP #S 10 ENCA key_lock
	Encode Format (key_lock): KEYD
	Transceiver behavior
	When a call with Status ID 10 is received, the transceiver executes Encode Format ‘key_lock’. When ‘key_lock’ is executed, Button Lock is turned on and button operation is disabled.  Note • The “” icon appears when Button Lock is turned on by executing the KEYD command. • After Button Lock is turned on by executing the KEYD command, the Button Lock pop-up will not appear on the display.

KEYE

Description	When the KEYE command is executed, the transceiver unlocks all buttons. Using this command in combination with the Decode Format unlocks the button lock state of the receiving transceiver.
Usage Example	Sample Script
	Decode Format: CMP #S 20 ENCA key_unlock
	Encode Format (key_unlock): KEYE
	Transceiver behavior
	When a call with Status ID 20 is received, the transceiver executes Encode Format 'key_unlock'. When 'key_unlock' is executed, Button Lock is turned off and button operation is enabled.
	 Note • After Button Lock is turned on by executing the KEYE command, the Button Lock pop-up will not appear on the display. • If no button is operated within the length of time configured in Auto Button Lock Timer after the button lock state is unlocked by the KEYE command, the transceiver automatically enters the button lock state.

LEDF

Description	When the LEDF command is executed, the LED flashes in yellow color.
Usage Example	Sample Script
	Decode Format: CMP #C 1000 ENCA call_1000
	Encode Format (call_1000): TEXT 'CALL 1000' LEDF
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the transceiver executes Encode Format 'call_1000'. When 'call_1000' is executed, "CALL 1000" appears on the display and the LED flashes in yellow color.

LEDF2

Description	When the LEDF2 command is executed, the LED flashes in blue color.
Usage Example	Sample Script
	Decode Format: CMP #C 2000 ENCA call_2000
	Encode Format (call_2000): TEXT 'CALL 2000' LEDF2
	Transceiver behavior When a call is received from a station whose Caller ID is 2000, the transceiver executes Encode Format 'call_2000'. When 'call_2000' is executed, a blinking "CALL 2000" message appears on the display and the LED flashes in blue color.

LEDS

Description	When the LEDS command is executed, the flashing LED goes off.
Usage Example	Sample Script
	Decode Format: CMP #S 30 ENCA call_end
	Encode Format (call_end): TXTOF LEDS
	Transceiver behavior When a call with Status ID 30 is received, the transceiver executes Encode Format 'call_end'. When 'call_end' is executed, the text display disappears, the transceiver returns to the standby mode and the LED light goes off.

RACK stime dec

Description	When the RACK stime dec command is executed, the transceiver enters the standby state with the Decode Format configured for “dec” for the length of time configured for “stime”.
Range	stime (Standard Time): 0 ms to 60000 ms (in steps of 10 ms) dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA auxa_act
	Encode Format (auxa_act): REP 10 RAUXA0 RAUXA1 DELL 1 RAUXA0 RACK 5000 act_stop RSML 5
	Decode Format (act_stop): CMP #S 200 REPOF BEEP 16
	Transceiver behavior When a call with Status ID 100 is received, the transceiver executes Encode Format ‘auxa_act’. When ‘auxa_act’ is executed, the transceiver deactivates the AUX A port temporarily, switches to the active state for 1 second, followed by restoring it to the inactive state. Next, the transceiver executes Decode Format ‘act_stop’ for 5000 ms. After executing ‘act_stop’ and 5 seconds have elapsed after deactivating the AUX A port, the transceiver executes Encode Format ‘auxa_act’ again. Encode Format ‘auxa_act’ can be executed repeatedly up to 10 times. If Status ID 200 is received before 5000 ms have elapsed, the transceiver emits a BEEP 16 tone and execution of ‘auxa_act’ ends.

RAUXA0

Supported Models: Mobile

Description	When the RAUXA0 command is executed, the AUX A port becomes inactive. If the AUX A function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxa_on CMP #S 111 ENCA auxa_off
	Encode Format (auxa_on): RAUXA1
	Encode Format (auxa_off): RAUXA0
	Transceiver behavior When a call with Status ID 123 is received, the transceiver executes Encode Format ‘auxa_on’. When ‘auxa_on’ is executed, the transceiver activates the AUX A port. When a call with Status ID 111 is received, the transceiver executes Encode Format ‘auxa_off’. When ‘auxa_off’ is executed, the transceiver deactivates the AUX A port.

RAUXA1

Supported Models: Mobile

Description	When the RAUXA1 command is executed, the AUX A port becomes active. If the AUX A function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxa_on CMP #S 111 ENCA auxa_off
	Encode Format (auxa_on): RAUXA1
	Encode Format (auxa_off): RAUXA0
	Transceiver behavior When a call with Status ID 123 is received, the transceiver executes Encode Format 'auxa_on'. When 'auxa_on' is executed, the transceiver activates the AUX A port. When a call with Status ID 111 is received, the transceiver executes Encode Format 'auxa_off'. When 'auxa_off' is executed, the transceiver deactivates the AUX A port.

RAUXB0

Supported Models: Mobile

Description	When the RAUXB0 command is executed, the AUX B port becomes inactive. If the AUX B function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxb_on CMP #S 111 ENCA auxb_off
	Encode Format (auxb_on): RAUXB1
	Encode Format (auxb_off): RAUXB0
	Transceiver behavior When a call with Status ID 123 is received, the transceiver executes Encode Format 'auxb_on'. When 'auxb_on' is executed, the transceiver activates the AUX B port. When a call with Status ID 111 is received, the transceiver executes Encode Format 'auxb_off'. When 'auxb_off' is executed, the transceiver deactivates the AUX B port.

RAUXB1

Supported Models: Mobile

Description	When the RAUXB1 command is executed, the AUX B port becomes active. If the AUX B function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxb_on CMP #S 111 ENCA auxb_off
	Encode Format (auxb_on): RAUXB1
	Encode Format (auxb_off): RAUXB0
	Transceiver behavior
When a call with Status ID 123 is received, the transceiver executes Encode Format 'auxb_on'. When 'auxb_on' is executed, the transceiver activates the AUX B port. When a call with Status ID 111 is received, the transceiver executes Encode Format 'auxb_off'. When 'auxb_off' is executed, the transceiver deactivates the AUX B port.	

RAUXC0

Supported Models: Mobile

Description	When the RAUXC0 command is executed, the AUX C port becomes inactive. If the AUX C function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxc_on CMP #S 111 ENCA auxc_off
	Encode Format (auxc_on): RAUXC1
	Encode Format (auxc_off): RAUXC0
	Transceiver behavior
When a call with Status ID 123 is received, the transceiver executes Encode Format 'auxc_on'. When 'auxc_on' is executed, the transceiver activates the AUX C port. When a call with Status ID 111 is received, the transceiver executes Encode Format 'auxc_off'. When 'auxc_off' is executed, the transceiver deactivates the AUX C port.	

RAUXC1

Supported Models: Mobile

Description	When the RAUXC1 command is executed, the AUX C port becomes active. If the AUX C function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxc_on CMP #S 111 ENCA auxc_off
	Encode Format (auxc_on): RAUXC1
	Encode Format (auxc_off): RAUXC0
	Transceiver behavior
When a call with Status ID 123 is received, the transceiver executes Encode Format 'auxc_on'. When 'auxc_on' is executed, the transceiver activates the AUX C port. When a call with Status ID 111 is received, the transceiver executes Encode Format 'auxc_off'. When 'auxc_off' is executed, the transceiver deactivates the AUX C port.	

REP rep

Description	When the REP rep command is executed, the transceiver executes Encode Format repeatedly for the number of times configured for "rep".
Range	rep: 0 (infinite) or 1 time to 255 times
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA auxa_act
	Encode Format (auxa_act): REP 10 RAUXA0 RAUXA1 DELL 1 RAUXA0 RACK 5000 act_stop RSML 5
	Decode Format (act_stop): CMP #S 200 REPOF BEEP 16
	Transceiver behavior
When a call with Status ID 100 is received, the transceiver executes Encode Format 'auxa_act'. When 'auxa_act' is executed, the transceiver deactivates the AUX A port temporarily, switches to the active state for 1 second, followed by restoring it to the inactive state. Next, the transceiver executes Decode Format 'act_stop' for 5000 ms. When 5 seconds have elapsed after restoring the AUX A port to the inactive state, the transceiver executes Encode Format 'auxa_act' again. Encode Format 'auxa_act' can be executed repeatedly up to 10 times. If Status ID 200 is received before 5000 ms have elapsed, the transceiver emits a BEEP 16 tone and execution of 'auxa_act' ends.	

RSML ltime

Description	When the RSML ltime command is executed, the transceiver executes Encode Format repeatedly by the REP rep command at the intervals configured for “ltime”. (Refer to REP rep .) The RSML ltime command is used for the transceiver to wait to receive an acknowledgment.
Range	ltime: 0 sec to 255 sec (in steps of 1 sec)
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA auxa_act
	Encode Format (auxa_act): REP 10 RAUXA0 RAUXA1 DELL 1 RAUXA0 RACK 5000 act_stop RSML 5
	Decode Format (act_stop): CMP #S 200 REPOF BEEP 16
Usage Example	Transceiver behavior
	When a call with Status ID 100 is received, the transceiver executes Encode Format ‘auxa_act’. When ‘auxa_act’ is executed, the transceiver deactivates the AUX A port temporarily, switches to the active state for 1 second, followed by restoring it to the inactive state. Next, the transceiver executes Decode Format ‘act_stop’ for 5000 ms.
	When 5 seconds have elapsed after restoring the AUX A port to the inactive state, the transceiver executes Encode Format ‘auxa_act’ again.
	Encode Format ‘auxa_act’ can be executed repeatedly up to 10 times.
Usage Example	If Status ID 200 is received before 5000 ms have elapsed, the transceiver emits a BEEP 16 tone and execution of ‘auxa_act’ ends.

RSMS stime

Description	When the RSMS stime command is executed, the transceiver executes Encode Format repeatedly by the REP rep command at the intervals configured for “stime”. (Refer to REP rep .)
Range	stime (Standard Time): 0 ms to 2550 ms (in steps of 10 ms)
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA auxa_act
	Encode Format (auxa_act): REP 10 RAUXA0 RAUXA1 DELL 1 RAUXA0 RACK 2000 act_stop RSMS 2500
	Decode Format (act_stop): CMP #S 200 REPOF BEEP 16
Usage Example	Transceiver behavior
	When a call with Status ID 100 is received, the transceiver executes Encode Format ‘auxa_act’. When ‘auxa_act’ is executed, the transceiver deactivates the AUX A port temporarily, switches to the active state for 1 second, followed by restoring it to the inactive state. Then, the transceiver executes Decode Format ‘act_stop’ for 2000 ms.
	When 2500 ms have elapsed after restoring the AUX A port to the inactive state, the transceiver executes Encode Format ‘auxa_act’ again.
	Encode Format ‘auxa_act’ can be executed repeatedly up to 10 times.
Usage Example	If Status ID 200 is received before 2000 ms have elapsed, the transceiver emits a BEEP 16 tone and execution of ‘auxa_act’ ends.

SELCH channel

Description	When the SELCH channel command is executed, the transceiver migrates to the channel configured for “channel”. If UP is configured for “channel”, executing the SELCH channel command increases the channel number by one. If DOWN is configured for “channel”, executing the SELCH channel command decreases the channel number by one.
Range	channel: Channel number 1 to Channel number 512, UP or DOWN
Usage Example	Sample Script
	Decode Format: CMP #S 10 ENCA set_10ch
	Encode Format (set_10ch): SELCH 10
	Transceiver behavior
	When a call with Status ID 10 is received, the transceiver executes Encode Format ‘set_10ch’. When ‘set_10ch’ is executed, the transceiver moves to Channel 10.  Note If Digital Profile is configured to “None” for the selected zone channel, the SELCH channel command will not function.

SELGR zone

Description	When the SELGR zone command is executed, the transceiver migrates to the zone configured for “zone”. If UP is configured for “zone”, executing the SELGR zone command increases the zone number by one. If DOWN is configured for “zone”, executing the SELGR zone command decreases the zone number by one.
Range	zone: Zone number 1 to Zone number 128, UP or DOWN
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA set_zone100
	Encode Format (set_zone100): SELGR 100 SELCH 10
	Transceiver behavior
	When a call with Status ID 100 is received, the transceiver executes Encode Format ‘set_zone100’. When ‘set_zone100’ is executed, the transceiver moves to Channel 10 of Zone 100.  Note If Digital Profile is configured to “None” for the selected zone channel, the SELGR zone command will not function.

STOPS

Description	When the STOPS command is executed, the transceiver stops scanning.
Usage Example	Sample Script
	Decode Format: CMP #S 30 ENCA scan_stop
	Encode Format (scan_stop): STOPS ALERT 2
	Transceiver behavior When a call with Status ID 30 is received, the transceiver executes Encode Format 'scan_stop'. When 'scan_stop' is executed, scanning ends and the transceiver emits the ALERT 2 tone.

STRTS

Description	When the STRTS command is executed, the transceiver starts scanning.
Usage Example	Sample Script
	Decode Format: CMP #S 50 ENCA scan_start
	Encode Format (scan_start): ALERT 1 STRTS
	Transceiver behavior When a call with Status ID 50 is received, the transceiver executes Encode Format 'scan_start'. When 'scan_start' is executed, the transceiver emits the ALERT 1 tone and scanning starts.

TEXT 'text'

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the TEXT 'text' command is executed, the transceiver displays the text string configured for "text" on the display. Execution of the TXTOF command restores the previous display. (Refer to TXTOF.)  Note - When the TEXT command is executed, the following are the cases according to the number of characters to be displayed: - For 14 characters or less: The text appears in Basic Frame 1. - For 15 characters or more: For Portable, the text appears in Message Frame, and for Mobile, the text appears in Function Frame 1.
Range	text: A maximum of 48-digit alphanumeric character
Usage Example	Sample Script
	Decode Format: CMP #C 2000 ENCA call_2000
	Encode Format (call_2000): TEXT 'CALL 2000'
	Transceiver behavior When a call is received from a station whose Caller ID is 2000, the transceiver executes Encode Format 'call_2000'. When 'call_2000' is executed, a "CALL 2000" message appears on the display.

TXTOF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the TXTOF command when a text string appears on the display by executing the TEXT command, the display returns to the previous display.
Usage Example	Sample Script
	Decode Format: CMP #S 30 ENCA call_end
	Encode Format (call_end): TEXT 'CALL END' DELL 3 TXTOF
	Transceiver behavior When a call with Status ID 30 is received, the transceiver executes Encode Format 'call_end'. When 'call_end' is executed, a "CALL END" message appears on the display for 3 seconds, after which the original display is being restored.

VIB

Supported Models: Portable (NX-3200/ NX-3300/ NX-3400)

Description	Upon execution of the VIB command when Vibrator is enabled, the Vibrator unit vibrates. The Vibrator unit vibrates for 10 sec at 500-ms intervals. Pressing any button while the Vibrator unit is vibrating stops the Vibrator unit from vibrating.
Usage Example	Sample Script
	Decode Format: CMP #C 500 ENCA act_vib
	Encode Format (act_vib): ALERT 2 LEDF VIB
	Transceiver behavior When a call is received from a station whose Caller ID is 500, the transceiver executes Encode Format 'act_vib'. When 'act_vib' is executed, the LED flashes in yellow color after the ALERT 2 tone is emitted from the transceiver. If Vibrator is enabled, the vibrator will be activated.

8.2 Decode Format

Decode Format is a script that is executed when receiving calls via NXDN digital communication. The script for the Decode Format can be created using the following commands.

Note

- This section explains the description of each command, the usage example, and the transceiver behavior. In addition, configuration range is also described for commands having a limit in its configuration range.

ALERT num

Description	When the ALERT num command is executed, the transceiver emits the Alert Tone configured for “num”. The Alert Tone can be configured by selecting from 8 types of Alert Tones configured for the transceiver. (Refer to Common Function Part Configuring the Alert Tone (Special Alert Tone) .)
Range	num: 1 to 8
Usage Example	Sample Script
	Decode Format: CMP #C 100 ALERT 8
	Transceiver behavior
	When a call is received from a station whose Caller ID is 100, the transceiver emits the ALERT 8 tone.

AUTR

Description	When the AUTR command is executed, Auto Reset Timer is activated and then the timer for Auto Reset Timer starts counting down. The timer counts down the time configured in Auto Reset Timer. When the time configured in Auto Reset Timer elapses, the following enabled functions become disabled according to the configuration in Auto Reset Timer: - LCD - LED - Alert Tone Note Auto Reset Timer in this section is the Auto Reset Timer to be configured in Digital Profile.
Usage Example	Sample Script
	Decode Format: CMP #C 1000 LEDF2 ALERT 8 DISPF AUTR
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the following statuses occur, and the transceiver activates the Auto Reset Timer: - The LED flashes blue. - The ALERT 8 tone sounds from the transceiver. - The LCD display blinks.

BEEP num

Description	When the BEEP num command is executed, the transceiver emits the beep tone configured for “num”. The beep can be configured by selecting from 48 types of beep patterns (0 to 47).
Range	num: 0 to 47
Usage Example	Sample Script
	Decode Format: CMP #C 100 ALERT 8 CMP ^OWNID BEEP 10
	Transceiver behavior
	When a call is received from a station whose Caller ID is 100, the transceiver emits the ALERT 8 tone. If the destination is Unit ID (Own), the transceiver emits the BEEP 10 tone.

BLTOF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Portable: When the BLTOF command is executed is executed, the display backlight goes off. Mobile: When the BLTOF command is executed, “Off” is configured in LCD Brightness .
Usage Example	Sample Script
	Decode Format: CMP #C 1000 BEEP 10 BLTOF
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the transceiver emits the BEEP 10 tone and the backlight of the display goes off.

BLTON

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Portable: When the BLTON command is executed, the display backlight lights up. Mobile: When the BLTON command is executed, “High” is configured in LCD Brightness .
Usage Example	Sample Script
	Decode Format: CMP #S 10 ALERT 1 BLTON CMP #S 30 ALERT 3 BLTOF
	Transceiver behavior
	When a call with Status ID 10 is received, the transceiver emits the ALERT 1 tone and the backlight of the display is turned on. When a call with Status ID 30 is received, the transceiver emits the ALERT 3 tone and the backlight of the display goes off.

CMP #C num

Description	When the CMP #C num command is executed, the transceiver compares the received ID with the ID specified in “num” and executes the subsequent commands if the IDs are found to be matching. It is possible to specify the range of IDs (0 to 9) by replacing a specific digit with a wild card “*”. When the wild card “*” is configured, zero-fill is executed as follows and a check to determine whether the IDs are matching is performed regardless of the preconfigured number of digits. Matching range in the case of CMP #C **: 1 (= 01) to 99 Matching range in the case of CMP #C ***: 1 (= 001) to 999 Matching range in the case of CMP #C *1: 1 (= 01), 11, 21, 31, 41, 51, 61, 71, 81 or 91
Range	num: 1 to 65519 (in steps of 1)
Usage Example	Sample Script
	Decode Format: CMP #C 100* DECA id_1000 CMP #C 20** DECA id_2000 CMP ^OWNID DECA id_other
	Decode Format (id_1000): CMP #C 100* LEDF ALERT 1
	Decode Format (id_2000): CMP #C 20** LEDF2 ALERT 2
	Decode Format (id_other): CMP ^OWNID DISPF ALERT 3
	Transceiver behavior
	When a call is received from a station whose Caller ID is from 1000 to 1009, the transceiver executes Decode Format ‘id_1000’. When ‘id_1000’ is executed, the LED flashes in yellow color and the ALERT 1 tone is emitted from the transceiver.
	When a call is received from a station whose Caller ID is from 2000 to 2099, the transceiver executes Decode Format ‘id_2000’. When ‘id_2000’ is executed, the LED flashes in blue color and the Alert 2 tone is emitted from the transceiver.
	If the destination is Unit ID (Own), the transceiver executes Decode Format ‘id_other’. When ‘id_other’ is executed, the information on the display flashes and the ALERT 3 tone is emitted from the transceiver.

CMP ^OWNID

Description	When the CMP ^OWNID command is executed, the transceiver compares the received ID with its own ID and executes the subsequent commands if the IDs are found to be matching.
Usage Example	Sample Script
	Decode Format: CMP #C 100 ALERT 5 CMP ^OWNID ALERT 6
	Transceiver behavior
	When a call is received from a station whose Caller ID is 100, the transceiver emits the ALERT 5 tone.
	If the destination is Unit ID (Own), the transceiver emits the ALERT 6 tone.

CMP #G num

Description	When the CMP #G num command is executed, the transceiver compares the received Group ID with the Group ID specified in “num” and executes the subsequent commands if the IDs are found to be matching. It is possible to specify the range of IDs (0 to 9) by replacing a specific digit with a wild card “*”. When the wild card “*” is configured, zero-fill is executed as follows and a check to determine whether the IDs are matching is performed regardless of the preconfigured number of digits. Matching range in the case of CMP #G **: 1 (= 01) to 99 Matching range in the case of CMP #G ***: 1 (= 001) to 999 Matching range in the case of CMP #G *1: 1 (= 01), 11, 21, 31, 41, 51, 61, 71, 81 or 91
Range	num: 1 to 65519 (in steps of 1)
Usage Example	Sample Script
	Decode Format: CMP #G 100 ALERT 5 CMP #G 20* ALERT 6 CMP #G 3** ALERT 7
	Transceiver behavior
	When a call with Group ID 100 is received, the transceiver emits the ALERT 5 tone. When a call with a Group ID from 200 to 209 is received, the transceiver emits the ALERT 6 tone. When a call with a Group ID from 300 to 399 is received, the transceiver emits the ALERT 7 tone.

CMP ^GL

Description	When the CMP ^GL command is executed, the transceiver determines whether the Group ID received is registered in the Group ID List and executes the subsequent commands if it is registered.
Usage Example	Sample Script
	Decode Format: CMP #G 100 ALERT 5 CMP ^GL ALERT 6
	Transceiver behavior
	When a call with Group ID 100 is received, the transceiver emits the ALERT 5 tone. If the ID of the received Group Call is registered in the Group ID List, the transceiver emits the ALERT 6 tone.

CMP ^PGL

Description	When the CMP ^PGL command is executed, the transceiver determines whether the Group ID received is registered in the Persistent Group ID List and executes the subsequent commands if it is registered.
Usage Example	Sample Script
	Decode Format: CMP #G 100 BEEP 10 CMP ^PGL BEEP 20
	Transceiver behavior
	When a call with Group Call 100 is received, the transceiver emits the BEEP 10 tone. If the ID of the received Group Call is registered in the Persistent Group ID List, the transceiver emits the BEEP 20 tone.

CMP ^ALL

Description	When the CMP ^ALL command is executed, the transceiver determines whether the Group ID received is an ALL Group ID and executes the subsequent commands if it is an ALL GROUP ID.
Usage Example	Sample Script
	Decode Format: CMP ^ALL ALERT 3 CMP ^GL ALERT 4
	Transceiver behavior
	If the ID of the received Group Call matches the ALL Group ID, the transceiver emits the ALERT 3 tone. If the ID of the received Group Call is registered in the Group ID List, the transceiver emits the ALERT 4 tone.

CMP #S num

Description	When the CMP #S num command is executed, the transceiver compares the received Status ID with the Status ID specified in “num” and executes the subsequent commands if the IDs are found to be matching. It is possible to specify the range of IDs (0 to 9) by replacing a specific digit with a wild card “*”. When the wild card “*” is configured, zero-fill is executed as follows and a check to determine whether the IDs are matching is performed regardless of the preconfigured number of digits. Matching range in the case of CMP #S *: 1 to 9 Matching range in the case of CMP #S **: 1 (= 01) to 99 Matching range in the case of CMP #S *1: 1 (= 01), 11, 21, 31, 41, 51, 61, 71, 81 or 91
Range	num: 1 to 207 (in steps of 1)
Usage Example	Sample Script
	Decode Format: CMP #S 10 ALERT 1 CMP #S 2* ALERT 2 CMP #S 1** ALERT 3
	Transceiver behavior
	When a call with Status ID 10 is received, the transceiver emits the ALERT 1 tone. When a call with a Status ID from 20 to 29 is received, the transceiver emits the ALERT 2 tone. When a call with a Status ID from 100 to 199 is received, the transceiver emits the ALERT 3 tone.  Note - Decode Format does not apply to Horn Alert Status. Upon receiving a Horn Alert Status, the transceiver activates the Horn Alert. The transceiver will not execute the subsequent commands in this case even when the same Status ID as Horn Alert Status is specified in “num” and the IDs are found to be matching. - Decode Format does not apply to Terminate Emergency Status (226). Upon receiving a Terminate Emergency Status, the transceiver cancels the Emergency status. The transceiver will not execute the subsequent commands in this case even when the same Status ID as Terminate Emergency Status is specified in “num” and the IDs are found to be matching.

CMP ^EMG

Description	When the CMP ^EMG command is executed, the transceiver determines whether the Status ID received is an Emergency Status (224) and executes the subsequent commands if it is an Emergency Status.
Usage Example	Sample Script
	Decode Format: CMP ^EMG ENCA emg_act
	Encode Format (emg_act): ALERT 8 TEXT 'EMERGENCY' DISPF DELL 10 TXTOF
	Transceiver behavior If the Status ID received is an Emergency Status, the transceiver executes Encode Format 'emg_act'. When 'emg_act' is executed, the transceiver emits the ALERT 8 tone and an "EMERGENCY" message appears blinking on the display for 10 seconds.

CMP ^EOMD

Description	When the CMP ^EOMD command is executed, the transceiver determines whether the Status ID received is a Man-down Status (225) and executes the subsequent commands if it is a Man-down Status.
Usage Example	Sample Script
	Decode Format: CMP ^EOMD ENCA emg_mandown
	Encode Format (emg_mandown): ALERT 8 TEXT 'MAN - DOWN' DISPF DELL 10 TXTOF
	Transceiver behavior If the Status ID received is a Man-down Status, the transceiver executes Encode Format 'emg_mandown'. When 'emg_mandown' is executed, the transceiver emits the ALERT 8 tone and a "MAN - DOWN" message appears blinking on the display for 10 seconds.

CMP ^EOS

Description	When the CMP ^EOS command is executed, the transceiver determines whether the Status ID received is a Stationary Status (227) and executes the subsequent commands if it is a Stationary Status.
Usage Example	Sample Script
	Decode Format: CMP ^EOS ENCA emg_sta
	Encode Format (emg_sta): ALERT 8 TEXT 'STATIONARY' DISPF DELL 10 TXTOF
	Transceiver behavior If the Status ID received is a Stationary Status, the transceiver executes Encode Format 'emg_sta'. When 'emg_sta' is executed, the transceiver emits the ALERT 8 tone and a "STATIONARY" message appears blinking on the display for 10 seconds.

CMP ^EOM

Description	When the CMP ^EOM command is executed, the transceiver determines whether the Status ID received is a Motion Status (228) and executes the subsequent commands if it is a Motion Status.
Usage Example	Sample Script
	Decode Format: CMP ^EOM ENCA meg_mot
	Encode Format (meg_mot): ALERT 8 TEXT 'MOTION' DISPF DELL 10 TXTOF
	Transceiver behavior If the Status ID received is a Motion Status, the transceiver executes Encode Format 'emg_mot'. When 'emg_mot' is executed, the transceiver emits the ALERT 8 tone and a "MOTION" message appears blinking on the display for 10 seconds.

CMP ^EOLW

Description	When the CMP ^EOLW command is executed, the transceiver determines whether the Status ID received is a Lone Worker Status (229) and executes the subsequent commands if it is a Lone Worker Status.
Usage Example	Sample Script
	Decode Format: CMP ^EOLW ENCA emg_lonewk
	Encode Format (emg_lonewk): ALERT 8 TEXT 'LONE WORKER' DISPF DELL 10 TXTOF
	Transceiver behavior If the Status ID received is a Lone Worker Status, the transceiver executes Encode Format 'emg_lonewk'. When 'emg_lonewk' is executed, the transceiver emits the ALERT 8 tone and a "LONE WORKER" message appears blinking on the display for 10 seconds.

CMP ^EMGC

Description	When the CMP ^EMGC command is executed, the transceiver determines whether the call received is an Emergency Call and executes the subsequent commands if it is an Emergency Call. This is not applicable to Emergency Status.
Usage Example	Sample Script
	Decode Format: CMP ^EMGC LEDF2 CMP #C 12345 ALERT 7 ENCA enc_ecall
	Encode Format (enc_ecall): TEXT 'Calling Received' DELL 5 TXTOF
	Transceiver behavior If the received call is an Emergency Call, the LED flashes in blue color regardless of the Caller ID. When a call other than an Emergency Call is received from a station whose Caller ID is 12345, the transceiver emits the ALERT 7 tone and executes Encode Format 'enc_ecall'. When 'enc_ecall' is executed, a "Calling Received" message appears on the display for 5 seconds, after which the original display is being restored.

DECA dec

Description	When the DECA dec command is executed, the transceiver executes the Decode Format specified in “dec”.
Range	dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP #C 1000 DECA id_1000 CMP #C 2000 DECA id_2000 CMP ^OWNID DECA id_other
	Decode Format (id_1000): CMP #C 1000 LEDF ALERT 1
	Decode Format (id_2000): CMP #C 2000 LEDF2 ALERT 2
	Decode Format (id_other): CMP ^OWNID DISPF ALERT 3
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the transceiver executes Decode Format ‘id_1000’. When ‘id_1000’ is executed, the LED flashes in yellow color and the ALERT 1 tone is emitted from the transceiver.
	When a call is received from a station whose Caller ID is 2000, the transceiver executes Decode Format ‘id_2000’. When ‘id_2000’ is executed, the LED flashes in blue color and the ALERT 2 tone is emitted from the transceiver.
	If the destination is Unit ID (Own), the transceiver executes Decode Format ‘id_1000’. When ‘id_1000’ is executed, the LED flashes in yellow color and the ALERT 3 tone is emitted from the transceiver.

DECAT time dec

Description	When the DECAT time dec command is executed, the transceiver executes the Decode Format specified in “dec” during the time interval configured in “time”. This command is used when executing other Decode Formats for a specific period of time.  Note - While executing the DECAT time dec command, the Decode Format specified in “dec” will not be executed even upon receiving an incoming call for which Decode Format of FPU is configured to “None”. For example, if Decode Format of Group Call on the FPU is configured to “None”, the Decode Format specified in “dec” will not be executed even when a Group Call is received while waiting for a call during the standby interval configured in “time” of the DECAT time dec command. - While executing the DECAT time dec command, the Decode Format specified in “dec” instead of the configuration on the FPU will be executed upon receiving an incoming call for which Decode Format of FPU is configured to a value other than “None”. For example, if Decode Format of Group Call on the FPU is configured to a value other than “None”, the Decode Format specified in “dec” instead of the configuration on the FPU will be executed when a Group Call is received while waiting for a call during the standby interval configured in “time” of the DECAT time dec command.
Range	time: 0 ms to 60000 ms (in steps of 10 ms) dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP #C 1000 DECAT 3000 DecNextST
	Decode Format (DecNextST): CMP #S 100 LEDF ALERT 1 CMP #S 200 LEDF2 ALERT 2
	Transceiver behavior When a call is received from a station whose Caller ID is 1000, the transceiver executes the next Decode Format ‘DecNextST’ for a period of 3000 ms. When a call with Status ID 100 is received within 3000 ms, the LED flashes in yellow color and the ALERT 1 tone is emitted from the transceiver. When a call with Status ID 200 is received within 3000 ms, the LED flashes in blue color and the ALERT 2 tone is emitted from the transceiver.

DECF dec

Description	The transceiver executes the DECF dec command, followed by executing the Decode Format specified in “dec”. This command is normally used when the script to be executed in Decode Format is insufficient in size.
Range	dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^PGL BEEP 10 DECF none_pglist
	Decode Format (none_pglist): CMP ^GL LEDF BEEP 5
	Transceiver behavior The transceiver checks whether the received Group ID is registered in the Persistent Group ID List. If the received Group ID is registered in the Persistent Group ID List, the transceiver emits the BEEP 10 tone. If the received Group ID is not registered in the Persistent Group ID List, the transceiver executes Decode Format ‘none_pglist’. If the received Group ID is registered in the Group ID List, the LED flashes in yellow color and the BEEP 5 tone is emitted from the transceiver.

DISPF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the DISPF command is executed, the information on the transceiver display starts blinking.
Usage Example	Sample Script
	Decode Format: CMP #C 1000 LEDF DISPF
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the LED flashes in yellow color and the information on the display also starts blinking.

ENCA enc

Description	When the ENCA enc command is executed, the transceiver executes the Encode Format specified in “enc”.
Range	enc: Encode Format Name
Usage Example	Sample Script
	Decode Format: CMP #C 100 ENCA text_100 CMP #C 200 ENCA text_200
	Encode Format (text_100): ALERT 5 TEXT ‘CALL 100’ DSPF DELL 3 TXTOF
	Encode Format (text_200): ALERT 6 TEXT ‘CALL 200’ DSPF DELL 3 TXTOF
	Transceiver behavior When a call is received from a station whose Caller ID is 100, the transceiver executes Encode Format ‘text_100’. When ‘text_100’ is executed, the transceiver emits the ALERT 5 tone and a “CALL 100” message appears blinking on the display for 3 seconds. When a call is received from a station whose Caller ID is 200, the transceiver executes Encode Format ‘text_200’. When ‘text_200’ is executed, the transceiver emits the ALERT 6 tone and a “CALL 200” message appears blinking on the display for 3 seconds.

HORN

Supported Models: Mobile

Description	Executing the HORN command activates Horn Alert. Horn Alert functions according to the settings in Logic Pattern and Off-hook Horn Alert .
Usage Example	Sample Script
	Decode Format: CMP #S 50 LEDF HORN
	Transceiver behavior
	When a call with Status ID 50 is received, the LED flashes in yellow color and Horn Alert is activated.  Note • If Horn Alert is disabled, the HORN command will not function.

LEDF

Description	When the LEDF command is executed, the LED flashes in yellow color.
Usage Example	Sample Script
	Decode Format: CMP #C 12345 LEDF VIB
	Transceiver behavior When a call is received from a station whose Caller ID is 12345, the LED flashes in yellow color. If Vibrator is enabled, the vibrator will be activated.

LEDF2

Description	When the LEDF2 command is executed, the LED flashes in blue color.
Usage Example	Sample Script
	Decode Format: CMP #S 100 LEDF2 ALERT 2
	Transceiver behavior
	When a call with Status ID 100 is received, the LED flashes in blue color and the ALERT 2 tone is emitted from the transceiver.

QUEUE

Description	When the QUEUE command is executed, the Caller ID received will be saved to the stack memory according to the stack setting of FPU (Status Message Stack, Caller ID Stack). Information that is saved can be viewed in the Stack Mode.
Usage Example	Sample Script
	Decode Format: CMP #C 100 QUEUE ALERT 5 CMP ^OWNID ALERT 5
	Transceiver behavior
	When a call is received from a station whose Caller ID is 100, the transceiver emits the ALERT 5 tone after the received Caller ID has been saved to the stack memory according to the Status Message Stack or Caller ID Stack setting. If the destination is Unit ID (Own), the transceiver emits the ALERT 5 tone without saving the received Caller ID to the stack memory.

REPOF

Description	When the REPOF command is executed, the transceiver stops the Encode Format from being executed repeatedly using the REP rep command of the Encode Format. (Refer to REP rep .)
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA auxa_act
	Encode Format (auxa_act): REP 10 RAUXA0 RAUXA1 DELL 1 RAUXA0 RACK 5000 act_stop RSML 5
	Decode Format (act_stop): CMP #S 200 REPOF BEEP 16
	Transceiver behavior
	When a call with Status ID 100 is received, the transceiver executes Encode Format 'auxa_act'. When 'auxa_act' is executed, the transceiver deactivates the AUX A port temporarily, switches to the active state for 1 second, followed by restoring it to the inactive state. Next, the transceiver executes Decode Format 'act_stop' for 5000 ms. When 5 seconds have elapsed after restoring the AUX A port to the inactive state, the transceiver executes Encode Format 'auxa_act' again. Encode Format 'auxa_act' can be executed repeatedly up to 10 times. If Status ID 200 is received before 5000 ms have elapsed, the transceiver emits a BEEP 16 tone and execution of 'auxa_act' ends.

VIB

Supported Models: Portable (NX-3200/ NX-3300/ NX-3400)

Description	Upon execution of the VIB command when Vibrator is enabled, the Vibrator unit vibrates. The Vibrator unit vibrates for 10 sec at 500-ms intervals. Pressing any button while the Vibrator unit is vibrating stops the Vibrator unit from vibrating.
Usage Example	Sample Script
	Decode Format: CMP #C 1000 LEDF VIB
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the LED flashes in yellow color. If Vibrator is enabled, the vibrator will be activated.

Task Request is a function for performing task management using the Short Message function.

It allows the task administrator using the Dispatch Console to monitor the progress of a task by issuing work instructions to the transceiver users and having the transceiver users reply with a response message.

Table 9-1 Task Request Specifications

Item	Description
No. of Saved Items	Up to 100
Mode	Task Request Confirmation Mode
Ways to Enter the Mode	PF button • Task Request Confirmation Menu button • Execute "Task Request Confirmation" from Menu Mode
Way to Respond to Task Request	Select from the Response List
No. of Characters	A maximum of 290 characters

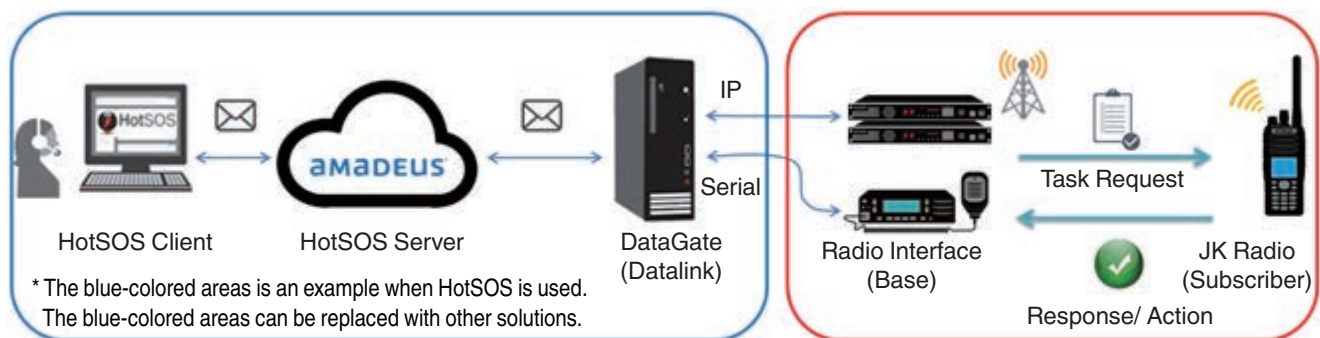


Figure 9-1 System Configuration Example for Task Request

Transceiver behavior

● State before Entering Task Request Confirmation Mode

To save the Task Request data, the following settings need to be configured on the transceiver.

Table 9-2 Settings for Saving Task Request Data

Transceiver	Configuration	Description
Subscriber	Task Request Receivable	Enabling this option allows saving or viewing of or reply to the Task Request messages.
	Message Deletable	Enabling this option allows a Task Request to be deleted in the Task Request Confirmation Mode.
	Response/ Category	A Response can be selected from below or a response text not longer than 14 characters can be registered. • No.1 Start/ Started (this is the default display and is changeable) • No.2 Stop/ Stopped (this is the default display and is changeable) • No.3 Complete/ Completed (this is the default display and is changeable) • No.4 to No.16: Blank (text can be registered manually)
	PF button	Refer to Table 9-1
Base	Short Message Serial Output	The reply message received from the subscriber is serially output as a Short Message command.
	COM portData or Data + GPS Data Output Data + Location Data Output	Allows a Task Request to be sent using a Short Message PC command.

The display in the LCD varies depending on whether there is saved Task Request data.

- When there are saved data and unread messages: “” appears blinking
- When there is saved data but no unread messages: “” lights up



The status of the transceiver changes as follows depending on whether there is saved Task Request data.

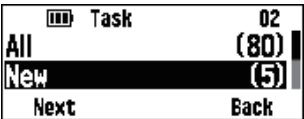
Table 9-3 Transceiver Status

Task Request	Tone	Display	Status
Saved data present	Button Beep A (1 beep)	“  ”	Task Request Confirmation Mode
No saved data	Button-entry Error Tone (1 beep)	Displays “Empty” for 1 second	Returns to operation display

Operating the Transceiver (Subscriber)

- Below are the steps for entering the Task Request Confirmation Mode to display the Task Request list.

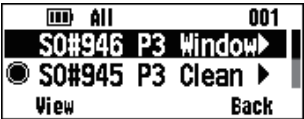
1 Press the **Task** button or **Menu** () button to enter the Task Confirmation Mode.



2 Press the **[▲]** button or **[▼]** button and select Category.

Below is an example of the display by Category.

- All: All Task Requests
 - New: Unread Task Request messages
- (The above are a part of the displayed information)



Note

- Unread messages are indicated by the “” icon.
- The “All” and “New” categories are items that exist at all times regardless of the FPU settings. Other items will vary in name and quantity according to the FPU settings.

Behavior of the Transceiver (Subscriber)

- Below are the steps for receiving and displaying a Task Request Message.

1 Message receiving starts.



2 Message receiving is complete.

Saves the Task Request if **Task Request Receivable** is enabled.

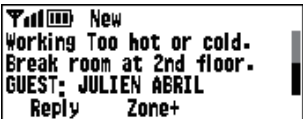
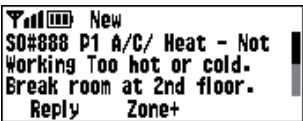


If ACK cannot be sent out successfully, an “Ack Error” message is displayed for 1 second, after which data receiving ends.



3 Displays the Task Request details.

The first 3 lines of the message are displayed for 3 seconds, followed by scrolling down line by line every 2 seconds. After the last line is shown, the display returns to the beginning of the message and scrolling repeats.



Note

- If **Alert Tone(Task Request)** is enabled, an Alert Tone is emitted from the transceiver.

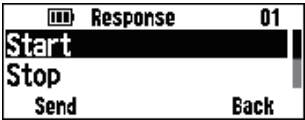
Operating the Transceiver (Subscriber)

- Below are the steps for responding to a Task Request.

1

In the Task Request View display, press the **Menu** ([]) button or [*****] button.

A Task Request Response selection screen appears.



2

On the Response selection screen, press one of the **PTT** switch, **Menu** ([]) button, or [*****] button.

The transceiver displays “Send Data” and starts sending the Response to the Caller ID. If TX LED is enabled, the LED lights up in red color during the transmission process.

When ACK is received, the transceiver emits the Complete Tone and displays “Complete” for 1 second. After the display disappears, the transceiver returns to the channel display screen.



Transceiver Behavior (Base)

- Below are the steps for sending a Task Request Message.

1

Message sending starts.

After receiving a PC command, sending of a Task Request to the subscriber starts.



2

Sending is complete.

When ACK is received, “Complete” appears for 1 sec, and sending is complete. After sending is complete, the transceiver returns to the channel display.



If ACK cannot be received, “No Reply” appears for 1 second, after which transmission of the Task Request ends.



If a Task Request cannot be sent due to the Busy state, “Busy” appears for 1 second, after which transmission of the Task Request ends.



● Below are the steps for receiving a response to the Task Request Message.

1 Message receiving starts.

“Receive Data” is displayed while a response to a Task Request is being received. If Busy LED is configured, the LED lights up in green color.



After data receiving is complete, the transceiver sends an ACK.



2 Receiving is complete.

When sending of ACK is complete, “Complete” appears for 1 sec and receiving is complete. After receiving is complete, the transceiver returns to the channel display.



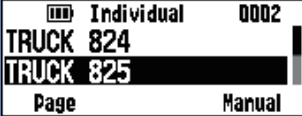
Note

- If a new Task Request is received when there are 100 saved Task Requests, the stored messages will be deleted starting from the oldest data and the new message will be saved.
- The saved Task Request messages can be deleted in the following ways.
 - Deleting by selecting one or all Task Request messages from the Task Request Confirmation Mode (deletion by the user)
 - Receiving a message to delete Task Requests (deletion by Air)
- As Task Request is a function that makes use of Short Message, the following items will behave according to their settings even when the Task Request function is in use.
 - Short Message on Data System-personality
 - Short Message on Data Zone-Channel
- To send a Task Request message which exceeds 100 characters (including the Message ID) from the base in an NXDN system, **Extended Short Message** needs to be enabled for the base and subscriber by using the FPU.

Configuration using KPG-D3/ D3N

- Saving the **Task Request** (See Radio Configuration > Global Options > Basics > Task Request)
- Deleting the **Task Request** (See Radio Configuration > Global Options > Basics > Task Request)
- Responding to the **Task Request** (See Radio Configuration > Global Options > Basics > Task Request > No. 1~16)
- Selecting the Category of the **Task Request** (See Radio Configuration > Global Options > Basics > Task Request > No. 1~16)
- Configuring **Alert Tone (Task Request)** (See Radio Configuration > Protocol Options > NXDN > General > Conventional > Alert Tone/ LED > Task Request)
- Configuring **Alert Tone (Task Request)** (See Radio Configuration > Protocol Options > NXDN > General > Trunking > Alert Tone/ LED > Task Request)

Button operations for selecting a list or entering characters are described for each mode in this section. Refer to Common Function Part “[Operating the Transceiver in Each Mode \(Common Operation\)](#)” for instruction.

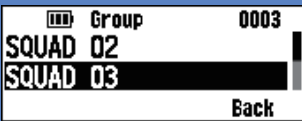
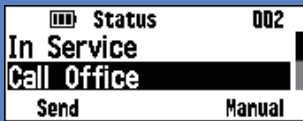
Button		Individual Call Mode	
		Selecting a list	Manual entry
			
Menu ([)* ¹	Press	Initiates a Paging Call after aborting the current mode.	Initiates a Paging Call after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)
	Hold	Migrates to Status Mode or Short Message Mode.	Migrates to Status Mode or Short Message Mode (after finalizing the Digit No.).
Back ([)* ¹	Press	Migrates to the code entry mode (only if Manual Dialing is enabled).	Deletes one character (While entering or after confirming the Digit No.). Migrates to the list selection mode (before entering the Digit No.).
	Hold Down	-	Deletes all characters (While entering or after confirming the Digit No.).
Function ([)* ²	Press	The configured function functions.	The configured function functions.
Home ([)* ¹	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the Menu button).
Side 1* ³	Press	The configured function functions.	
Side 2* ³	Press	The configured function functions.	
[]/[ 1	Press	Selects Unit IDs registered in the Individual ID List one at a time.	Selects Digit No. one at a time.
	Hold Down	Selects Unit IDs registered in the Individual ID List continuously.	Selects Digit No. continuously.
[ * ¹	Press	-	
[ * ¹	Press	Migrates to Status Mode or Short Message Mode.	
Selector* ³	-	The configured function functions after aborting the current mode.	
[0] to [9]* ⁴	Press	Directly selects a Unit ID registered in the list.	Enters the Digit No.
[*]* ⁴	Press	Initiates a Paging Call after aborting the current mode.	Initiates a Paging Call after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)
	Hold	Migrates to Status Mode or Short Message Mode.	Migrates to Status Mode or Short Message Mode (after finalizing the Digit No.).
[#]* ⁴	Press	Migrates to the code entry mode (only if Manual Dialing is enabled).	Deletes one character (While entering or after confirming the Digit No.). Migrates to the list selection mode (before entering the Digit No.).
	Hold Down	-	Deletes all characters (While entering or after confirming the Digit No.).
PTT Switch	Press	Transmits after aborting the current mode.	

*¹ Portable (Full Key Model/ Standard Key Model)/ Mobile only

*² Portable (Full Key Model/ Standard Key Model) only

*³ Portable only

*⁴ Portable (Full Key Model)/ Mobile only

Button		Group Call Mode (NXDN Conventional)	Status Mode
		Selecting a list 	Selecting a list 
Menu ([) ^{*1}	Press	-	Transmits the status after aborting the current mode.
	Hold	Migrates to Status Mode or Short Message Mode.	-
Back ([) ^{*1}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Migrates to the status entry mode (only if Manual Dialing is enabled).
	Hold Down	-	-
Function ([) ^{*2}	Press	The configured function functions.	
Home ([) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
Side 2 ^{*3}	Press	The configured function functions.	
[]/[ *1	Press	Selects Group IDs registered in the Group ID List one at a time.	Selects statuses registered in the Status ID List one at a time.
	Hold Down	Selects Group IDs registered in the Group ID List continuously.	Selects statuses registered in the Status ID List continuously.
[ *1	Press	-	Migrates to Individual Call Mode or Group Call Mode.
[ *1	Press	Migrates to Status Mode or Short Message Mode.	-
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Directly selects a Group ID registered in the list.	Directly selects a status registered in the list.
[*] ^{*4}	Press	-	Transmits the status after aborting the current mode.
	Hold	Migrates to Status Mode or Short Message Mode.	-
[#] ^{*4}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Migrates to the status entry mode (only if Manual Dialing is enabled).
PTT Switch	Press	Transmits after aborting the current mode.	Transmits the status after aborting the current mode.

^{*1} Portable (Full Key Model/ Standard Key Model)/ Mobile only

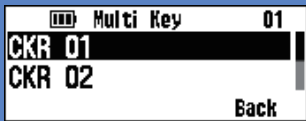
^{*2} Portable (Full Key Model/ Standard Key Model) only

^{*3} Portable only

^{*4} Portable (Full Key Model)/ Mobile only

Button		Status Mode	Short Message Mode
		Manual entry 	Manual entry 
Menu ([)* ¹	Press	Transmits the status after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)	Sends the message after aborting the current mode (after finalizing the characters). Finalizes the characters. (While the characters are flashing)
Back ([)* ¹	Press	Deletes one character (While entering or after confirming the Digit No.). Migrates to the list selection mode (before entering the Digit No.).	Deletes one character (While entering or after confirming the character). Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the Menu button).
	Hold Down	Deletes all characters (While entering or after confirming the character).	
Function ([)* ²	Press	The configured function functions.	
Home ([)* ¹	Press	Aborts the current mode.	
	Hold Down	Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the Menu button).	
Side 1* ³	Press	The configured function functions.	
Side 2* ³	Press	The configured function functions.	
[]/[ * ¹	Press	Selects Digit No. one at a time.	If “Characters” is configured in Up/Down: Selects characters one at a time. If “Line Up/Down” is configured in Up/Down: Shifts the cursor up and down.
	Hold Down	Selects Digit No. continuously.	If “Characters” is configured in Up/Down: Selects characters continuously. If “Line Up/Down” is configured in Up/Down: Shifts the cursor up and down continuously.
[ * ¹	Press	Migrates to Individual Call Mode or Group Call Mode.	Shifts the cursor to the left. Migrates to Individual Call Mode or Group Call Mode if no character is entered.
	Hold Down	-	Shifts the cursor to the left continuously.
[ * ¹	Press	-	Shifts the cursor to the right.
	Hold Down	-	Shifts the cursor to the right continuously.
Selector* ³	-	The configured function functions after aborting the current mode.	
[0] to [9]* ⁴	Press	Enters the Digit No.	Enters characters.
[*]* ⁴	Press	Transmits the status after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)	Switches character types (upper case/lower case/figure) (after finalizing the characters). Finalizes the characters. (While the characters are flashing)
[#]* ⁴	Press	Deletes one character (While entering or after confirming the Digit No.). Migrates to the list selection mode (before entering the Digit No.).	Deletes one character (While entering or after confirming the character). Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the Menu button).
	Hold Down	Deletes all characters (While entering or after confirming the character).	
PTT Switch	Press	Transmits the status after aborting the current mode.	Sends the message after aborting the current mode.

*¹ Portable (Full Key Model/ Standard Key Model)/ Mobile only*² Portable (Full Key Model/ Standard Key Model) only*³ Portable only*⁴ Portable (Full Key Model)/ Mobile only

Button		Site Select Mode (NXDN Trunking)	Scrambler/Encryption Code Mode
			
Menu ([M]) ^{*1}	Press	Confirms the configuration and then aborts the current mode.	Confirms the configuration and then aborts the current mode. (If Key is selected) Restores the presets and then aborts the current mode. (If Preset is selected)
Back ([←]) ^{*1}	Press	Migrates to the site number entry mode.	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
Function ([F]) ^{*2}	Press	The configured function functions.	
Home ([H]) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
Side 2 ^{*3}	Press	The configured function functions.	
[▲]/[▼] ^{*1}	Press	Selects sites registered in the system one at a time.	Selects a Multi-key configured in Multi-key List one at a time.
	Hold Down	Selects sites registered in the system continuously.	Selects Multi-keys configured in Multi-key List continuously.
[◀]/[▶] ^{*1}	Press	-	
	Hold Down	-	
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Directly selects a site registered in the list.	Directly selects a Multi-key registered in the list.
[*] ^{*4}	Press	Confirms the configuration and then aborts the current mode.	-
[#] ^{*4}	Press	Migrates to the site number entry mode.	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
PTT Switch	Press	Transmits after aborting the current mode.	

^{*1} Portable (Full Key Model/ Standard Key Model)/ Mobile only

^{*2} Portable (Full Key Model/ Standard Key Model) only

^{*3} Portable only

^{*4} Portable (Full Key Model)/ Mobile only

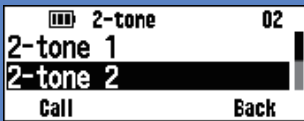
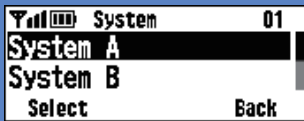
Button		Scan Program Mode	Priority-channel	Priority-channel Select Mode
Menu ([]) ^{*1}	Press	Confirms addition or deletion.	Confirms the configuration and then restores the Scan List edit screen.	Confirms the configuration and then aborts the current mode.
Back ([]) ^{*1}	Press	The transceiver enters the Priority Channel edit screen.	Restores the Scan List edit screen.	-
Function ([]) ^{*2}	Press	The configured function functions.		
Home ([]) ^{*1}	Press	Aborts the current mode.		
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).		
Side 1 ^{*3}	Press	The configured function functions.		
Side 2 ^{*3}	Press	The configured function functions.		
[]/[] ^{*1}	Press	Selects channels one at a time.	Selects configuration items one at a time.	
	Hold Down	Selects channels continuously.	Selects configuration items continuously.	
[]/[] ^{*1}	Press	Selects zones one at a time.	-	
	Hold Down	Selects zones continuously.	-	
Selector ^{*3}	-	The configured function functions after aborting the current mode.		
[0] to [9] ^{*4}	Press	-	Selects a configuration item from the list.	
[*] ^{*4}	Press	Confirms addition or deletion.	Confirms the configuration and then restores the Scan List edit screen.	Confirms the configuration and then aborts the current mode.
[#] ^{*4}	Press	The transceiver enters the Priority Channel edit screen.	Restores the Scan List edit screen.	-
PTT Switch	Press	-		Transmits after aborting the current mode.

*1 Portable (Full Key Model/ Standard Key Model)/ Mobile only

*2 Portable (Full Key Model/ Standard Key Model) only

*3 Portable only

*4 Portable (Full Key Model)/ Mobile only

Button		2-tone Mode	System Select Mode
			
Menu ([M]) ^{*1}	Press	Transmits after aborting the current mode.	Confirms the configuration and then aborts the current mode.
Back ([B]) ^{*1}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Function ([F]) ^{*2}	Press	The configured function functions.	
Home ([H]) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
Side 2 ^{*3}	Press	The configured function functions.	
[▲]/[▼] ^{*1}	Press	Selects a 2-tone code one at a time.	Selects a system one at a time.
	Hold Down	Selects a 2-tone code continuously.	Selects systems continuously.
[◀]/[▶] ^{*1}	Press	-	
	Hold Down	-	
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Directly selects a 2-tone code registered in the list.	Directly selects a system registered in the list.
[*] ^{*4}	Press	Transmits after aborting the current mode.	-
[#] ^{*4}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
PTT Switch	Press	Transmits after aborting the current mode.	

^{*1} Portable (Full Key Model/ Standard Key Model)/ Mobile only

^{*2} Portable (Full Key Model/ Standard Key Model) only

^{*3} Portable only

^{*4} Portable (Full Key Model)/ Mobile only

● Control Tone

Tone Name	Pattern	Reference
Button Beep A	1 beep  1630 Hz (50 ms)	Individual Call Acknowledge Request Lone Worker Activity Detection Single Scan List Scan Scan Program Priority Scan
Button Beep B	2 beeps  1630 Hz (50 ms)	Lone Worker Activity Detection Single Scan List Scan Priority Scan
Button Beep C	3 beeps  1630 Hz (50 ms)	Priority Scan
Button-entry Error Tone	1 beep  700 Hz (50 ms)	Regroup ID Scan Delete/Add Send the Location Data (Indoor Location)
Priority-channel Tone	1 beep  2000 Hz (50 ms)	Priority Scan Priority-channel Stop Tone
Scan Stop Tone	2 beeps  700 Hz (50 ms)	Channel Recall Scan Stop Tone
Search Mode Tone	1 beep  770 Hz (400 ms)	Control Channel Hunt
Out of Range Tone	1 beep  770 Hz (400 ms)	Out of Range Indicator
In-service Tone	3 beeps  770 Hz (50 ms)	Out of Range Indicator

Tone Name	Pattern	Reference
Call Request Tone	1 beep  1630 Hz (50 ms)	Individual Call Acknowledge Request Call Request Tone (NXDN Conventional) Individual Call (Transmission Trunked) Call Request Tone (NXDN Trunking) Individual Call (Message Trunked (Enhanced)) Group Call (Transmission Trunked) Group Call (Message Trunked (Enhanced)) Broadcast Group Call
Call In Progress Tone	2 beeps  980 Hz (100 ms)	Individual Call Acknowledge Request Individual Call (Message Trunked (Enhanced)) Group Call (Message Trunked (Enhanced))
Disconnect Indication Tone	2 beeps  980 Hz (300 ms) 490 Hz (300 ms)	Individual Call (Message Trunked (Enhanced)) Group Call (Message Trunked (Enhanced))
Complete Tone	5 beeps  980 Hz (20 ms)	Send the Location Data (Indoor Location)

● Warning Tone

Tone Name	Pattern	Reference
Warning Tone A	continuous beep  700 Hz (until the PTT switch is released)	Busy Channel Lockout Individual Call Acknowledge Request Individual Call (Message Trunked (Enhanced)) PTT Hold Inhibit
TOT Pre-alert Tone	3 beeps  1630 Hz (50 ms)	Time-out Timer (NXDN Conventional) Time-out Timer (NXDN Trunking)
Busy Tone 2	3 beeps  940 Hz (150 ms)	Individual Call (Transmission Trunked) Transparent Send the Location Data (Indoor Location)
Call Queue Tone	2 beeps  940 Hz (50 ms)	Individual Call (Transmission Trunked)
System Busy Tone	3 beeps  440 Hz (200 ms)	Individual Call (Transmission Trunked)

Tone Name	Pattern	Reference
Call Invalid Tone	4 beeps  440 Hz (1 sec) 440 Hz (50 ms)	Individual Call (Transmission Trunked)
No Reply Tone	4 beeps  440 Hz (50 ms) 440 Hz (1 sec)	Individual Call (Transmission Trunked)
Call Fail Tone	2 beeps  440 Hz (50 ms) 440 Hz (1 sec)	Individual Call (Transmission Trunked)
Call Deny Tone	3 beeps  440 Hz (200 ms) 440 Hz (80 ms) 440 Hz (900 ms)	Individual Call Acknowledge Request
Lone Worker Tone	2 beeps  1630 Hz (150 ms) 940 Hz (150 ms)	Lone Worker
Group-registration Invalid Tone	2 beeps  440 Hz (50 ms)	Group-registration
Call Processing Tone	2 beeps  940 Hz (50 ms)	Individual Call Acknowledge Request Call Processing Tone (NXDN Conventional) Individual Call (Transmission Trunked) Call Processing Tone (NXDN Trunking) Individual Call (Message Trunked (Enhanced)) Group Call (Transmission Trunked) Group Call (Message Trunked (Enhanced)) Broadcast Group Call

Tone Name	Pattern	Reference
Network Failure Tone A	2 beeps  620 Hz 930 Hz (100 ms)(100 ms)	Network Failure
Network Failure Tone B	1 beep  1630 Hz (1 sec)	Network Failure
Man-down Pre-alert Tone	1 beep  1630 Hz (50 ms)	Man-down Detection
Stationary Pre-alert Tone	1 beep  770 Hz (50 ms)	Stationary Detection
Motion Pre-alert Tone	1 beep  1210 Hz (50 ms)	Motion Detection
Key Fail Alert Tone	6 beeps  940 Hz (100 ms)	Zeroize

● Locator Tone

Tone Name	Pattern	Reference
Emergency Locator Tone	2 beeps  1630 Hz 940 Hz (90 ms) (90 ms)	Emergency Mode

● Sidetone

Tone Name	Pattern	Reference
Proceed Tone	3 beeps  1000 Hz (20 ms)	Individual Call Individual Call Acknowledge Request Group Call Individual Call (Transmission Trunked) Call Request Tone/ Call Processing Tone Individual Call (Message Trunked (Enhanced)) Group Call (Transmission Trunked) Group Call (Message Trunked (Enhanced)) Broadcast Group Call

● Alert Tone

Tone Name	Pattern	Reference
Unencrypted Call Alert Tone	1 beep  1477 Hz (50 ms)	Unencrypted Call Alert Tone

● Transmit Tone

Tone Name	Pattern	Reference
PTT Release Tone	1 beep  1397 Hz (100 ms)	Individual Call
Background Tone	1 beep  1630 Hz (50 ms)	Background Tone Transmission

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DMR is a generic name for a digital communication system protocol utilizing 4-level FSK. Using DMR, the transceiver can initiate an individual call or group call for voice calls, text data communications or GPS data communications. Also, connecting a transceiver to an external device (such as a PC) allows communication because the transceiver supports serial command communication.

In a DMR Conventional system, digital signals can be transmitted and received on a DMR digital channel. Using a DMR ID (Unit ID or Group ID) allows the various communications.

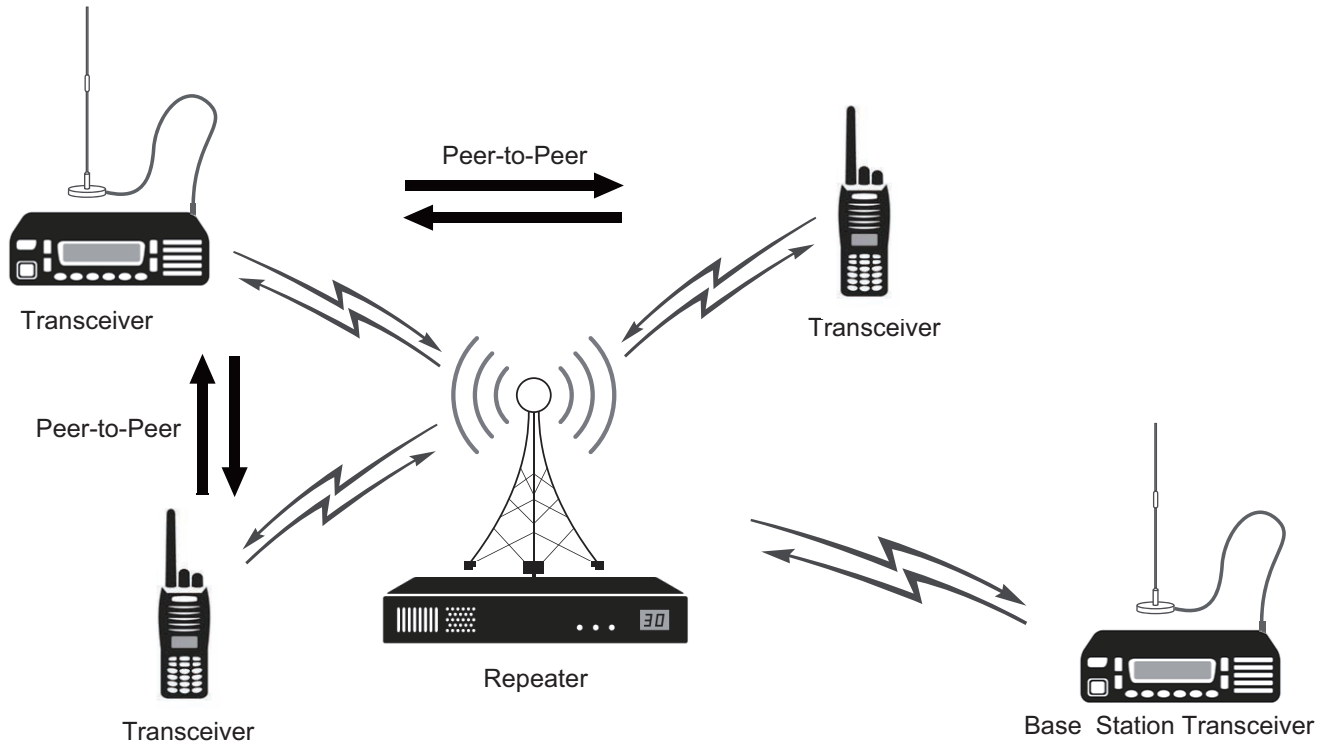


Figure 2-1 Image of Communications in a DMR Conventional System

Transceivers can communicate directly between transceivers without using a repeater. (Refer to [Communicating Without Using a Repeater \(Talk Around/ DMR Direct Mode\)](#).)

Or, the transceiver can communicate with another transceiver via a repeater. (Refer to [Communicating via a Repeater \(Repeater Mode\)](#).)

2.1 Initiating Voice Communications (Basic Transmission and Reception)

This section describes the basic methods for transmission and reception in a DMR Conventional system and the relevant functions.

About Own ID

To initiate various communications by using DMR, **Unit ID**, the identification code of a transceiver, needs to be configured for the transceiver.

A Unit ID can be configured in the range between 000001 and FFFCDF (hexadecimal), or between 1 and 16776415 (decimal).

If **Global ID** is enabled, a Unit ID is shared by all DMR Conventional.

If **Global ID** is disabled, a Unit ID needs to be configured for each DMR Conventional.

Also, a name specific to the transceiver can be configured for **Unit ID (Own)**.

Configuration using KPG-D3/ D3N

- Configuring **Unit ID** and **Unit ID Name**
- Configuring **Global ID** to be enabled or disabled

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > General > ID (Own))

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > General > ID (Own))

About Communication Security (Encryption)

The transceiver is equipped with the Encryption function (bit scramble encryption type, AES/ DES encryption type, and Enhanced Encryption type) which can enhance the confidentiality of communications by encrypting communication data when making various communications on a DMR digital channel. (Refer to [USING COMMUNICATION SECURITY](#).)

Receiving

Received audio sounds from the speaker if the transceiver receives digital signals, and the frequency matches the frequency of the channel on which the transceiver waits, or the DMR ID or Color Code matches the DMR ID or Color Code preconfigured for the transceiver.

Auto Reset Timer

Auto Reset Timer is the amount of time from when the received Unit ID or Group ID matches the Unit ID or Group ID preconfigured for the transceiver until the LCD, blinking of LED and emission of Alert Tone will automatically be reset.

By using KPG-D3/ D3N, **Auto Reset Timer** can be configured. Also, how the transceiver behaves after the length of time configured in **Auto Reset Timer** elapses can be configured.

Respective **Auto Reset Timer** can be configured for each voice communication (Voice) and data communication (Message).

Table 2-1 Auto Reset Timer

Configuration		Description
Auto Reset Timer (Voice or Message)	Off	Auto Reset Timer will not be activated.
	0 sec to 300 sec	After the configured time elapses, the matching state of the Unit ID or Group ID is automatically reset.
LED (Voice only)		If this function is enabled, the flashing LED for the Selective Call Alert LED turns off when the length of time configured in Auto Reset Timer elapses.
Alert Tone (Voice or Message)		If this function is enabled, the intermittently emitted Alert Tone stops when the length of time configured in Auto Reset Timer elapses.
LCD (Voice or Message)		While this function is enabled, the display will change from one of the following displays to the previous channel display if the amount of time configured for Auto Reset Timer elapses. • ID display after receiving an Individual Call or Group Call • Status Message display after receiving a Status Message • Short Message display after receiving a Short Message

Configuration using KPG-D3/ D3N

- Configuring **Auto Reset Timer** (Voice) ( See Radio Configuration > Protocol Options > DMR > General > RX Options > Auto Reset > Voice)
- Configuring **Auto Reset Timer** (Message) ( See Radio Configuration > Protocol Options > DMR > General > RX Options > Auto Reset > Message)

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a call using a DMR ID. A user can notice by the LED that the transceiver is receiving a call.

One of the 7 colors can be used to make the LED flash, and the flashing color can be configured for each type of call.

- Yellow
- Purple
- Blue
- Light Blue
- Red
- Green
- White

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** ( See Radio Configuration > Protocol Options > DMR > Alert Tone/LED > Conventional)
- Configuring **LED Color** ( See Radio Configuration > Protocol Options > DMR > Alert Tone/LED > Conventional > Alert Tone/LED Individually Settings)

Optional Signaling LED

Optional Signaling LED is the function to make the LED flash yellow when the Optional Signaling matches.

A user can notice by the LED that the transceiver is receiving a call.

If the matching state of Optional Signaling is disabled when the buttons on the transceiver are pressed, or when the time configured in **Auto Reset Timer** elapses, the LED is turned off.

However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration in **Selective Call Alert LED** even if **Optional Signaling LED** is enabled.

Configuration using KPG-D3/ D3N

Configuring **Optional Signaling LED** to be enabled or disabled ( Radio Configuration > Protocol Options > DMR > Alert Tone/LED > Conventional)

Over-the-Air Alias

Over-the-Air Alias allows the receiving transceiver to display the ID Name of the transmitting transceiver when receiving a call even if the ID Name of the transmitting transceiver is not configured for the receiving transceiver.

Using this function, Unit ID Name of the added unit does not need to be configured such as when a unit is added to the system in service.

The transmitting transceiver sends Unit ID Name when making voice calls. If the receiving transceiver receives a call such as an Individual Call, the Unit ID Name stored in the reception frame will appear on the display.

The transmitting transceiver converts the Unit ID Name to the data for transmission in the transceiver as follows according to the characters entered for Unit ID Name and according to the character code of Language 1 configured in FPU, and then sends the data:

- ASCII characters only
7-bit
- When those other than ASCII characters are included and the Language 1 character code is ISO 8859-1
ISO 8-bit
- When those other than ASCII characters are included and Language 1 uses a character code other than ISO 8859-1
UTF-16BE

Table 2-2 Language Configuration of Language 1 and Character Code

Language Configuration of Language 1	Character Code to Display
English, Spanish (Spain), Spanish (Latin America), German, Dutch, Italian, Portuguese (Brazil)	ISO 8859-1
Russian	ISO 8859-5
French	ISO 8859-15

Note

- If **Over-the-Air Alias** is enabled, the transceiver does not execute the **Call Interruption** reception behavior.
- The received Unit ID Name appears after displaying differently from the received Unit ID Name in the following cases:
 - The Unit ID of the transmitting transceiver is not configured in the Individual ID List.
 - The Unit ID of the transmitting transceiver is not stored as Caller ID.
 - The received Unit ID Name is different from the ID Name configured in the Individual ID List or the ID Name stored in the transceiver.
- When Lookback is being executed during Priority Scan, Unit ID Name may not be displayed depending on the configuration in Lookback Time.
- If **Caller ID Stack** is enabled, received Unit ID Name also is stored in the transceiver stack memory. The stored Unit ID Name is also reflected to ID Name with Individual ID List selected.
- The Unit ID Name (Own) configured for the current system is used for the Unit ID Name to be transmitted.
- The following is the time required for receiving signals to receive and display the text string of **Over-the-Air Alias**: The received text string does not appear if the communication time is shorter than the time listed below. Also, if the transceiver participates in an on-going call by Late Entry, or if the transmitting transceiver sends the GPS data, it may take longer to display a text string depending on the signal strength.

Table 2-3 Date Format and Time Needed for Over-the-Air Alias Reception

Date Format	Approximately 1 sec	Approximately 2 sec	Approximately 2.5 sec	Approximately 3 sec
7-bit	7 characters	14 characters	23 characters	31 characters
ISO 8-bit	6 characters	13 characters	20 characters	27 characters
UTF-16BE	3 characters	6 characters	10 characters	13 characters

Configuration using KPG-D3/ D3N

- Configuring **Over-the-Air Alias** to be enabled or disabled
 ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > TX Options)
 ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > TX Options)
- Configuring **Unit ID Name (Own)** ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > General > ID (Own))

Participating in an On-going Voice Call Midway Through the Call (Late Entry)

The transceiver can participate in an on-going voice call even if the transceiver receives this call midway through.

The transceiver in a DMR Conventional system can participate in an on-going voice call by decoding control data always sent along with audio data, even if the transceiver receives a voice call midway through the call.

Searching Whether the Transceiver Receives a Call (Scan)

Using the Scan function, the transceiver can check each channel in turn whether the channel has a signal. If a channel has a signal, the transceiver receives the signal on the channel.

The following scan functions can be used in a DMR Conventional system.

- Single Scan
- List Scan
- Multi-Zone Scan

Refer to “[USING SCAN](#)” for details of Scan.

Transmitting

Transmitting can be initiated by pressing the **PTT** switch, or by selecting a DMR ID and then pressing the **PTT** switch. When a signaling (Color Code) is used, the transceiver sends the Color Code. In this case, if the transmitted Color Code matches the Color Code preconfigured for the receiving transceiver, the transceivers can communicate.

Restricting the Continuous Transmission Duration (Time-out Timer)

Time-out Timer (TOT) is the function to restrict the duration for the transceiver to continuously transmit.

This function is used to prevent a user from occupying a repeater or frequency which is shared with other users. The transceiver automatically stops transmitting and releases the channel if it continuously transmits longer than the configured time.

Time-out Timer can be configured for each system. Also, timers, such as **TOT Pre-alert**, **TOT Rekey Time**, and **TOT Reset Time**, relevant to **Time-out Timer** can be configured.

TOT Pre-alert

TOT Pre-alert is the function to notify a user that a continuous transmission is about to end by the **Time-out Timer**. A TOT Pre-alert Tone (3 beeps) sounds from the transceiver before the transceiver stops the continuous transmission by the **Time-out Timer**.

Example: Time-out Timer: 30 sec, TOT Pre-alert: 4 sec

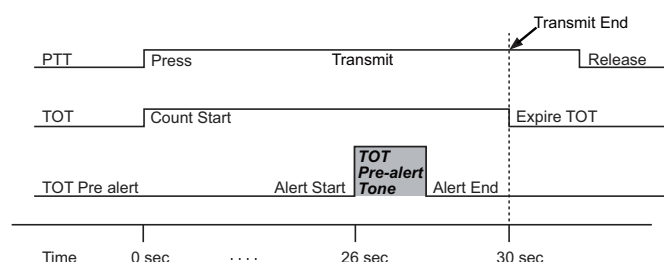


Figure 2-2 TOT Pre-alert

Note

- If "Off" is configured for **TOT Pre-alert**, no TOT Pre-alert tone sounds from the transceiver.

TOT Rekey Time

TOT Rekey Time is the amount of time from when the transceiver stops the transmission by the **Time-out Timer** until transmission becomes possible again.

Example: Time-out Timer: 30 sec, TOT Rekey Time: 20 sec

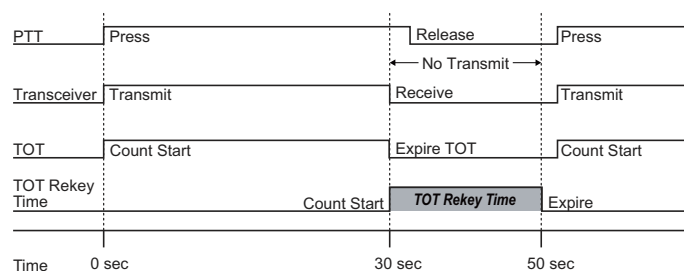


Figure 2-3 TOT Rekey Time

Note

- If "Off" is configured for **TOT Rekey Time**, the transceiver will immediately be ready to transmit.
- The timer will be reset and transmission becomes possible if the zone or channel is changed while the **TOT Rekey Time** is counting down.
- TOT Rekey Time** will not be reset if **Revert Channel** is not changed during the scan.

TOT Reset Time

TOT Reset Time is the time required to initialize and reset the elapsed time for **Time-out Timer**.

Example 1: Time-out Timer: 30 sec, TOT Reset Time: 10 sec

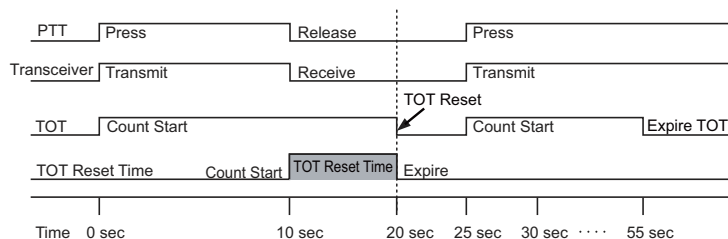


Figure 2-4 TOT Reset Time 1

The transceiver considers a retransmission within this configured length of time as a continuous transmission. In the following example, the counting of **Time-out Timer** continues because the transmission was started by a user pressing the **PTT** switch while the **TOT Reset Time** was counting down.

Example 2: Time-out Timer: 30 sec, TOT Reset Time: 10 sec

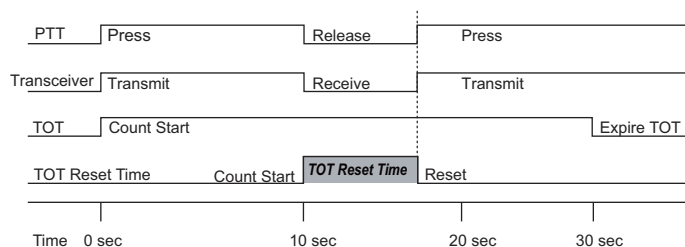


Figure 2-5 TOT Reset Time 2

Note

- If "Off" is configured for **TOT Reset Time**, the **Time-out Timer** will be reset immediately after the transceiver finishes transmitting.
- The timer will be reset if the zone or channel is changed while the **TOT Rekey Time** is counting down.
- **TOT Reset Time** will not be reset if **Revert Channel** is not changed during the scan.

Configuration using KPG-D3/ D3N

Configuring various functions of **Time-out Timer**

([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > General > MDC-1200 > Other Options > TX > Time-out Timer)

([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > General > FleetSync > Other Options > TX > Time-out Timer)

([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > General > 5-tone > Other Options > TX > Time-out Timer)

([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > General > Other Options > TX > Time-out Timer)

Avoiding Interference with Other Communications (Busy Channel Lockout)

Busy Channel Lockout is the function to automatically restrict the transmission so as not to interfere with other communications.

If an attempt is made to transmit on a channel that is already being used by other groups, the transceiver automatically restricts the transmission.

If the **PTT** switch is pressed while **Busy Channel Lockout** is enabled, a Warning Tone A (continuous beep) sounds from the transceiver, and transmission is disabled. In this case, "Busy" appears on the display. The Warning Tone A sounds from the transceiver until the **PTT** switch is released.

The following are conditions to disable transmission by **Busy Channel Lockout**:

Table 2-4 Busy Channel Lockout

Configuration	Description
No	Busy Channel Lockout is disabled. Transmission is not restricted even if the channel on which the transceiver attempts to transmit is busy.
Carrier Only	The transceiver cannot transmit while the transceiver is receiving a carrier.
Correct CC	The transceiver cannot transmit if the transceiver receives a carrier and the received Color Code matches the Color Code preconfigured for the transceiver.

The transceiver is controlled in the following manner according to the configuration in **Transmit Mode** on a channel with "Mixed" configured in **Channel Type**.

- **If "Analog" is configured for Transmit Mode:**

The transceiver transmits according to the configuration in **Busy Channel Lockout** (Analog).

- **If "DMR" is configured for Transmit Mode:**

The transceiver transmits according to the configurations in **Busy Channel Lockout** (DMR) and **In-call Busy Channel Lockout**.

Also, while the **Signaling Reset Timer** or **Auto Reset Timer** is activated on a channel with "Mixed" configured in **Channel Type**, the transceiver transmits according to the configuration in **Busy Channel Lockout** in the same mode as that of the received signal (Analog or DMR). If the transceiver receives an analog signal, the transceiver transmits according to the configuration in **Busy Channel Lockout** (Analog). If the transceiver receives a DMR signal, the transceiver transmits according to the configuration in **Busy Channel Lockout** (DMR) and **In-call Busy Channel Lockout**.

In-call Busy Channel Lockout is configured when audio can be emitted for a received call.

The following are the conditions to transmit and receive by **In-call Busy Channel Lockout**:

Table 2-5 In-call Busy Channel Lockout

Configuration	Description
Allow TX	If the PTT switch is pressed during a call, transmission is not restricted regardless of the configuration in Busy Channel Lockout (DMR). However, if "Carrier Only" or "Correct CC" is configured in Busy Channel Lockout (DMR) and when the following occurs, Busy Channel Lockout functions: • When a call is started by a different type of call from the current incoming call • When a call is started with an ID that is different from the call ID used for the current incoming call
Follow BCL	If the PTT switch is pressed during a call, transmission is restricted according to the configuration in Busy Channel Lockout (DMR).
Interrupt CALL	The current incoming call can be interrupted by pressing the PTT switch to respond (Talkback) while the transceiver is receiving an Individual Call, Group Call, or Unaddressed Call to the own transceiver. (Refer to Terminating Voice Communications by a Transceiver Other Than the Transmitting Transceiver (Call Interruption) .)

Note

- **Busy Channel Lockout** does not function in Emergency Mode. However, if "Interrupt CALL" is configured in **In-call Busy Channel Lockout**, the transceiver behaves with "Interrupt CALL" configured in **In-call Busy Channel Lockout** and "No" configured in **Busy Channel Lockout** while the transceiver is in Emergency Mode.

Configuration using KPG-D3/ D3N

- Configuring **Busy Channel Lockout**
- Configuring **In-call Busy Channel Lockout**

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR)

( **See**) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR)

Using a Channel Being Used by Other Parties (BCL Override)

BCL Override is the function to transmit on a busy channel even if **Busy Channel Lockout** is activated and transmission is restricted.

Operating the transceiver

1 Press the **PTT** switch while transmission is restricted by **Busy Channel Lockout**.

2 Release the **PTT** switch, then press the **PTT** switch again within 500 ms.

Busy Channel Lockout is temporarily disabled, and the transceiver starts transmitting.

Note

- This function also works while the transceiver is transmitting using the VOX function. For a transmission using VOX, **Busy Channel Lockout** is temporarily disabled and the transceiver can transmit if audio is input within 500 ms after audio input terminates.

Configuration using KPG-D3/ D3N

Configuring **BCL Override** to be enabled or disabled

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > General > MDC-1200 > Other Options > TX)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > General > FleetSync > Other Options > TX)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > General > 5-tone > Other Options > TX)

( **See**) Radio Configuration > System Properties > Systems > DMR Site Roaming > General > Other Options > TX)

Communicating Without Using a Repeater (Talk Around/ DMR Direct Mode)

Talk Around

Talk Around is the function allowing direct communication between transceivers without using a repeater.

If the transceiver cannot link to a repeater due to too great distance between the transceiver and the repeater, the transceiver can directly communicate with the target transceiver by using **Talk Around**.

The transceiver with **Talk Around** enabled transmits on the receive frequency and the Color Code configured for the selected channel.

On a channel with **Talk Around Key** enabled, **Talk Around** can be toggled between enabled and disabled by operating the transceiver.

- Pressing the **Talk Around** button toggles **Talk Around** between enabled and disabled.
- Pressing the **Menu** button causes the transceiver to enter Menu Mode, and then **Talk Around** can be toggled between enabled and disabled by selecting "Talk Around". (Refer to Common Function Part [Using Menu Mode](#).)

Note

- For the 800 MHz/ 900 MHz model, the 800 MHz model, and the 900 MHz model, except in a DMR Site Roaming system, **Talk Around** cannot be toggled between enabled and disabled by operating the transceiver even on a channel with **Allow Talk Around** enabled.

Operating the transceiver

● Enabling the Talk Around

Press the **Talk Around** button while **Talk Around** is disabled.

The "📡" icon appears and **Talk Around** will be enabled.



● Disabling the Talk Around

Press the **Talk Around** button while **Talk Around** is enabled.

The "📡" icon disappears and **Talk Around** will be disabled.



Note

- **Talk Around** is disabled by changing the zone or channel while **Talk Around** is enabled.
- On a channel with **Talk Around** disabled, **Talk Around** cannot be toggled between enabled and disabled by operating the **Talk Around** button.
- If **Talk Around** is enabled by operating the **Talk Around** button, **Talk Around** becomes disabled when the transceiver enters Emergency Mode.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Talk Around** to be enabled or disabled
([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > General)
([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > General)

DMR Direct Mode

DMR Direct Mode is the function allowing direct communication between transceivers without using a repeater.

If the transmit frequency and receive frequency are the same configuration on a DMR digital channel, the channel can be used in DMR Direct Mode. Also, the channel can be used in DMR Direct Mode even if the **Talk Around** function is enabled.

Simultaneous Communications by Dual Slot Direct Mode

The DMR Direct Mode communication methods have the new version (ETSI TS 102 361-1 V2.2.1 2013-02 or later) and old version (earlier than ETSI TS 102 361-1 V2.2.1 2013-02).

Which version is used to communicate can be configured by configuring **Dual Slot Direct Mode** by using KPG-D3/ D3N.

Table 2-6 Dual Slot Direct Mode

Configuration	Description
Enabled	The transceiver communicates using the new version of DMR Direct Mode. In the new version of DMR Direct Mode, if the slot numbers are different, communications of 2 parties can be realized separately without receiving interference even on the channel with the same frequency configured.
Disabled	The transceiver communicates using the old version of DMR Direct Mode. In the old version of DMR Direct Mode, if the slot numbers are different, communications of 2 parties cannot be realized separately without receiving interference even on the channel with the same frequency configured.

Note

- Communication cannot be realized between the transceiver configured with the new version of DMR Direct Mode and the transceiver configured with the old version of DMR Direct Mode.

Configuration using KPG-D3/ D3N

Configuring **Dual Slot Direct Mode** to enabled or disabled

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR)

( **See**) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR)

Communicating via a Repeater (Repeater Mode)

Repeater Mode is the function to communicate with another transceiver via a repeater.

If the transmit frequency and receive frequency are different configurations on a DMR digital channel, the channel can be used in Repeater Mode.

In Repeater Mode, the transceiver can synchronize with a repeater if the transceiver receives a synchronization signal from the repeater.

If a synchronization signal from a repeater cannot be detected (when no synchronization signal is received, or the Color Code does not match), the transceiver sends a Wakeup Message to prompt synchronization. If the transceiver does not receive any response from the repeater after the lapse of a specific time interval, the transceiver resends the Wakeup Message.

The wait time from when a Wakeup Message is sent until a repeater transmits a synchronization signal (**Sync Wakeup Wait Time**) can be configured by using KPG-D3/ D3N. Also, the number of times a Wakeup Message is resent (**Number of Wakeup Message Retries**) can be configured.

Note

- If a response from a repeater cannot be detected after a Wakeup Message is sent for the number of times configured in **Number of Wakeup Message Retries**, a Call Fail Tone (2 beeps) sounds from the transceiver, and "Fail" appears on the display.
- If the **Talk Around** function is enabled, the transceiver does not behave in Repeater Mode, as the transceiver behaves in DMR Direct Mode even if the transmit frequency and receive frequency are different configurations.
- In data communications, if a synchronization signal from a repeater cannot be detected even if a Wakeup Message is resent, the Wakeup Message is resent for the number of times configured in **Number of Wakeup Message Retries**.
- If the transmit frequency and receive frequency are different configurations on a DMR digital channel, the channel can also be used in DMR Direct Mode. However, according to the configuration in **Talk Around**, either enabled or disabled, whether to transmit on the receive frequency (if enabled) or on the transmit frequency (if disabled) can be selected for Talkback.

Configuration using KPG-D3/ D3N

- Configuring **Sync Wakeup Wait Time**
- Configuring **Number of Wakeup Message Retries**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > DMR Parameters)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > DMR Parameters)

About the Slot Numbers (Slot Selection)

In DMR, the transceiver communicates using the predetermined slot according to the standard.

If communicating in Repeater Mode, the transceiver needs to communicate using the predetermined slot, as the information indicating slot 1 or slot 2 is in the synchronization signal transmitted from a repeater.

Also, for example in Repeater Mode, the signal being transmitted using slot 2 cannot be received when using slot 1, even if the receive frequencies are the same.

The slot number used for communication (1 or 2) or "Auto" can be configured by using KPG-D3/ D3N. If "Auto" is configured, the **Auto Slot Select** function is activated.

(Refer to [Auto Slot Select](#).)

Note

- **Slot Selection** functions only when Repeater Mode or **Dual Slot Direct Mode** is enabled.
- "Auto" needs to be configured in the **Slot Selection** configuration for use in a Repeater Voting system.

Configuration using KPG-D3/ D3N

Configuring **Slot Selection**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR)

Auto Slot Select

Auto Slot Select is a function that automatically selects a slot or switches the slot according to the communication status of the transceiver.

Using **Auto Slot Select** allows communication to be carried out by two lines at a single frequency.

Allowing transceivers to make use of vacant slots helps to reduce communication traffic and achieve communication with little delay.

To use this function, operation by the transceiver is not required, but “Auto” needs to be configured in **Slot Selection** by using KPG-D3/ D3N. (Refer to [About the Slot Numbers \(Slot Selection\)](#).)

Table 2-7 Slot Selection Configuration (Auto Slot Select)

Configuration	Description
Auto	Auto Slot Select is enabled.
1 or 2	Auto Slot Select is disabled. Communicates only with the selected slot number.

Note

- **Auto Slot Select** runs only in the Repeater Mode. It does not function in the Direct Mode. **Auto Slot Select** functions even when only the receive frequency is configured in the Repeater Mode.
- When **Talk Around** is enabled, communication is fixed at slot 1 and **Auto Slot Select** is disabled.
- **Auto Slot Select** also functions during an Emergency Mode.
- During Call Hangtime*¹ of the repeater, Auto Slot Select of the transceiver is disabled in the following cases:
 - To make a voice call and data transmission to the same ID during Call Hangtime after the transmission ends
 - To make a voice call and data transmission to the caller during Call Hangtime after the reception to the own transceiver ends

*¹ Call Hangtime is the duration to continue transmission to retain the communication state of the channel used by the repeater after the transceiver ends transmission of voice communication in Repeater Mode.

Configuration using KPG-D3/ D3N

Configuring Slot Selection

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR)

( See) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR)

2.2 Using the Signaling

Color Code is the signaling to be used for facilitating communication within a group if the same channel is shared by several groups.

Sharing the Same Channel (Frequency) by Several Groups (Color Code)

Color Code is a digital signaling type having the same function as analog QT tone or DQT code. This signaling is used when the transceiver transmits or receives on a digital channel.

The transceiver mutes calls from a zone having a restricted Color Code if a Color Code is configured for each channel. Therefore, a user can communicate in a group without listening to conversations from other groups.

The transceiver can distinguish the signaling even if the transceiver receives any signaling during a call since this signaling type has a continuous waveform.

The following is transmission and reception behavior of a Color Code:

Table 2-8 Transmission and Reception Behavior of a Color Code

Reception/ Transmission	Description
Reception	If the transceiver receives a signal and the received Color Code matches the Color Code preconfigured for the transceiver, the transceiver unmutes the speaker and emits the received audio from the speaker.
Transmission	The transceiver sends the preconfigured Color Code while transmitting. Pressing the PTT switch causes the transceiver to send the Color Code.

Note

- The transceiver transmits with the signaling of the received signal regardless of the configuration in **Transmit Mode** if within the amount of time configured in **Signaling Reset Timer** after the transceiver receives a signal on a channel with "Mixed" configured in **Channel Type**.

Configuration using KPG-D3/ D3N

Configuring **Color Code** (Individually)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR)

( See) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR)

2.3 Waiting for Both Digital Signals and Analog Signals (Mixed Mode)

Mixed Mode can be used to wait for a call in both digital and analog modes.

The channel used in analog mode can also be used in digital mode, hence the transceiver can easily migrate from analog mode to digital mode.

The following is the transceiver behavior for transmission and reception on a channel with “Mixed” configured in **Channel Type**:

Table 2-9 Mixed Mode 1

Reception/ Transmission	Description
Reception	Mixed Mode can be used to wait for a call in both digital (Color Code) and analog (QT tone and DQT code) modes. The transceiver unmutes the speaker if the received signaling (QT tone, DQT code or Color Code) matches the signaling preconfigured for the transceiver (QT tone, DQT code or Color Code).
Transmission	The transceiver transmits in the mode (Analog or DMR) configured in Transmit Mode. If the received signaling (QT tone, DQT code, or Color Code) matches the signaling preconfigured for the transceiver, the transceiver can transmit in the same mode as the mode of the received signal regardless of the configuration in Transmit Mode before the length of time configured in Signaling Reset Timer elapses (except if the transceiver is doing data communications). If the received FleetSync ID or DMR ID matches the FleetSync ID or DMR ID preconfigured for the transceiver, the transceiver can transmit in the same mode as the mode of the received signal regardless of the configuration in Transmit Mode before the length of time configured in Auto Reset Timer elapses. The transceiver can also transmit in the same mode as that of the received signal regardless of the configuration in Transmit Mode while doing data communications as well.

The following is the difference in operation for transmission depending on the transceiver configuration and the received signal.

Table 2-10 Mixed Mode 2

Optional Signaling	Transmit Mode	Received signal	Transmission Operation
Disabled	Analog	Digital	The transceiver can transmit using the Color Code preconfigured for the transceiver until the length of time configured in Signaling Reset Timer elapses.
Disabled	Analog	Analog	The transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver until the length of time configured in Signaling Reset Timer elapses.
Disabled	DMR	Digital	The transceiver can transmit using the Color Code preconfigured for the transceiver until the length of time configured in Signaling Reset Timer elapses.
Disabled	DMR	Analog	The transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver until the length of time configured in Signaling Reset Timer elapses.
Enabled	Analog	Digital	The transceiver can transmit using the Color Code preconfigured for the transceiver and specifying the received ID until the length of time configured in Auto Reset Timer elapses.
Enabled	Analog	Analog	By specifying the received ID, the transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver until the length of time configured in Auto Reset Timer elapses. However, ID can be specified only when FleetSync signaling is received. The transceiver can transmit using only QT tone or DQT code preconfigured for the transceiver if the transceiver receives a DTMF or 2-tone code, or an MDC-1200 ID.
Enabled	DMR	Digital	The transceiver can transmit using the Color Code preconfigured for the transceiver and specifying the received ID until the length of time configured in Auto Reset Timer elapses.
Enabled	DMR	Analog	By specifying the received ID, the transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver until the length of time configured in Auto Reset Timer elapses. However, ID can be specified only when FleetSync signaling is received. The transceiver can transmit using only QT tone or DQT code preconfigured for the transceiver if the transceiver receives a DTMF or 2-tone code, or an MDC-1200 ID.

Note

- While the transceiver is in Emergency Mode, the transceiver transmits according to the configuration in **Transmit Mode**.
- If the transceiver receives FleetSync data, the transceiver sends an ACK in analog mode, and if the transceiver receives DMR data, the transceiver sends an ACK in digital mode. The transceiver transmits according to the configuration in **Transmit Mode** after the transceiver ends data communications regardless of the configuration in **Signaling Reset Timer** or **Auto Reset Timer**.
- If "Off" is configured in **Signaling Reset Timer**, the transceiver retains the status of transmission in the same mode as that of the received signal. This status will be reset by an operation such as changing a channel.
- If "0" is configured in **Signaling Reset Timer**, the transceiver transmits according to the configuration in **Transmit Mode**.

Configuration using KPG-D3/ D3N

- Configuring **Channel Type** and **Transmit Mode**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > General)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > General)

- Configuring **Signaling Reset Timer** ( **See** Radio Configuration > Protocol Options > DMR > General > RX Options)

2.4 Using DMR ID to Initiate a Selective Call

An individual call and group call are available by using DMR IDs. In addition, a message can be sent to a specified target ID in various types of message communications.

Available Calls

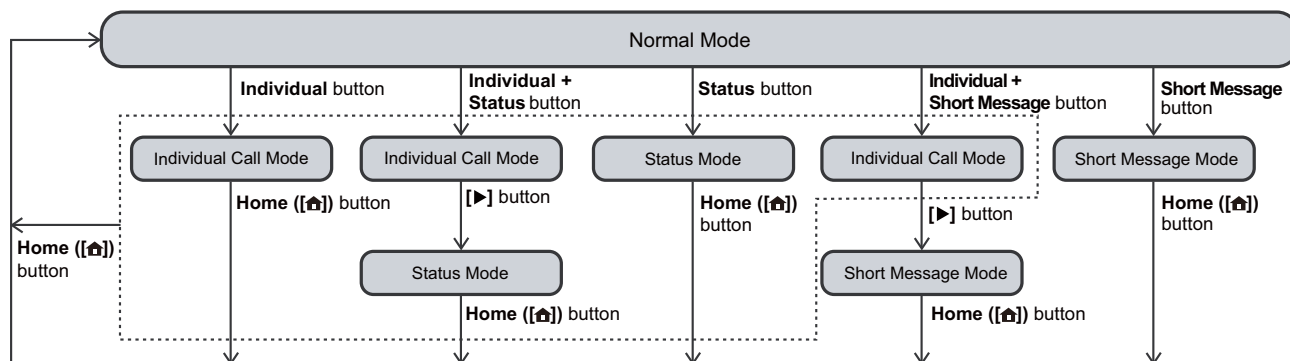
The following various types of calls can be used in a DMR Conventional system. For transceiver operations and behaviors, refer to the instructions of each call type.

- Individual Call/ Paging Call
- Individual Call (Individual Call Acknowledge Request)
- Group Call
- Broadcast Group Call
- Status Call
- Short Data Call

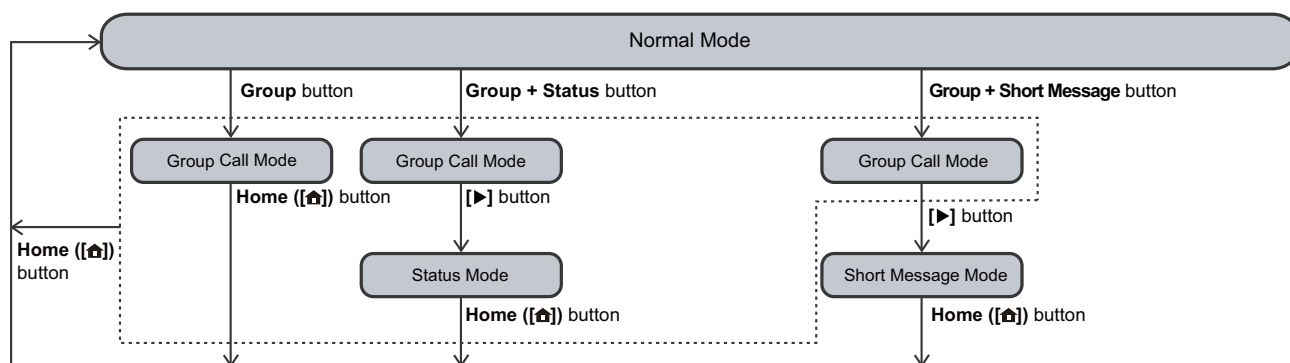
Transition for Each Mode

If a user wishes to send or receive an Individual Call, Group Call, Status Message, or Short Message, the user must operate the transceiver after selecting the desired mode. The following are the transition diagrams for each mode.

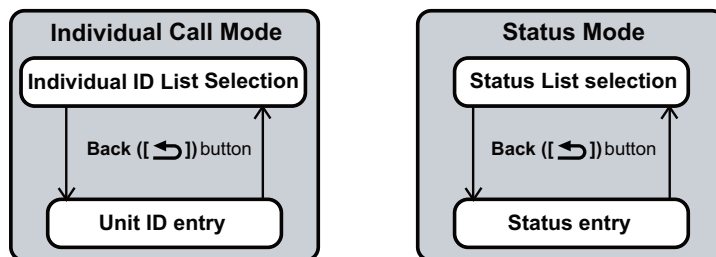
Transmission (Individual Call)



Transmission (Group Call)



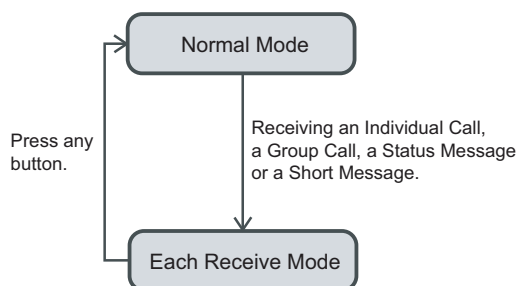
In Individual Call Mode, a Unit ID of the target transceiver can be selected from the Individual ID List or a Unit ID can directly be entered. Also, in Status Mode, a status to be sent can be selected from the Status List or the status can directly be entered. In either mode, the entry method can be switched by pressing the **Back** ([↩]) button.



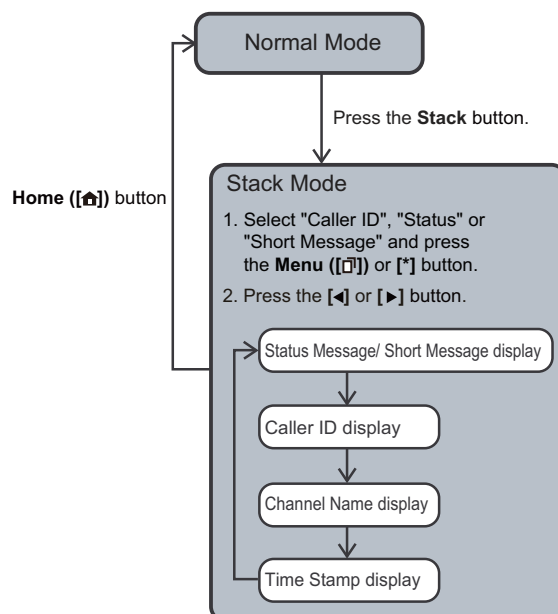
Note

- If **Manual Dialing** is enabled, a Unit ID and status can be manually entered.

Reception



Checking the incoming call history of a received Individual Call, Group Call, Status Message or Short Message



2.5 Making an Individual Call

Individual Call can be used to initiate a call to a target transceiver individually to establish voice calls.

By specifying a Unit ID, the transceiver can initiate a call to the transceiver having the Unit ID.

Initiating an Individual Call

An Individual Call can be started by one of the following methods.

- **Individual Call Mode**

In Individual Call Mode, an Individual Call is initiated by selecting a Unit ID configured in the Individual ID List or directly entering a Unit ID.

Pressing the **Individual**, **Individual + Status**, or **Individual + Short Message** button places the transceiver in Individual Call Mode.

The transceiver also enters Individual Call Mode by selecting “Individual”, “Individual + Status”, or “Individual + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

If “Individual”, “Individual + Status”, or “Individual + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad also places the transceiver in Individual Call Mode. The transceiver enters Unit ID Shortcut Entry Mode or will be on hold as the first digit of the Unit ID is entered.

(Refer to Common Function Part [Keypad Operation](#).)

- **Selcall on PTT**

The transceiver initiates an Individual Call when the **PTT** switch is pressed on a channel where “Individual Call” is configured for **Selcall on PTT**. The Unit ID of the target transceiver can be configured by selecting one Unit ID from the Individual ID List by using KPG-D3/ D3N.

- **Talkback**

By pressing the **PTT** switch while the **Auto Reset Timer** is counting down after the transceiver receives an Individual Call, the transceiver can respond (Talkback) to the transceiver which made the Individual Call.

- **Stack Mode**

Selecting the receive history in Stack Mode and pressing the **PTT** switch initiates an Individual Call. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

- **PC command**

The transceiver starts an Individual Call upon the receipt of a PC command from the communication port. To use a PC command, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

The following describes how to initiate an Individual Call in Individual Call Mode.

Operating the transceiver

● Initiating an Individual Call by list selection

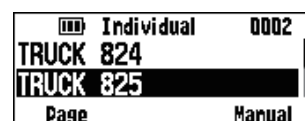
1 Press the **Individual**, **Individual + Status**, or **Individual + Short Message** button.

The transceiver enters Individual Call Mode, and a selection screen for the Individual ID List will appear.

The following operations are identical even if the transceiver enters Individual Call Mode by a user pressing the **Menu** button or using the keypad.

2 Press the **[▲]** or **[▼]** button to select a Unit ID from the Individual ID List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

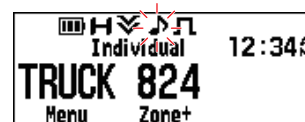


3 Initiating an Individual Call.

Press the **PTT** switch to initiate a Voice Call. The “” icon blinks, and the display changes to “Individual” and the ID name of the target transceiver.

Press the **Menu** () or **[*]** button to initiate a Paging Call.

If Individual Call Mode has been entered with “Individual + Status” or “Individual + Short Message”, Status Mode or Short Message Mode is entered by pressing the **[▶]** button.



Note

- The selection screen for the Individual ID List closes at the same time as pressing the **PTT** switch. If selecting an ID and sending an Individual Call again, reexecute the operations from step 1.

● Initiating an Individual Call using Manual Dialing

To initiate an Individual Call by directly entering a Unit ID, **Manual Dialing** needs to be enabled.

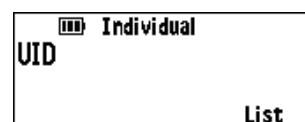
1 Press the **Individual**, **Individual + Status**, or **Individual + Short Message** button.

The transceiver enters Individual Call Mode, and a selection screen for the Individual ID List will appear.

The following operations are identical even if the transceiver enters Individual Call Mode by a user pressing the **Menu** () button or using the keypad.

2 Press the **Back** () button.

The Unit ID entry display appears.



3 Enter a Unit ID.

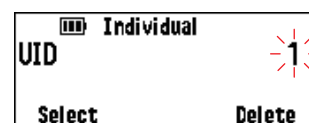
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

- **Using the keypad**

Press the [0] to [9] buttons to enter a Unit ID.

- **Using the PF buttons**

Press the [▲] or [▼] button to select a number and press the **Menu** ([□]) or [*] button to confirm the selected number.

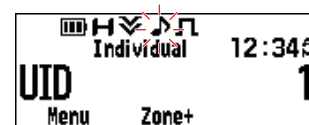


4 Initiating an Individual Call.

Press the **PTT** switch to initiate a Voice Call. The “” icon blinks, and the display changes to “Individual” and the ID of the target transceiver.

Press the **Menu** ([□]) or [*] button to initiate a Paging Call.

If Individual Call Mode has been entered with “Individual + Status” or “Individual + Short Message”, Status Mode or Short Message Mode is entered by pressing the button.



Note

- The selection screen for the Individual ID List closes at the same time as pressing the **PTT** switch. If selecting an ID and sending an Individual Call again, reexecute the operations from step 1.

Note

- If the Individual Call Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode by pressing the **Individual** button. A selection screen for the Individual ID List will appear by pressing the **Back** ([←]) button.
- If no ID is registered in the Individual ID List, the transceiver enters Manual Dialing mode by pressing the **Individual** button if **Manual Dialing** is enabled. In this case, the transceiver cannot enter Individual Call Mode if **Manual Dialing** is disabled.
- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Manual Dialing** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > TX Options)
- Configuring **Selcall on PTT** ([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > TX Options)
- Configuring **Selcall on PTT** ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR > Selcall on PTT)
- Configuring **Selcall on PTT** ([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR > Selcall on PTT)

Receiving an Individual Call

The transceiver can receive an Individual Call if the received Unit ID matches the Unit ID preconfigured for the transceiver.

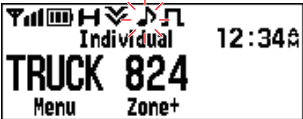
Transceiver behavior

1 The transceiver receives an Individual Call.

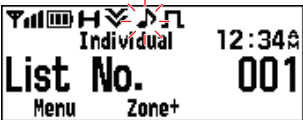
The “🔊” icon blinks, and the ID Name of the transmitting transceiver appears.



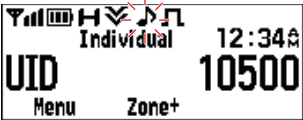
- This is the case when the received Unit ID exists in the Individual ID List and the Unit ID Name for the Unit ID is configured.



If the ID Name is not configured in the Individual ID List, the Individual ID List number appears.



If the Unit ID is not configured in the Individual ID List, the Unit ID appears.



2 Press the PTT switch.

The transceiver can respond to the received Unit ID. When a button other than the PTT switch is pressed, the configured function will be activated.

 Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving an Individual Call/ Paging Call](#).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [Transceiver behavior when receiving an Individual Call/ Paging Call](#).)
- When the transceiver receives an Individual Call, the Unit ID Name or Unit ID of the transmitting transceiver appears. If the Unit ID Name is stored in the transceiver, the stored Unit ID Name appears. If the Unit ID Name is not stored in the transceiver, the Unit ID Name configured in the Individual ID List appears. If the Unit ID Name is not configured in the Individual ID List, the Individual ID List number appears.
- If the transceiver receives the Unit ID Name by **Over-the-Air Alias**, the received Unit ID Name appears.

Transceiver behavior when receiving an Individual Call/ Paging Call**● Alert Tone**

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration of **Alert Tone (Individual Call)** or **Alert Tone (Paging Call)** for the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert Tone (Individual Call)** or **Alert Tone (Paging Call)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to DMR Conventional.

● Selective Call Alert LED

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration of **Alert LED (Individual)** or **Alert LED (Paging Call)** for the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert LED (Individual Call)** or **Alert LED (Paging Call)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration in **Alert LED (Individual Call)** or **Alert LED (Paging Call)** common to DMR Conventional.

● Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration in **Selective Call Alert LED**.

Also, if buttons on the transceiver are pressed while the LED flashes according to the configuration of **Selective Call Alert LED**, the LED flashes yellow if the matching status of Optional Signaling continues.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/LED > Conventional)
- Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED > Conventional)
- Configuring **Alert Tone (Individual Call)/ Alert Tone (Paging Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > DMR Individual ID > DMR Individual ID List)
- Configuring **Alert LED (Individual Call)/ Alert LED (Paging Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > DMR Individual ID > DMR Individual ID List)
- Configuring **Tone Number** common to DMR Conventional ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED > Conventional)
- Configuring **LED Color** common to DMR Conventional ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED > Conventional)

Individual ID List

If making Individual Calls, the desired Unit IDs need to be preconfigured in the transceiver using KPG-D3/ D3N prior to use of the transceiver. A maximum of 1,500 Unit IDs can be configured for Individual ID List.

Table 2-11 Individual ID List

Configuration	Description
ID	A Unit ID can be configured in the range between 1 and 16776415 (decimal).
ID Name	The caller's ID Name is configured. A maximum of 14 characters can be configured for the ID Name. If the ID Name of the transmitting transceiver is configured in the Individual ID List, the ID Name of the transmitting transceiver appears when the transceiver receives a call. If the transceiver receives the Unit ID Name by the Over-the-Air Alias function when the transceiver receives a call, the received Unit ID Name appears. If the transceiver cannot receive the Unit ID Name, the stored Unit ID Name appears if the Unit ID Name is stored for the Unit ID stored in the transceiver. If the Unit ID Name is not stored in the transceiver, the Unit ID Name configured in the Individual ID List appears if the Unit ID Name for the received Unit ID is configured in the Individual ID List. The Unit ID number appears if the above conditions are not satisfied.
Type	The permission or inhibition of transmission of the receiving party can be configured. An ID for which "RX Only" is configured for Type does not appear on the ID selection display in Individual Call Mode, and a user cannot select the ID in Individual Call Mode. If the transceiver receives a call from an ID for which "RX Only" is configured for Type, the caller's ID Name appears. In this case, a user cannot initiate a call to the party even if the user attempts to respond by pressing the PTT switch.
Alert Tone	Individual: The type of tone sounding from the transceiver can be configured for an Individual Call from the Unit IDs configured in the Individual ID List. Paging: The type of tone sounding from the transceiver can be configured for a Paging Call from the Unit IDs configured in the Individual ID List.
Alert LED Color	Individual: The color of flashing LED can be configured for an Individual Call from the Unit IDs configured in the Individual ID List. Paging: The color of flashing LED can be configured for a Paging Call from the Unit IDs configured in the Individual ID List.  Note To use Alert LED Color, Selective Call Alert LED needs to be enabled.

Configuration using KPG-D3/ D3N

Configuring **Individual ID List** ( **See** Radio Configuration > System Properties > ID List/Status List > ID List/Status List > DMR Individual ID > DMR Individual ID List)

Restricting IDs for Which the Transceiver Can Initiate a Call (Encodable Unit ID Range)

Encodable Unit ID Range is the Unit ID range used to initiate a call.

A Unit ID with which a user is allowed to initiate a call can be restricted using KPG-D3/ D3N. A user can initiate a call to a Unit ID configured in the Individual ID List even if it is outside the range of **Encodable Unit ID Range**.

The transceiver for which **Encodable Unit ID Range** is not configured can initiate a call to all transceivers.

The transceiver unmutes the speaker and emits received audio when the transceiver receives the Unit ID satisfying the receiving conditions. In this case, the Unit ID of the transmitting transceiver appears on the receiving transceiver. If the Unit ID of the transmitting transceiver is in the range of the **Encodable Unit ID Range** or has been registered in the Individual ID List, the receiving transceiver can respond to the transmitting transceiver by pressing the **PTT** switch. If the Unit ID of the transmitting transceiver is outside the range of the **Encodable Unit ID Range** and also has not been registered in the Individual ID List, the receiving transceiver cannot respond to the transmitting transceiver.

Configuration using KPG-D3/ D3N

Configuring **Encodable Unit ID Range**

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > TX Options)

( **See**) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > TX Options)

Sending the Received Unit ID from the Communication Port (Unit ID (Serial Output))

Unit ID (Serial Output) allows the transceiver to send the received Unit ID from its communication port when the transceiver receives the PTT ID.

With the **Unit ID (Serial Output)** enabled, an administrator can monitor and control in real time the transceivers that are transmitting. Also, the Unit ID sent from the communication port can also be used for management of the call log.

Only when the received Color Code and Slot Selection match the Color Code and Slot Selection configured for the transceiver, the transceiver sends the Unit ID from the communication port.

Note

- To use **Unit ID (Serial Output)**, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Unit ID (Serial Output)** ( **See**) Radio Configuration > Protocol Options > DMR > General > Serial Output)

2.6 Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Individual Call Acknowledge Request)

Individual Call Acknowledge Request is the function that allows a user to distinguish whether or not the receiving transceiver is available to communicate so as to initiate an Individual Call in a DMR Conventional system.

Individual Call Acknowledge Request enables a call to the particular transceiver having the specified Unit ID in the same way as a normal Individual Call; however, an acknowledgment message must be received from the receiving transceiver for the communication to start (also, receiving an Individual Call from the receiving transceiver allows the communication to start).

The transmitting transceiver sends a message requesting an acknowledgment when initiating an Individual Call. Upon receipt of the message requesting an acknowledgment, the receiving transceiver sends to the transmitting transceiver an acknowledgment message to notify that the receiving transceiver is available for the call. The transmitting transceiver becomes enabled for the communication upon receipt of the acknowledgment message from the receiving transceiver.

To use this function, **Individual Call Acknowledge Request** needs to be enabled and a value other than “No” needs to be configured in **Busy Channel Lockout** by using KPG-D3/ D3N for the channel to be used by the transmitting transceiver. Also, using KPG-D3/ D3N, the parameters of the following various functions to be used with **Individual Call Acknowledge Request** can be configured.

- Call Request Tone
- Call Processing Tone
- Call Processing Tone Delay Time
- Call in Progress Tone

Note

- If “Interrupt CALL” is configured in **In-call Busy Channel Lockout**, **Individual Call Acknowledge Request** can be used even if “No” is configured in **Busy Channel Lockout**.
- **Individual Call Acknowledge Request** cannot be used while the transceiver is placed in Emergency Mode. A normal Individual Call, which does not require the sending of a message requesting an acknowledgment, can only be used.
- For an Individual Call (**Individual Call Acknowledge Request**), the following functions used for a normal Individual Call are available. (Refer to [Making an Individual Call](#).)
 - Individual ID List
 - Encodable Unit ID Range

Configuration using KPG-D3/ D3N

- Configuring **Individual Call Acknowledge Request** to be enabled or disabled

( See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Individual Call Acknowledge Request)

( See Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Individual Call Acknowledge Request)

- Configuring **Busy Channel Lockout**

( See Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR)

( See Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR)

Initiating an Individual Call (Individual Call Acknowledge Request)

An Individual Call (Individual Call Acknowledge Request) can be activated by one of the following methods.

● Individual Call Mode

Selecting a Unit ID configured in the Individual ID List or directly entering a Unit ID while the transceiver is in Individual Call Mode, and then pressing the **PTT** switch or **Menu** () button sends a message requesting an acknowledgment. Pressing the **Individual**, **Individual + Status**, or **Individual + Short Message** button places the transceiver in Individual Call Mode.

The transceiver also enters Individual Call Mode by selecting “Individual”, “Individual + Status”, or “Individual + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

If “Individual”, “Individual + Status”, or “Individual + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad also places the transceiver in Individual Call Mode. The transceiver enters Unit ID Shortcut Entry Mode or will be on hold as the first digit of the Unit ID is entered. (Refer to Common Function Part [Keypad Operation](#).)

● Stack Mode

Selecting the receive record in Stack Mode and then pressing the **PTT** switch sends a message requesting an acknowledgment. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

● Selcall on PTT

Selecting the channel where the target Unit ID for **Selcall on PTT** is configured and then pressing the **PTT** switch sends a message requesting an acknowledgment. The Unit ID of the target transceiver can be configured by selecting one Unit ID from the Individual ID List by using KPG-D3/ D3N.

● Call button

Pressing one of the **Call 1** button to the **Call 6** button sends a message requesting an acknowledgment to the Unit ID which corresponds to the button pressed.

For Mobile, a message requesting an acknowledgment is sent to the Unit ID which corresponds to the active port when any of the “Call 1” to “Call 6” ports allocated to the AUX Input port becomes active.

● PC command

A message requesting an acknowledgment is sent when the PC command is received from the communication port. To use a PC command, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

Operating the transceiver

1 Follow one of the methods mentioned above to initiate an Individual Call (Individual Call Acknowledge Request).

A message requesting an acknowledgment is sent.

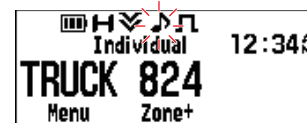
When the receiving transceiver is inside the communication range, “Calling” appears on the display, and the transceiver waits to receive an acknowledgment message from the receiving transceiver.



2 Receive an acknowledgment message from the receiving transceiver.

The “” icon blinks, and the transceiver enters a state allowing transmission of an Individual Call.

Receiving an acknowledgment message while the **PTT** switch is being pressed initiates an Individual Call.



3 Press the **PTT** switch.

The Individual Call is initiated.

Note

- If the **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call request for an Individual Call (Individual Call Acknowledge Request) is initiated. Also, if the **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives an acknowledgment message from the receiving transceiver after the call request for an Individual Call (Individual Call Acknowledge Request) is sent. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#), [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for transmissions with Individual Call.
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- While the transceiver is on standby to receive an acknowledgment message from the receiving transceiver, canceling the call is possible by pressing the **Clear** button.
- The transmitting transceiver sends a message requesting another acknowledgment when the length of time configured in **Maximum ACK Wait Time** elapses without receiving an automatic response message for a message requesting an acknowledgment from the receiving transceiver. If a response message cannot be received, the transmitting transceiver can send a message requesting an acknowledgment up to the number of times configured for **Number of Retries**. (Refer to [Maximum ACK Wait Time](#), [Number of Retries](#).)
- The transceiver terminates the call if the transceiver cannot receive an automatic response message from the receiving transceiver even if a message requesting an acknowledgment has been sent for the number of times configured in **Number of Retries**. At that time, “No Reply” appears on the display for 1 sec. (Refer to [Number of Retries](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port ( [See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)
- Configuring **Selcall on PTT**
( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR > Selcall on PTT)
( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR > Selcall on PTT)
- Configuring a Unit ID corresponding to the **Call 1** to **Call 6** buttons or ports ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call > Call 1~Call 6)

Receiving an Individual Call (Individual Call Acknowledge Request)

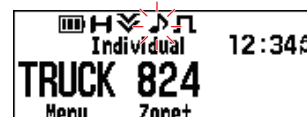
The transceiver can receive an Individual Call if the received Unit ID matches the Unit ID preconfigured for the transceiver. To receive an Individual Call (Individual Call Acknowledge Request), the receiving transceiver must receive a message requesting an acknowledgment from the transmitting transceiver. The transceiver becomes enabled for the communication after the transmitting transceiver receives an acknowledgment message.

Operating the transceiver

1 Receive a message requesting an acknowledgment.

The “” icon blinks, and the ID Name of the transmitting transceiver appears.

An acknowledgment message is automatically sent to the transmitting transceiver.



2 Press the **PTT** switch after transmission of an acknowledgment.

The transceiver initiates an Individual Call to the transmitting transceiver.

Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving an Individual Call \(Individual Call Acknowledge Request\)](#).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [Transceiver behavior when receiving an Individual Call \(Individual Call Acknowledge Request\)](#).)
- If the transceiver receives the Unit ID Name by **Over-the-Air Alias**, the received Unit ID Name appears.
- If **Over the Air Alias** is not configured for the transmitting transceiver, and if the Unit ID is registered in Individual ID List but the Unit ID Name is not configured, the Individual ID List number appears. If the Unit ID is not registered in the Individual ID List, the Unit ID appears.

Transceiver behavior when receiving an Individual Call (Individual Call Acknowledge Request)

● Alert Tone

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration for **Alert Tone (Individual Call)** of the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert Tone (Individual Call)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to DMR Conventional.

● Selective Call Alert LED

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration for **Alert LED (Individual Call)** of the corresponding Unit ID.

However, if “Protocol Common” is configured in **Alert LED Color (Individual)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration in **Alert LED (Individual Call)** common to DMR Conventional.

● Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration in **Selective Call Alert LED**.

Also, if buttons on the transceiver are pressed while the LED flashes according to the configuration of **Selective Call Alert LED**, the LED flashes yellow if the matching status of Optional Signaling continues.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED > Conventional)
- Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED > Conventional)
- Configuring **Alert Tone (Individual Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > DMR Individual ID > DMR Individual ID List)
- Configuring **Alert LED (Individual Call)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID List/Status List > ID List/Status List > DMR Individual ID > DMR Individual ID List)
- Configuring **Tone Number** common to DMR Conventional ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED > Conventional)
- Configuring **LED Color (Individual Call)** common to DMR Conventional ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED > Conventional)

Notifying the User with a Tone That a Call Request Has Been Initiated (Call Request Tone)

Call Request Tone is the function to emit a Call Request Tone (1 beep) from the transceiver when a call request for an Individual Call (Individual Call Acknowledge Request) is initiated in a DMR Conventional system.

The Call Request Tone (1 beep) from the transceiver notifies the user that a call request for an Individual Call (Individual Call Acknowledge Request) has been initiated.

The user can initiate the communication after the call request has been established.

Configuration using KPG-D3/ D3N

Configuring **Call Request Tone** to be enabled or disabled

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Individual Call Acknowledge Request)

( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Individual Call Acknowledge Request)

Notifying the User with a Tone That a Call Request Is in Progress (Call Processing Tone)

Call Processing Tone is the function to emit a Call Processing Tone (2 beeps) from the transceiver until the transceiver receives an acknowledgment message from the receiving transceiver after the call request for an Individual Call (Individual Call Acknowledge Request) is initiated in a DMR Conventional system.

The Call Processing Tone (2 beeps) from the transceiver notifies a user that the call request for an Individual Call (Individual Call Acknowledge Request) is in progress. A Call Processing Tone stops when the call request is established, and the user can initiate the communication.

After the call request for an Individual Call (Individual Call Acknowledge Request) is initiated, a Call Processing Tone (2 beeps) sounds from the transceiver upon the elapse of the time configured for **Call Processing Tone Delay Time**.

Configuration using KPG-D3/ D3N

Configuring **Call Processing Tone** and **Call Processing Tone Delay Time**

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Individual Call Acknowledge Request)

( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Individual Call Acknowledge Request)

2.7 Making a Group Call

Group Call is the function to establish 2-way group voice communications by initiating a call to a group.

The transceiver can initiate a call to the transceivers having the same Group ID by specifying the Group ID. The transceiver can also initiate a call to all transceivers by specifying the All Group ID (\$FFFFFF) for which "ALL" is configured.

If the transceiver receives the All Group ID (\$FFFFFF), the transceiver treats the reception as the reception of an All Group Call, and unmutes the speaker. However, if the **PTT** switch is pressed after the reception of an All Group Call, the transceiver does not reply to the transmitting transceiver by an All Group Call.

Initiating a Group Call

Group Call can be started by one of the following methods.

● Group Call Mode

While the transceiver is in Group Call Mode, the transceiver can initiate a Group Call by a user selecting a Group ID configured in the Group ID List and then pressing the **PTT** switch. (Refer to [Group ID List](#).)

Pressing the **Group**, **Group + Status**, or **Group + Short Message** button places the transceiver in Group Call Mode.

The transceiver also enters Group Call Mode by selecting "Group", "Group + Status", or "Group + Short Message" after the transceiver enters Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

If "Group", "Group + Status", or "Group + Short Message" is configured in **Keypad Operation**, pressing the [0] to [9] buttons on the keypad also places the transceiver in Group Call Mode. The transceiver enters Group ID Shortcut Entry Mode or will be on hold as the first digit of the Group ID is entered. (Refer to Common Function Part [Keypad Operation](#).)

● Selcall on PTT

The transceiver initiates a Group Call when the **PTT** switch is pressed on a channel where "Group Call" is configured for **Selcall on PTT**. The Group ID of the target transceiver can be configured by selecting one Group ID from the Group ID List by using KPG-D3/ D3N.

● PC Command

The transceiver starts a Group Call upon the receipt of a PC command from the communication port. To use a PC command, "Data", "Data + GPS Data Output", or "Data + Location Data Output" needs to be assigned to the communication port of the transceiver.

Operating the transceiver

The following describes how to initiate a Group Call in Group Call Mode.

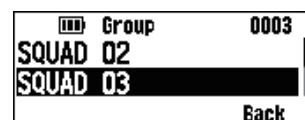
1 Press the **Group**, **Group + Status**, or **Group + Short Message** button.

The transceiver enters Group Call Mode and the Group ID List selection display appears.

The following operations are identical even if the transceiver enters Group Call Mode by a user pressing the **Menu** button or using the keypad.

2 Press the [▲] or [▼] button to select a Group ID from the Group ID List.

Refer to Common Function Part "[Selecting or Clearing Data from a List](#)" for selection methods.



3 Press the **PTT** switch.

The transceiver initiates a Group Call.

If Group Call Mode has been entered with “Group + Status” or “Group + Short Message”, Status Mode or Short Message Mode is entered by pressing the **[▶]** button.

Note

- The selection screen for the Group ID List closes at the same time as pressing the **PTT** switch. If selecting an ID and sending a Group Call again, reexecute the operations from step 1.
- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- The transceiver starts a Group Call only by a user pressing the **PTT** switch if the transceiver transmits on a channel with “Group Call” configured for **Selcall on PTT**. In this case, a Group ID does not need to be selected by using the transceiver.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)

- Configuring **Selcall on PTT**

([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR > Selcall on PTT)

([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR > Selcall on PTT)

Receiving a Group Call

If the received Group ID matches the Group ID configured for the transceiver, the transceiver can receive the Group Call.

Transceiver behavior

1 The transceiver receives a Group Call.

The “**🔊**” icon blinks and a received Group ID appears. Any of the received Group ID, the Unit ID of the transmitting transceiver, or both appears according to the configuration in **Group Call Display Type**. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)



2 Press the **PTT** switch.

The transceiver can respond to the received Group ID. When a button other than the **PTT** switch is operated, the configured function functions.

 Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving a Group Call](#).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [Transceiver behavior when receiving a Group Call](#).)
- The transceiver can record the receipt of a Group Call. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)
- If **Group ID Scan** is enabled, the transceiver is on standby to receive a Group Call from all Group IDs configured in the Group ID List. (Refer to [Group ID Scan](#).)

Transceiver behavior when receiving a Group Call

● Alert Tone

If the received Group ID is configured in the Group ID List, an Alert Tone sounds from the transceiver according to the configuration for **Alert Tone** of the corresponding Group ID.

However, if “Protocol Common” is configured in **Alert Tone** of the Group ID List, or if the received Group ID is not configured in the Group ID List, an Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to DMR Conventional.

● Selective Call Alert LED

If the received Group ID is configured in the Group ID List, the LED blinks according to the configuration for **Alert LED Color** of the corresponding Group ID.

However, if “Protocol Common” is configured in **Alert LED Color** of the Group ID List, or if the received Group ID is not configured in the Group ID List, the LED flashes according to the configuration in **LED Color** common to DMR Conventional.

● Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration in **Selective Call Alert LED**.

Also, if buttons on the transceiver are pressed while the LED flashes according to the configuration of **Selective Call Alert LED**, the LED flashes yellow if the matching status of Optional Signaling continues.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED > Conventional)
- Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED > Conventional)
- Configuring **Alert Tone/ Alert LED Color** (Group ID List) ( [See](#) Radio Configuration > System Properties > ID List/ Status List > ID List/Status List > DMR Group ID > DMR Group ID List)
- Configuring **Tone Number** common to DMR Conventional ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED > Conventional)
- Configuring **LED Color** common to DMR Conventional ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED > Conventional)

Group ID List

The transceiver uses a Group ID configured in the Group ID List to initiate a Group Call in a DMR Conventional system. The desired Group IDs must be preconfigured using KPG-D3/ D3N for the transceiver to initiate a Group Call. A maximum of 1,500 Group IDs can be configured in the Group ID List.

Table 2-12 Group ID List

Configuration	Description
ID	A Group ID can be configured in the range between 000001 and FFFCDF (hexadecimal), between 1 and 16776415 (decimal), or "ALL". "ALL" allows initiation of a call to all groups.  Note For All Group ID (ALL), the ID for sending and receiving is fixed to 0xFFFFFFFF.
ID Name	The caller's ID Name is configured. A maximum of 14 characters can be configured for the ID Name. If the ID Name of the group is configured in the Group ID List, the ID Name appears when the transceiver receives a call. If the ID Name is not configured in the Group ID List, the Group ID List number appears.
Type	The permission or inhibition of transmission of the receiving party can be configured. An ID for which "RX Only" is configured for Type does not appear on the ID selection display in Group Call Mode, and a user cannot select the ID in Group Call Mode. If the transceiver receives a call from an ID for which "RX Only" is configured for Type, the caller's ID Name appears. In this case, a user cannot initiate a call to the party even if the user attempts to respond by pressing the PTT switch.
Alert Tone	The tone type sounding from the transceiver can be configured for a Group Call from the Group IDs registered in the Group ID List.
Alert LED Color	The color of flashing LED can be configured for a Group Call from the Group IDs registered in the Group ID List.  Note To use Alert LED Color, Selective Call Alert LED needs to be enabled.

Configuration using KPG-D3/ D3N

Configuring **Group ID List** ( **See** Radio Configuration > System Properties > ID List/Status List > ID List/Status List > DMR Group ID > DMR Group ID List)

Display When the Transceiver Receives a Group Call (Group Call Display Type)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Group Call Display Type can be used to display the received information on the display when the transceiver receives a Group Call.

Table 2-13 Group Call Display Type

Configuration	Description
Group ID	The Group ID of the received Group Call appears.
Calling Transceiver ID	The Unit ID of the transmitting transceiver appears. If the Unit ID Name is stored in the transceiver, the stored Unit ID Name appears. If the Unit ID Name is not stored in the transceiver, the Unit ID Name configured in the Individual ID List appears. If the Unit ID Name is not configured in the Individual ID List, the Individual ID List number appears. If the transceiver receives the Unit ID Name by Over-the-Air Alias , the received Unit ID Name appears.
Calling Transceiver ID/Group ID	The Group ID of the received Group Call and the Unit ID of the transmitting transceiver appear for 2 sec alternately.

Configuration using KPG-D3/ D3N

Configuring **Group Call Display Type** ( See Radio Configuration > Protocol Options > DMR > General > RX Options)

Group ID Scan

Group ID Scan is the function to standby to receive a Group Call from all Group IDs in a DMR Conventional system.

If this function is enabled, the transceiver is on standby to receive a Group Call from all Group IDs configured for Group ID List.

If this function is disabled, the transceiver is on standby to receive only the Group Calls from the Group IDs configured for **Selcall on PTT** or for **Persistent Group ID (DMR)**.

Note

- This function can be used only if “Group Call” is configured for **Selcall on PTT**.

Configuration using KPG-D3/ D3N

- Configuring **Group ID Scan** to be enabled or disabled

( See Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR)

( See Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR)

- Configuring **Selcall on PTT**

( See Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR > Selcall on PTT)

( See Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR > Selcall on PTT)

- Configuring **Persistent Group ID**

( See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > RX Options > Persistent Group ID)

( See Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > RX Options > Persistent Group ID)

Preventing the Functions Working with Group Call Reception from Activating (Group Call Alert Inhibit)

Group Call Alert Inhibit is the function that disables the Alert Tone, Selective Call Alert LED, Horn Alert, Vibrator, and Caller ID Stack functions when the transceiver receives a Group Call.

Use of this function prevents specific functions from activating as follows even if these functions are enabled or configured to be enabled when the transceiver receives a Group Call.

- **Alert Tone**

Alert Tones do not sound from the transceiver even if the transceiver receives a Group Call.

- **Selective Call Alert LED**

A Selective Call Alert LED does not blink even if the transceiver receives a Group Call.

- **Horn Alert (Mobile only)**

The headlight of the vehicle connected to Horn Alert does not light up and the horn is not sounded even when a Group Call is received.

- **Caller ID Stack**

The Caller ID will not be stored in the transceiver stack memory even if the transceiver receives a Group Call.

Configuration using KPG-D3/ D3N

Configuring **Group Call Alert Inhibit** to be enabled or disabled ( See Radio Configuration > Protocol Options > DMR > General > RX Options > Alert Tone/LED)

2.8 Making an Informative Group Call (Broadcast Group Call)

Broadcast Group Call can be used to engage in one-way informative group voice calls by initiating a call to a group. The transceiver can initiate a call to the transceivers having the same Group ID by specifying the Group ID.

Initiating a Broadcast Call

Broadcast Group Call can be started by one of the following methods:

● Broadcast button

Broadcast Call information is added to a Group Call and sent by the transceiver initiating a Group Call while Broadcast Group Call is enabled.

Pressing the **Broadcast** button toggles the Broadcast Group Call between enabled and disabled.

If the **Menu** button is pressed to enter Menu Mode and then “Broadcast” is selected, Broadcast Group Call can also be toggled between enabled and disabled. (Refer to Common Function Part [Using Menu Mode.](#))

● PC command

The transceiver starts a Broadcast Group Call upon the receipt of a PC command from the communication port. To use a PC command, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

Operating the transceiver

1 Press the **Broadcast** button.

Broadcast Group Call is enabled after a Button Beep A (1 beep) sounds from the transceiver. The “” icon appears.

The following operations are identical even if Broadcast Group Call is enabled by pressing the **Menu** button.



2 Initiating a Group Call.

Refer to “[Initiating a Group Call](#)” for methods to initiate a Group Call.

Pressing the **Broadcast** button after the transmission causes Broadcast Group Call to be disabled.



- The transceiver cannot transmit the Broadcast Group Call by specifying the All Group ID.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Receiving a Broadcast Group Call

If the received Group ID matches the Group ID configured for the transceiver, the transceiver can receive the Broadcast Group Call.

Note

- The transceiver can receive the Broadcast Group Call initiated using the Group ID for which “ALL” is configured even if no Group ID is configured for the transceiver.

Operating the transceiver

Press the **Broadcast** button.

The “” icon blinks, and then “Broadcast” and a received Group ID appear.

Any of the received Group ID, the Unit ID of the transmitting transceiver, or both appears according to the configuration in **Group Call Display Type**. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)



Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving a Group Call](#).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [Transceiver behavior when receiving a Group Call](#).)
- The transceiver can send the ID of the transmitting transceiver from the communication port on the transceiver when receiving a Group Call.

2.9 Common Functions for Data Communications

The following functions are used in common for data communications such as Status Call and Short Data Call:

- Number of Retries
- Transmit Busy Wait Time
- Maximum ACK Wait Time
- Preamble Length

Number of Retries

If the transceiver does not receive the acknowledgment after the transceiver sends data and the time configured for **Maximum ACK Wait Time** elapses, the transceiver resends data. **Number of Retries** is the number of times for the transceiver to resend data. A smaller number can be configured if there is good communicating conditions, and a larger number can be configured if there are inferior communicating conditions.

Configuration using KPG-D3/ D3N

Configuring **Number of Retries**

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications)

( **See**) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Data Communications)

Transmit Busy Wait Time

The transceiver confirms that the traffic channel is available before sending data and then starts sending data when the channel is available. **Transmit Busy Wait Time** is the duration to wait for the traffic channel to become available.

A transmission is canceled when the channel is busy and the Transmit Busy Wait Time elapses.

Configuration using KPG-D3/ D3N

Configuring **Transmit Busy Wait Time**

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications)

( **See**) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Data Communications)

Maximum ACK Wait Time

Maximum ACK Wait Time is the length of time that the transceiver stands by to receive the acknowledgment after the transceiver sends data. If the transceiver does not receive the acknowledgment within the time configured for **Maximum ACK Wait Time**, the transceiver resends data.

Note

- A Long Data Message transmits data divided over multiple times. The receiving transceiver stands by to receive the next data for the time configured for **Maximum ACK Wait Time** after receiving the previous data. The transceiver exits Long Data Message Receive Mode if the transceiver does not receive any data during the period.
- For Transparent communications, the transceiver stands by to receive the next data while **Maximum ACK Wait Time** is counting down after the transceiver receives the data. If the transceiver does not receive any data during this period, the transceiver exits the Transparent receive mode.

Configuration using KPG-D3/ D3N

Configuring **Maximum ACK Wait Time**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Data Communications)

Preamble Length

Preamble Length is the function to extend the duration for sending a preamble when the DMR frame is sent.

Extending the time for sending a preamble at the beginning of transmission makes the receiving transceiver easier to receive a call and reduces missing of the beginning of the audio during the scan.

The extended time of a preamble is determined by using the following equation.

$$\text{Time [sec]} = 60 \text{ ms} \times \text{Configuration value for Preamble Length}$$

Configuration using KPG-D3/ D3N

Configuring **Preamble Length**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > DMR Parameters)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > DMR Parameters)

2.10 Sending and Receiving a Status Message (Status Call)

Status Call is a simple messaging system that allows a user to send and receive a status (Status Message). Since the message is replaced by status, communications can take place quickly and communication traffic can be reduced.

The following methods are available to send a Status Message.

Note

- This section describes information for both a DMR Conventional system and DMR-based Trunking system. For each operation description, the display of the DMR Conventional system is used.
- The range of the statuses that can be sent and received varies as follows in a DMR Conventional system and DMR-based Trunking system:

DMR Conventional system: 0 to 1023

DMR-based Trunking system: 0 to 99

Table 2-14 Sending Status Messages

Transmission Methods	Description
Status Mode	The transceiver enters Status Mode by a user pressing a PF button or a button on the keypad, and then the transceiver will send a Status Message. (Refer to Sending a Status Message .)
Call button	Pressing one of the “Call 1” to “Call 6” buttons allocated to the PF buttons of the transceiver causes the transceiver to send the preconfigured Status Message. For Mobile, the Status Message preconfigured in the transceiver is sent when any of the “Call 1” to “Call 6” ports allocated to the AUX Input port becomes active. “Call 1” to “Call 6” can be assigned to the PF buttons or AUX Input ports by using KPG-D3/ D3N, and the Status Message corresponding to each button can be selected from the Status List in DMR. In this case, a Status Message is always sent to the preconfigured Base ID.
Turning the transceiver on/ off	The transceiver sends the Status Message configured in the transceiver when the transceiver is turned ON or OFF. (Refer to Power-on Status , Power-off Status .) In this case, a Status Message is always sent to the preconfigured Base ID.
AUX Input Status Message (Mobile Only)	The specified Status Message is sent when the AUX Input port goes high level to low level or goes low level to high level. (Refer to AUX Input Status Message .)
PC Command	The transceiver will send a Status Message when the transceiver receives a PC command from the communication port. To use a PC command, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to a communication port 0 to 2 or the Bluetooth of the transceiver.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port ( [See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)
- Configuring the Status Message corresponding to **Call 1** to **Call 6** ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call > Call 1~Call 6)

Sending a Status Message

This section describes how to send a Status Message in Status Mode.

The transceiver enters Status Mode with one of the following operations, and then the transceiver will send a Status Message.

● **Status, Individual + Status, or Group + Status button**

Pressing the **Status** button places the transceiver in Playback Mode. In this case, a Status Message is addressed to a Base ID.

Pressing the **Individual + Status** button places the transceiver in Individual Call Mode. The transceiver enters Status Mode by pressing the **▶** button, or pressing and holding the **Menu** (**[M]**) button or **[*]** button after selecting the target Unit ID.

The transceiver's behavior when the **Group + Status** button is pressed varies depending on the system.

For a DMR Conventional system:

The transceiver enters Group Call Mode. The transceiver enters Status Mode by pressing the **▶** button, or pressing and holding the **Menu** (**[M]**) button or **[*]** button after selecting the target Group ID.

For a DMR-based Trunking system:

The transceiver enters Status Mode. The Group ID configured for the channel must be selected before entering Status Mode.

● **Menu button**

Pressing the **Menu** button places the transceiver in Menu Mode, and then the transceiver enters Status Mode by selecting "Status". In this case, a Status Message is addressed to a Base ID.

Pressing the **Menu** button to enter Menu Mode and then selecting "Individual + Status" places the transceiver in Individual Call Mode. The transceiver enters Status Mode by pressing the **▶** button, or pressing and holding the **Menu** (**[M]**) button or **[*]** button after selecting the target Unit ID.

The transceiver's behavior varies depending on the system when the **Menu** button is pressed to enter Menu Mode and then selecting "Group + Status".

For a DMR Conventional system:

The transceiver enters Group Call Mode. The transceiver enters Status Mode by pressing the **▶** button, or pressing and holding the **Menu** (**[M]**) button or **[*]** button after selecting the target Group ID.

For a DMR-based Trunking system:

The transceiver enters Status Mode. The Group ID configured for the channel must be selected before entering Status Mode.

Refer to Common Function Part "[Using Menu Mode](#)" for operations in Menu Mode.

● **Keypad entry**

If "Status" is configured for **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the transceiver keypad causes the transceiver to enter Status Mode. In this case, a Status Message is addressed to a Base ID.

If "Individual + Status" is configured in **Keypad Operation**, pressing the **[0]** button to **[9]** button on the keypad places the transceiver in Individual Call Mode. The transceiver enters Status Mode by pressing the **▶** button, or pressing and holding the **Menu** (**[M]**) button or **[*]** button after selecting the target Unit ID. (Refer to Common Function Part [Keypad Operation](#).)

The transceiver's behavior varies depending on the system while "Group + Status" is configured in **Keypad Operation**.

For a DMR Conventional system:

Pressing the **[0]** button to **[9]** button on the transceiver keypad places the transceiver in Group Call Mode. The transceiver enters Status Mode by pressing the **▶** button, or pressing and holding the **Menu** (**[M]**) button or **[*]** button after selecting the target Group ID.

For a DMR-based Trunking system:

Pressing the **[0]** button to **[9]** button on the keypad places the transceiver in Status Mode. The Group ID configured for the channel must be selected before entering Status Mode.



- For operating in Individual Call Mode or Group Call Mode, refer to the information on the various call types of DMR.

Operating the transceiver

● Sending a Status Message by list selection

1 Select one of the following operations to place the transceiver in Status Mode.

- **Press the Status button.**

The transceiver enters Status Mode. In this case, a Status Message is addressed to a Base ID.

- **Press the Individual + Status button.**

Pressing the **[▶]** button after selecting the Unit ID of the target transceiver causes Status Mode to be entered.

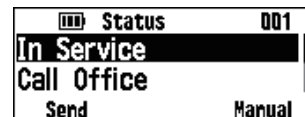
- **Press the Group + Status button. (DMR Conventional system)**

Pressing the **[▶]** button after selecting the Group ID of the target transceiver causes Status Mode to be entered.

- **Press the Group + Status button after selecting the Group ID configured for the channel. (DMR-based Trunking system)**

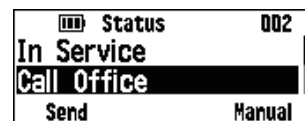
The transceiver enters Status Mode.

Or, the transceiver enters Status Mode by pressing the **Menu** button or using a keypad. In this case, the following operations are identical.



2 Press the **[▲]** button or **[▼]** button and then select the target data from the Status List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **PTT** switch or the **Menu** (**[□]**) button.

The transceiver sends the Status Message.



If the Status Message is properly sent to the target transceiver, “Complete” appears.



Note

- The selection screen for the Status List closes at the same time as pressing the **PTT** switch or the **Menu** (**[□]**) button. If selecting an ID and sending a Status Call again, reexecute the operations from step 1.

● Sending a Status Message using Manual Dialing

To send a Status Message using **Manual Dialing**, **Manual Dialing** must be enabled using KPG-D3/ D3N.

1 Select one of the following operations to place the transceiver in Status Mode.

- **Press the Status button.**

The transceiver enters Status Mode. In this case, a Status Message is addressed to a Base ID.

- **Press the Individual + Status button.**

Pressing the **[▶]** button after selecting the Unit ID of the target transceiver causes Status Mode to be entered.

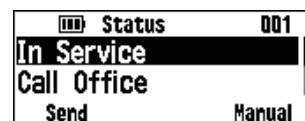
- **Press the Group + Status button. (DMR Conventional system)**

Pressing the **[▶]** button after selecting the Group ID of the target transceiver causes Status Mode to be entered.

- **Press the Group + Status button after selecting the Group ID configured for the channel. (DMR-based Trunking system)**

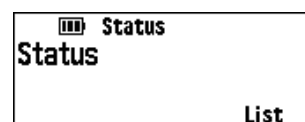
The transceiver enters Status Mode.

Or, the transceiver enters Status Mode by pressing the **Menu** button or using a keypad. In this case, the following operations are identical.



2 Press the Back (**[↩]**) button.

The status entry display appears.



3 Enter a status.

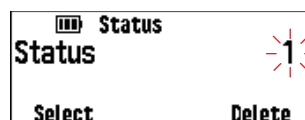
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

- **Using the keypad**

A code can be entered by pressing the **[0]** to **[9]** buttons.

- **Using the PF buttons**

Press the **[▲]** or **[▼]** button to select a number and press the **Menu** (**[□]**) or **[*]** button to confirm the selected number.



4 Press the PTT switch or the Menu (**[□]**) button.

The transceiver sends the Status Message.



If the Status Message is properly sent to the target transceiver, “Complete” appears.



 Note

- The status entry display closes at the same time as pressing the **PTT** switch or **Menu** () button. If entering status and sending a Status Call again, reexecute the operations from step 1.
- Transmission can be canceled by pressing the **Clear** button while a Status Message is being transmitted.
- In a DMR Conventional system, “No Reply” appears on the display and transmission of a Status Message is terminated if no response is received from the target transceiver. If transmission fails because of busy status, “Busy” appears on the display and transmission of a Status Message is terminated.
- For details on the information displayed on the display during transmission in a DMR-based Trunking system, refer to “[Transceiver behavior during transmitting](#)”.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the **Keypad Operation** of the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring **Manual Dialing** in DMR Conventional to be enabled or disabled
( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > TX Options)
( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > TX Options)
- Configuring **Manual Dialing** in DMR-based Trunking to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > DMR > RX/TX Options > TX Options)
- Configuring the **Base ID Type** and **Base ID** in DMR Conventional
( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications)
( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Data Communications)
- Configuring **Base ID Type** and **Base ID** in DMR-based Trunking ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Data Communications)

Receiving a Status Message

Upon receiving a Status Message, the received Status Message appears on the display, and the transceiver can send the Status Message to an external device from the communication ports.

Note

- To use serial communications, a user needs to prepare DMR compatible software or external devices.
- A received Status Message can be left as a record. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Transceiver behavior

1 The transceiver starts receiving a Status Message.

“Receive Data” appears.

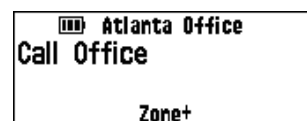


2 A Status Message is received.

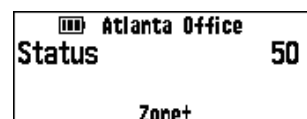
The “” icon blinks and “Complete” appears.



The Status Message appears.



If the status is not configured for Status List or the Status Name is not configured, a status No. appears.



If any Emergency status or Horn Alert status (Mobile only) is configured by using KPG-D3/ D3N, the display appears as below when each status is received:

Table 2-15 Status reception

Status	Display
Reception of Emergency Status	Emergency
Reception of Man-down Status	Man Down
Reception of Lone Worker Status	Emg Lone-Work
Reception of Stationary Status	Emg Stationary
Reception of Motion Status	Emg Motion
Reception of Horn Alert Status (Mobile only)	Horn Alert

 Note

- If the received status number is configured in the Status List, an Alert Tone sounds from the transceiver according to the configuration of the corresponding Status List. If “Protocol Common” is configured in **Alert Tone** of the Status List, or if the received status number is not configured in the Status List, an Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to DMR. Pressing any button on the transceiver stops the Alert Tone from sounding.

Configuration using KPG-D3/ D3N

- Configuring **Alert Tone** (Status List) ( **See** Radio Configuration > System Properties > ID List/Status List > ID List/Status List > DMR Status > DMR Status List)
- Configuring **Tone Number** common to DMR Conventional ( **See** Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Conventional)
- Configuring **Tone Number** common to DMR-based Trunking ( **See** Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking)
- Configuring **Horn Alert Status** ( **See** Radio Configuration > Protocol Options > DMR > Status)

About the Behavior When a Message Requesting the Status Transmission Is Received

The transceiver sends status 1023 in a Conventional system and status 99 in a Trunking system if a status has never been selected, such as when the transceiver is turned on.

If the transceiver receives a status transmission request message in the Stun state, the status configured in **Stun Response Status** will be sent. If **Stun Response Status** is not configured, the transceiver transmits the status as when the transceiver is in the normal state and not in the Stun state.

 Note

- The transceiver determines that a **Horn Alert Status** or **AUX Output Status Message** has been received only when the transceiver receives a Status Message between 0 and 99 on a channel in a DMR-based Trunking system.

Configuration using KPG-D3/ D3N

Configuring **Stun Response Status** ( **See** Radio Configuration > Protocol Options > DMR > Status)

Status List

To use a Status Message, the status to be sent must be preconfigured in the transceiver by using KPG-D3/ D3N prior to the transmission. A maximum of 1024 statuses can be configured in the Status List.

Table 2-16 Status List

Configuration	Description
Status	The status number can be configured. In a DMR Conventional system, a status number can be configured in the range between 0 and 1023. In a DMR-based Trunking system, a status number can be configured in the range between 0 and 99.
Status Name	The status name can be configured. It is not easy to recognize the meaning of a status only by viewing a status number. In this case, a user can link the status number to a short message; hence, it can be easily understood. A maximum of 16 characters can be configured. If the status number is configured in the Status List, the Status Name appears when the transceiver receives a Status Message. If the transceiver receives a status that is not configured in the Status List, the status number appears on the transceiver display.
Transmit Inhibit	The permission or inhibition of transmission of status can be configured. The status for which Transmit Inhibit is enabled does not appear on the status selection display in Status Mode. In this case, a user cannot select a status for which Transmit Inhibit is enabled in Status Mode.
Alert Tone	The type of tone sounding from the transceiver can be configured for a received status number from the status numbers registered in the Status List.
Voice Announcement	Voice guidance of when the transceiver receives a status can be configured for each status. If the transceiver receives a status for which voice guidance is configured, the voice guidance is executed. If Alert Tone is enabled, voice guidance is executed after an Alert Tone is emitted. To configure voice guidance for Voice Announcement, "User Programmable" needs to be configured in Voice Announcement Type.

Configuration using KPG-D3/ D3N

- Configuring **Status List** ( See Radio Configuration > System Properties > ID List/Status List > ID List/Status List > DMR Status > DMR Status List)
- Configuring **Voice Announcement Type** ( See Radio Configuration > Special Settings > Customization > Voice Announcement)

Status Message Stack

Status Message Stack is the function to store a Status Message in the stack memory of the transceiver. A maximum of 250 Status Message and Caller ID can be stored in the stack memory of the transceiver.

If a message is stored in the transceiver, the “” icon blinks as notification. In this case, a user can read the stored Status Message if the transceiver enters Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Status Message Stack** ( [See](#) Radio Configuration > Protocol Options > DMR > General > Stack > Message)

Status Message on Data System-personality

Status Message on Data System-personality is the function that allows the transceiver to automatically change the channel to the **Data System-personality** to send a Status Message in a DMR Conventional system.

The transceiver automatically changes the channel to the channel in a DMR Conventional system configured in **Data System-personality** to send a Status Message. When the transmission ends, the transceiver restores the Zone-channel that was used before sending the Status Message. **Status Message on Data System-personality** can be used to send data using a specific dedicated channel.

Note

- This function is not applied if an Emergency Status is sent while the transceiver is in Emergency Mode.

Configuration using KPG-D3/ D3N

- Configuring **Status Message on Data System-personality** ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications > Data System-personality)
- Configuring **Data System-personality** ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications > Data System-personality)

Sending the Received Status Message from the Communication Port (Status Message (Serial Output))

Status Message (Serial Output) allows the transceiver to send the Status and the Unit ID of the transmitting transceiver from its communication port when the transceiver receives a Status Message.

Using **Status Message (Serial Output)**, the dispatcher can monitor the received Status Message in real time.

In a DMR Tier III Trunking system and S-Trunking system, a DMR ID in the range between 1 and 16776415 is used for a Unit ID and Group ID in the data to be sent even if **Fleet Dialing Plan** is enabled.

Note

- To use **Status Message (Serial Output)**, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Status Message (Serial Output)** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > General > Serial Output)
- Assigning functions to the **COM port** ( [See](#) Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1,Bluetooth)

Power-on Status

Power-on Status allows the transceiver to send the selected Status Message when the transceiver is turned ON.

Using the **Power-on Status**, the base station can recognize that the transceiver has been turned ON. The transceiver sends the message to the Base ID of the system to which the channel selected when the transceiver is turned ON belongs.

The configuration in **Power-on Status** is used in common in a DMR Conventional system and DMR-based Trunking system. In **Power-on Status**, a status can be configured in the range between 0 and 1023. However, the configuration range of **Power-on Status** is between 0 and 99 in a DMR-based Trunking system. Therefore, if a status 100 or higher is configured when the transceiver sends a **Power-on Status** in a DMR-based Trunking system, the transceiver changes the status to 99 to send the Status Message.

Note

- In a DMR-based Trunking system, the transceiver ends a transmission without sending the Power-on Status again if the transceiver fails to send the Power-on Status.
- If **Transceiver Password** is used at the same time, a Status Message is sent when the transceiver is turned on and the transceiver migrates from Transceiver Password Mode to user mode.
- For transmission with GPS data added by using the **GPS Combination** function, or when BLE data is sent by using the **BLE Combination** function, using the functions by configuring the **Preamble Length** configuration to 1 second or more is recommended. (Refer to [Sending GPS Data Together With Status Call \(GPS Combination\)](#), [Sending the BLE Data Linked With the Configured Mode \(BLE Combination \(Indoor Location\)\)](#), and [Preamble Length](#).)

Configuration using KPG-D3/ D3N

Configuring **Power-on Status** ( [See](#) Radio Configuration > Protocol Options > DMR > Status)

Power-off Status

Power-off Status allows the transceiver to send the selected Status Message when the transceiver is turned OFF.

Using the **Power-off Status**, the base station can recognize that the transceiver has been turned OFF. The transceiver sends the message to the Base ID of the system to which the channel selected when the transceiver is turned OFF belongs.

The configuration in **Power-off Status** is used in common in a DMR Conventional system and DMR-based Trunking system. In **Power-off Status**, a status can be configured in the range between 0 and 1023. However, the configuration range of **Power-off Status** is between 0 and 99 in a DMR-based Trunking system. Therefore, if a status 100 or higher is configured when the transceiver sends a **Power-off Status** in a DMR-based Trunking system, the transceiver changes the status to 99 to send the Status Message.



Note

- In a DMR-based Trunking system, the transceiver ends a transmission without sending the Power-off Status again if the transceiver fails to send the Power-off Status.

Configuration using KPG-D3/ D3N

Configuring **Power-off Status** (See Radio Configuration > Protocol Options > DMR > Status)

Base ID

Base ID is the target transceiver's ID used to send GPS data or Transparent data and the following Status Messages and Short Messages:

- AUX Input Status Message (Mobile Only)
- Power-on Status
- Power-off Status
- A Status Message that is sent by selecting a status number or directly entering a status number after the transceiver enters Status Mode by pressing the **Status** button or the **[0]** to **[9]** buttons on the keypad
- A Status Message that is sent by selecting a status number or directly entering a status number after the transceiver enters Status Mode by a user selecting "Status" from Menu Mode
- A Status Message that is sent by pressing any of the **PF** buttons having "Call 1" to "Call 6" allocated
- A Status Message that is sent when any of the AUX Input ports having "Call 1" to "Call 6" allocated becomes active (Mobile only)
- A Short Message that is sent by entering a text string after the transceiver enters Short Message Mode by pressing the **Short Message** button or the **[0]** to **[9]** buttons on the keypad
- A Short Message that is sent by entering a text string after the transceiver enters Short Message Mode by a user selecting "Short Message" from Menu Mode

By using KPG-D3/ D3N, either Unit ID or Group ID can be configured as **Base ID**.

In a DMR Tier III Trunking system and S-Trunking system, if **Fleet Dialing Plan** is enabled, **Base ID** can be configured even in the Prefix-Fleet-IN/GN format. The ID of the base station which is responsible for operation and administration of system is normally configured.

Table 2-17 Destination ID Configuration

Configuration	Description
Base ID Type	The ID type (Group ID or Unit ID) of the target transceiver when the transceiver sends GPS data can be configured.
Base ID	The ID of the target transceiver when the transceiver sends GPS data can be configured. Base ID can be configured in the range between 000001 and FFFCDF (hexadecimal), or between 1 and 16776415 (decimal). If “Group ID” is configured in Base ID Type , “ALL” can be configured.
Prefix-Fleet-IN/GN	The ID of the target transceiver when the transceiver sends GPS data by using Fleet Dialing can be configured. The ID consists of Prefix, Fleet, and IN (Individual Number)/ GN (Group Number). ● Prefix A Prefix number can be configured in the range between 328 and 806. ● Fleet A Fleet number can be configured in the range between 20 and 89. ● IN (Individual Number)/ GN (Group Number) If “User ID” is configured in Base ID Type: If the Fleet is between 20 and 41, an Individual number can be configured in the range between 200 and 899. If the Fleet is between 42 and 89, an Individual number can be configured in the range between 200 and 549. If “Group ID” is configured in Base ID Type: A Group number can be configured in the range between 900 and 999.

Configuration using KPG-D3/ D3N

- Configuring the **Base ID Type** and **Base ID** in DMR Conventional
( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications)
- Configuring **Base ID Type** and **Base ID** in DMR-based Trunking ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Data Communications)
- Configuring **Base ID Type** and **Base ID** in DMR-based Trunking ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Data Communications)

Emergency Status Response

Emergency Status Response is the function to emit an Alert Tone when the transceiver receives an Emergency Status. The transceiver behaves as follows according to the configuration using KPG-D3/ D3N:

Table 2-18 Emergency Status Response

Configuration	Description
Alert Tone	The Alert Tone configured for Tone Number sounds from the transceiver when receiving an Emergency Status. In a DMR-based Trunking system, the Alert Tone does not stop even if the Auto Reset Timer elapses. Pressing any button stops the Alert Tone. However, when the transceiver receives a voice call, the Alert Tone which sounds for the reception of a voice call and the received voice call output have priority.
Horn Alert (Mobile only)	If receiving an Emergency Status, the Alert Tone configured for Tone Number sounds from the transceiver and the Horn Alert port is activated. In a DMR-based Trunking system, the behavior of the Horn Alert port does not stop even if the Auto Reset Timer elapses.
Voice Announcement	If the transceiver receives an Emergency Status for which voice guidance is configured, the voice guidance is executed. If Alert Tone is enabled, voice guidance is executed after an Alert Tone is emitted. To configure voice guidance for Voice Announcement, "User Programmable" needs to be configured in Voice Announcement Type . In a DMR-based Trunking system, the Alert Tone does not stop even if the Auto Reset Timer elapses. Pressing any button stops the Alert Tone. However, when the transceiver receives a voice call, the Alert Tone which sounds for the reception of a voice call and the received voice call output have priority.

Configuration using KPG-D3/ D3N

- Configuring **Emergency Status Response (Alert Tone/ Horn Alert/ Voice Announcement)** ( [See](#) Radio Configuration > Protocol Options > DMR > General > Emergency > Emergency Status Response)
- Configuring **Tone Number** in DMR Conventional ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Conventional)
- Configuring **Tone Number** in DMR-based Trunking ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking)

AUX Input Status Message

Supported Models: Mobile

AUX Input Status Message is the function that sends out a specified Status Message when the AUX Input port goes high level to low level or goes low level to high level.

A Status Message can be sent out when there is a change in the AUX Input port status by attaching a sensor to the port. The target transceiver is the ID configured in Base ID. (Refer to [Base ID](#).)

The configuration in **AUX Input Status Message** is used in common in a DMR Conventional system and DMR-based Trunking system. In **AUX Input Status Message**, a status can be configured in the range between 0 and 1023. However, the configuration range of **AUX Input Status Message** is between 0 and 99 in a DMR-based Trunking system. Therefore, if a status 100 or higher is configured when the transceiver sends an **AUX Input Status Message** in a DMR-based Trunking system, the transceiver changes the status to 99 to send the Status Message.

To use this function, **AUX Input Status Message** must be assigned to one of AUX Input ports.



- An Emergency Status can also be sent by using AUX Input Status Message.

Configuration using KPG-D3/ D3N

- Configuring **AUX Input Status Message** (See Radio Configuration > Protocol Options > DMR > Status > AUX Port Status Function > Input)
- Assigning functions to the AUX Input port (See Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)

AUX Output Status Message

Supported Models: Mobile

AUX Output Status Message is the function to switch the status of the AUX Output port from high to low or from low to high when the transceiver receives the specified Status Message. This function can be used to remotely turn the external device on or off.

The configuration in **AUX Output Status Message** is used in common in a DMR Conventional system and DMR-based Trunking system. In **AUX Output Status Message**, a status can be configured in the range between 0 and 1023. However, the configuration range of **AUX Output Status Message** is between 0 and 99 in a DMR-based Trunking system. Therefore, the AUX Output port switches from high level to low level or from low level to high level only when the transceiver receives the Status Message for a status between 0 and 99.

To use this function, **AUX Output Status Message** must be assigned to one of AUX Output ports.

Configuration using KPG-D3/ D3N

- Configuring **AUX Output Status Message** (See Radio Configuration > Protocol Options > DMR > Status > AUX Port Status Function > Output)
- Assigning functions to the AUX Output port (See Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)

Storing the Selected or Sent Status (Status Hold)

Status Hold is the function to store in the transceiver the status selected from the Status List in Status Mode and the transmitted status.

When the transceiver receives a Status Inquiry Message, the status stored in the transceiver will automatically be transmitted. Also, the status stored in the transceiver will be used as the status to be transmitted when the Status Inquiry Message is received.

Table 2-19 Status Hold

Configuration	Description
Selected	The transceiver stores the status selected from the Status List in Status Mode.
Selected + Sent	The transceiver stores a status selected from the Status List in Status Mode and a status transmitted by one of the following method. • The status transmitted when one of the AUX Input Status Message 1 to AUX Input Status Message 3 ports change (Mobile only) • The status transmitted when the transceiver is turned on (Power-on Status) • The status transmitted by pressing any of the PF buttons having “Call 1” to “Call 6” allocated • The status transmitted when any of the AUX Input ports having “Call 1” to “Call 6” allocated becomes active (Mobile only) • The status transmitted by using a PC command

Although the range of the status that can be sent varies in a DMR Conventional system and DMR-based Trunking system, the Status List can be used in common. If the transceiver receives a Status Inquiry Message on a channel in a DMR-based Trunking system when the status stored in the transceiver is 100 or higher, the transceiver changes the status to 99 to transmit. However, the status stored in the transceiver is not changed.

Configuration using KPG-D3/ D3N

Configuring **Status Hold** ( **See** Radio Configuration > Protocol Options > DMR > Status)

2.11 Sending and Receiving a Short Message (Short Data Call)

Short Data Call is the message communication function to send and receive a text string. Information which is difficult to send by voice, such as an address or a telephone number, can be reliably sent.

Note

- This section describes information for both a DMR Conventional system and DMR-based Trunking system. For each operation description, the display of the DMR Conventional system is used.

The number of characters that can be sent and received is as follows:

● DMR Conventional

The number of characters that can be sent:

During a Group Call: A maximum of 365 characters

During an Individual Call: A maximum of 489 characters

The number of characters that can be received:

During a Group Call: A maximum of 369 characters

During an Individual Call: A maximum of 493 characters

● Trunking 2.5

The number of characters that can be sent and received:

During a Group Call: A maximum of 23 characters

During an Individual Call: A maximum of 23 characters

● DMR Tier III Trunking/ S-Trunking

The number of characters that can be sent and received:

During a Group Call: A maximum of 365 characters

During an Individual Call: A maximum of 489 characters

Also, in a DMR-based Trunking system, the communication channel varies as follows depending on the number of characters to send and receive, and on whether encrypted communications are used:

Table 2-20 Channel Used in a DMR-based Trunking System

Encryption	Number of Characters That Can Be Sent and Received	
	46 bytes or less	47 bytes or more (DMR Tier III Trunking and S-Trunking only)
Disabled	Control Channel	Traffic Channel
Enabled	Traffic Channel	Traffic Channel

About the Configuration for the DMR Message Communications (DMR Message Type)

In a DMR Conventional system, when “KENWOOD-defined Data” is configured in **DMR Message Type**, the transceiver carries out communication of mutually-compatible messages with transceivers that support KENWOOD’s DMR Protocol. Also the transceiver is compatible with the proprietary communication standard of Hytera Communications Corporation Limited.

If “DMR Standard” is configured in **DMR Message Type**, the transceiver communicates compliant with DMR Standard. If a transceiver of another company supports the configuration of DMR Standard, the transceiver can initiate compatible message communications with the transceiver of another company.

Regarding the receipt of a Short Message, the transceiver can receive messages of both the KENWOOD-defined Data configuration and DMR Standard configuration, regardless of the configuration in **DMR Message Type**.

Note

- In a DMR-based Trunking system, “DMR Standard” is fixed as the data format of **DMR Message Type**.

Configuration using KPG-D3/ D3N

Configuring **DMR Message Type** ( See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications)

Sending a Short Message

The transceiver sends a Short Message by one of the following operations.

• Short Message Mode

The transceiver enters Short Message Mode and sends a Short Message by one of the following operations.

• Short Message, Individual + Short Message, or Group + Short Message button

Pressing the **Short Message** button places the transceiver in Short Message Mode. In this case, a Short Message is addressed to a Base ID.

Pressing the **Individual + Short Message** button places the transceiver in Individual Call Mode. The transceiver enters Short Message Mode by pressing the **[▶]** button, or pressing and holding the **Menu** (**[⏏]**) button or **[*]** button after selecting the target Unit ID.

The transceiver's behavior when the **Group + Short Message** button is pressed varies depending on the system.

For a DMR Conventional system:

The transceiver enters Group Call Mode. The transceiver enters Short Message Mode by pressing the **[▶]** button, or pressing and holding the **Menu** (**[⏏]**) button or **[*]** button after selecting the target Group ID.

For a DMR-based Trunking system:

The transceiver enters Short Message Mode. The Group ID configured for the channel must be selected before entering Short Message Mode.

• Menu Button

The transceiver enters Short Message Mode when the **Menu** button is pressed to enter Menu Mode and then "Short Message" is selected. In this case, a Short Message is addressed to a Base ID.

Pressing the **Menu** button to enter Menu Mode and then selecting "Individual + Short Message" places the transceiver in Individual Call Mode. The transceiver enters Short Message Mode by pressing the **[▶]** button, or pressing and holding the **Menu** (**[⏏]**) button or **[*]** button after selecting the target Unit ID.

The transceiver's behavior varies depending on the system when the **Menu** button is pressed to enter Menu Mode and then selecting "Group + Short Message".

For a DMR Conventional system:

The transceiver enters Group Call Mode. The transceiver enters Short Message Mode by pressing the **[▶]** button, or pressing and holding the **Menu** (**[⏏]**) button or **[*]** button after selecting the target Group ID.

For a DMR-based Trunking system:

The transceiver enters Short Message Mode. The Group ID configured for the channel must be selected before entering Short Message Mode.

Refer to Common Function Part "[Using Menu Mode](#)" for operations in Menu Mode.

• Keypad entry

If "Short Message" is configured for **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the transceiver keypad places the transceiver in Short Message Mode. The transceiver will be on hold as the first digit of the Short Message is entered. In this case, a Short Message is addressed to a Base ID.

If "Individual + Short Message" is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad places the transceiver in Individual Call Mode. The transceiver enters Short Message Mode by pressing the **[▶]** button, or pressing and holding the **Menu** (**[⏏]**) button or **[*]** button after selecting the target Unit ID.

The transceiver's behavior varies depending on the system while "Group + Short Message" is configured for **Keypad Operation**.

For a DMR Conventional system:

Pressing the **[0]** button to **[9]** button on the transceiver keypad places the transceiver in Group Call Mode. The transceiver enters Short Message Mode by pressing the **[▶]** button, or pressing and holding the **Menu** (**[⏏]**) button or **[*]** button after selecting the target Group ID.

For a DMR-based Trunking system:

Pressing the **[0]** button to **[9]** button on the transceiver keypad places the transceiver in Short Message Mode. The Group ID configured for the channel must be selected before entering Short Message Mode.

● PC command

“Data”, “Data + GPS Data Output”, or “Data + Location Data Output” is assigned to the communication port of the transceiver. The transceiver will send a Short Message when a PC sends a command to the transceiver communication port specifying to send a Short Message. (Refer to Common Function Part [Available Functions for COM Port.](#))

The following describes how to send a Short Message in Short Message Mode.

Note

- For operating in Individual Call Mode or Group Call Mode, refer to the information on the various call types of DMR.

Operating the transceiver

1 Select one of the following operations to place the transceiver in Short Message Mode.

- **Press the Short Message button.**

The transceiver enters Short Message Mode. In this case, a Short Message is addressed to a Base ID.

- **Press the Individual + Short Message button.**

Pressing the **[▶]** button after selecting the Unit ID of the target transceiver causes Short Message Mode to be entered.

- **Press the Group + Short Message button. (DMR Conventional system)**

Pressing the **[▶]** button after selecting the Group ID of the target transceiver causes Short Message Mode to be entered.

- **Press the Group + Short Message button after selecting the Group ID configured for the channel. (DMR-based Trunking system)**

The transceiver enters Short Message Mode.

Or, the transceiver enters Short Message Mode by pressing the **Menu** button or using a keypad. In this case, the following operations are identical.



2 Enter a Short Message.

For a Group call, a maximum of 365 characters can be entered, and for an Individual Call, a maximum of 489 characters can be entered. Refer to Common Function Part [“Entering or Deleting Characters”](#) for entry method.



3 Press the PTT switch or the Menu ([□]) button.

The transceiver sends the Short Message.



“Complete” appears if the Short Message is properly sent to the target transceiver.



 Note

- The entry screen for messages closes at the same time as pressing the **PTT** switch or the **Menu** () button. If entering a message and sending a Short Data Call again, reexecute the operations from step 1.
- In a DMR Conventional system, “No Reply” appears on the display and transmission of a Short Message is terminated if no response is received from the target transceiver. If transmission fails because of busy status, “Busy” appears on the display and transmission of a Short Message is terminated.
- For details on the information displayed on the display during transmission in a DMR-based Trunking system, refer to [“Transceiver behavior during transmitting”](#).

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the **Keypad Operation** of the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring the **Base ID Type** and **Base ID** in DMR Conventional
( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications)
( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Data Communications)
- Configuring **Base ID Type** and **Base ID** in DMR-based Trunking ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Data Communications)

Receiving a Short Message

Upon receiving a Short Message, the received Status Message appears on the display, and the transceiver can send the Short Message to an external device from the communication ports.

Note

- To use serial communications, a user needs to prepare DMR compatible software or external devices.
- A received Short Message can be left as a record. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Transceiver behavior

1 The transceiver starts receiving a Short Message.

“Receive Data” appears.

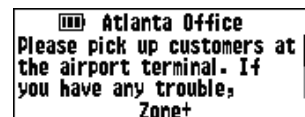


2 The transceiver receives a Short Message.

The “✉” icon blinks and “Complete” appears.



The initial portion (three lines) of the ID Name and Short Message of the transmitting transceiver appears for three seconds. Then, the display is scrolled line by line every two seconds until the last line is shown. After the last line is shown, the display scroll is repeated from the first line.



Note

- If **Alert Tone (Tone Number)** is configured to sound when receiving, an Alert Tone will sound. Pressing any button on the transceiver stops the Alert Tone from sounding.
- If the received message fits on a single screen, a scroll display is not activated.

Configuration using KPG-D3/ D3N

- Configuring **Alert Tone (Tone Number)** in DMR Conventional ([See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Conventional)
- Configuring **Alert Tone (Tone Number)** in DMR-based Trunking ([See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking)

Short Message Stack

Short Message Stack is used to store a Short Message in the stack memory. If storing Short Messages using the DMR protocol, a maximum of 32 Short Messages can be stored in the stack memory.

If a message is stored in the transceiver, the “✉” icon blinks as notification. In this case, a user can read the stored Short Message when the transceiver enters Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Note

- The maximum number of Short Message data that can be stored in the transceiver stack memory varies as follows depending on the configuration of **Short Message Stack** in each communication protocol.

Table 2-21 The Maximum Number of Short Messages That Can Be Stored (DMR/ FleetSync)

Configuration of Short Message Stack		The maximum number of data that can be stored
DMR	FleetSync	
Disabled	Disabled	0
Disabled	Enabled	128
Enabled	Disabled	32
Enabled	Enabled	32

Configuration using KPG-D3/ D3N

Configuring **Short Message Stack** ( [See](#) Radio Configuration > Protocol Options > DMR > General > Stack > Message)

Short Message on Data System-personality

Short Message on Data System-personality is the function that allows the transceiver to automatically change the channel to the **Data System-personality** to send a Short Message in a DMR Conventional system.

The transceiver automatically changes the channel to the channel in a DMR Conventional system configured in **Data System-personality** to send a Short Message. When the transmission ends, the transceiver restores the Zone-channel that was used before sending the Short Message. **Short Message on Data System-personality** can be used to send data using a specific dedicated channel.

Configuration using KPG-D3/ D3N

- Configuring **Short Message on Data System-personality** ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications > Data System-personality)
- Configuring **Data System-personality** ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications > Data System-personality)

Sending the Received Short Message from the Communication Port (Short Message (Serial Output))

Short Message (Serial Output) allows the transceiver to send a Short Message and the Unit ID of the transmitting transceiver from the transceiver's communication port when the transceiver receives a Short Message.

Using **Short Message (Serial Output)**, the dispatcher can monitor received Short Messages in real time.

In a DMR Tier III Trunking system and S-Trunking system, a DMR ID in the range between 1 and 16776415 is used for a Unit ID and Group ID in the data to be sent even if **Fleet Dialing Plan** is enabled.

Note

- To use **Short Message (Serial Output)**, "Data", "Data + GPS Data Output", or "Data + Location Data Output" needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Short Message (Serial Output)** to be enabled or disabled ( **See** Radio Configuration > Protocol Options > DMR > General > Serial Output)
- Assigning functions to the **COM port** ( **See** Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1,Bluetooth)

2.12 Sending and Receiving a Long Message (Long Data Call)

Long Data Call can be used to send and receive a maximum of 4,096 characters (Long Message).

By using Long Message, information can reliably be sent to the target transceiver.

The transceiver cannot display the received Long Message on the display.

Note

- This section describes information for both a DMR Conventional system and DMR-based Trunking system. For each operation description, the display of the DMR Conventional system is used.

Sending a Long Message

A Long Message is sent from an external device such as a PC. A Long Message cannot be sent from the transceiver.

To send a Long Message, "Data", "Data + GPS Data Output", or "Data + Location Data Output" needs to be assigned to a communication port 0 to 2 or the Bluetooth of the transceiver. (Refer to Common Function Part [Available Functions for COM Port.](#))

Transceiver behavior

A PC sends the PC command to the transceiver to request transmission of a Long Message.

The transceiver starts sending the Long Message.



If the Long Message is properly sent to the receiving transceiver, "Complete" appears for approximately 1 sec.



Note

- In a DMR Conventional system, "No Reply" appears on the display and transmission of a Long Message is terminated if no response is received from the target transceiver. If the target transceiver is busy, "Busy" appears on the display and transmission of a Long Message is terminated.
- For details on the information displayed on the display during transmission in a DMR-based Trunking system, refer to ["Transceiver behavior during transmitting"](#).

Configuration using KPG-D3/ D3N

Assigning functions to **COM port** (See Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1,Bluetooth)

Receiving a Long Message

The received Long Message data can be transferred via a PC or external device.

Note

- To use serial communications, a user needs to prepare DMR compatible software or external devices.
- To receive a Long Message, the received Color Code needs to match.

Transceiver behavior

If the transceiver receives a Long Message, “Receive Data” appears on the transceiver display.



When the reception of the Long Message completes, “Complete” appears on the transceiver display for approximately 1 sec.



The received Long Message is transferred to an external device such as a PC with the serial output.

Note

- If an ACK for a receipt response message cannot be received, the transceiver resends the receipt response message up to a maximum number of times configured in **Number of Retries**. Even if an ACK cannot be received, because the transceiver is receiving a Long Message, “Complete” appears for 1 sec and the transceiver completes reception of the Long Message.

Long Message on Data System-personality

Long Message on Data System-personality is the function that allows the transceiver to automatically change the channel to the **Data System-personality** to send a Long Message in a DMR Conventional system.

The transceiver automatically changes the channel to the channel in a DMR Conventional system configured in **Data System-personality (DMR)** to send a Long Message. When the transmission ends, the transceiver restores the Zone-channel which was used before sending the Long Message. **Long Message on Data System-personality** can be used to send data using a specific dedicated channel.

Configuration using KPG-D3/ D3N

- Configuring **Long Message on Data System-personality** (See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications > Data System-personality)
- Configuring **Data System-personality (DMR)** (See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications > Data System-personality)

2.13 Communicating with a Telephone (Telephone Call)

Telephone Call is the function to initiate voice communications using a telephone by connecting to a telephone line such as PSTN and PABX.

A call can be initiated from the transceiver to a telephone, and from a telephone to the transceiver.

For a Telephone Call in a DMR Conventional system, voice communications by a SIP Phone are made by using an Individual Call or Group Call (an incoming call only).

Initiating a Telephone Call

Telephone Call has two configurations: the configuration with an IP Gateway connection and the configuration without an IP Gateway connection.

In the configuration where an IP Gateway is connected, the transceiver can identify an Individual ID unique to PSTN or PABX.

The sender ID (Telephone ID) of when an IP Gateway is connected is \$FFFE1 for PABX and \$FFFE0 for PSTN.

When an Individual Call or Group Call is received from a Telephone ID, **Auto Reset Timer** functions as “0 sec” regardless of the FPU settings.

A Telephone Call can be initiated by one of the following methods:

● Paging Call

By pressing the **PTT** switch or **Menu** () button after a target ID is selected or a target ID is directly specified in Individual Call Mode, the transceiver sends a Paging Call.

The KAIROS system or the NXR-1700/ NXR-1800 repeater system is used for a Paging Call.

Also, the target ID of a Paging Call needs to match the configuration in a system.

● Autodial Mode (Autodial button)

In Autodial Mode, a Telephone Call is initiated by selecting a DTMF code configured in the Autodial List, or directly entering a DTMF code and pressing the **PTT** switch. (Refer to [Sending a DTMF Code by Selecting from a List \(Autodial List\)](#).)

Pressing the **Autodial** button places the transceiver in Autodial Mode.

The transceiver can also be placed in Autodial Mode by executing “Autodial” after placing the transceiver in Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

● Keypad entry

If “Autodial” is configured in **Keypad Operation**, pressing a button on the keypad causes the transceiver to enter Autodial Mode. If the transceiver with **Store and Send** enabled is in Autodial Mode, the transceiver will be on hold as the first digit of the DTMF code is entered.

A Telephone Call is initiated by entering a DTMF code and pressing the **PTT** switch.

To make a Telephone Call from Autodial Mode, “01” needs to be added to the beginning of the DTMF code for a PSTN telephone line, and “02” needs to be added to the beginning of the DTMF code for a PABX telephone line.

● Call button

Pressing any of the buttons for **Call 1** to **Call 6**, or activating any of the ports for **Call 1** to **Call 6** (Mobile only) initiates a Telephone Call addressed to a telephone number of the selected Autodial List. A DTMF code of the target transceiver can be configured for the **Call 1** to **Call 6** buttons by selecting one DTMF code from the Autodial List by using KPG-D3/ D3N. (Refer to [Sending the DTMF Code with a Single Touch \(Call 1 to Call 6 Buttons\)](#).)

To make a Telephone Call from a **Call** button, “01” needs to be added to the beginning of the DTMF code for a PSTN telephone line, and “02” needs to be added to the beginning of the DTMF code for a PABX telephone line.

Note

- To make a Telephone Call by Paging Call, **Individual Call Acknowledge Request** needs to be disabled.
- To make a Telephone Call in Autodial Mode or by the **Call** button, the **Autodial Telephone Interconnect** configuration needs to be enabled.
- Telephone Call functions by using the Individual Call and Group Call functions. Therefore, for **Busy Channel Lockout**, configure the transceiver to be able to transmit even while unmuted. In addition, use Telephone Call after configuring the Encryption and **Call Interruption** functions to be disabled.
- To use **Autodial Telephone Interconnect**, execute the configuration described just above (in Note), and configure anything other than “No” in **Busy Channel Lockout**.
- When a call is made to a telephone by Paging Call, an ID available for the call is the same as the one for making a Paging Call to the transceiver. Therefore, **Encodable Unit ID Range** needs to be properly configured so that a call can be made from the transceiver to a telephone.

Operating the transceiver

● Initiating a Telephone Call by using Individual Call

The transceiver starts an Individual Call by telephone after starting a Paging Call. When the telephone of the other party responds, communications by Telephone Call become possible.

The “” icon starts blinking, and “Telephone” and “PABX” or “PSTN” appear.

**Note**

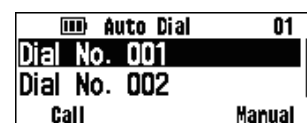
- When a response from a telephone is received, the transceiver behaves the same as when an Individual Call is received (Refer to [Receiving an Individual Call](#)).
- Pressing the **Clear** button terminates a Telephone Call, and the transceiver restores the previous channel display.

● Initiating a Telephone Call by selecting a DTMF code from the Autodial List

1 Press the **Autodial** button on the channel of the system with Autodial Telephone Interconnect enabled.

The transceiver enters Autodial Mode and then the Autodial List selection display appears.

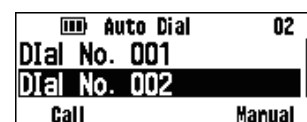
The following operations are identical when the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.

**Note**

- If **Store and Send** is enabled, the DTMF code entry display will appear. Pressing the **Back** () button causes the transceiver to switch to the selection screen for the Autodial List.

2 Press the **[▲]** or **[▼]** button to select the DTMF code to be sent from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **PTT** switch, or **Menu** ([) button.

The connection request of a SIP Phone to the repeater is executed by Individual Call.

“Individual” and “Calling” appear.



4 Receive the response from the repeater.

The “” icon blinks, and “PABX” or “PSTN” appears.

The communication state of Individual Call is entered, and the selected DTMF code is sent.

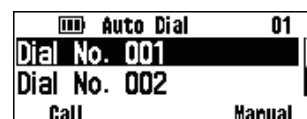


● Initiating a Telephone Call by directly entering a DTMF code

1 Press the **Autodial** button on the channel of the system with Autodial Telephone Interconnect enabled.

The transceiver enters Autodial Mode and then the Autodial List selection display appears.

The following operations are identical when the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.



Note

- If **Store & Send** is enabled, the DTMF code entry display will appear.

2 Press the **Back** ([) button.

The DTMF code entry display appears.



3 Enters a DTMF code.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

- **Using the keypad**

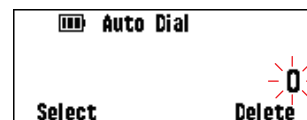
Press a button on the keypad to enter a DTMF code.

- **Using the PF buttons**

Enter a DTMF code by pressing the **[▲]** button or **[▼]** button and confirm the entered DTMF code by pressing the **Menu** (**[□]**) button.

Note

- To enter the DTMF “A” code, press and hold the **[*]** button and then press the **[2]** button.
- To enter the DTMF “B” code, press and hold the **[*]** button and then press the **[5]** button.
- To enter the DTMF “C” code, press and hold the **[*]** button and then press the **[8]** button.
- To enter the DTMF “D” code, press and hold the **[*]** button and then press the **[0]** button.
- To enter the DTMF “*” code, press the **[*]** button and then press the **[*]** button.
- To enter the DTMF “#” code, press the **[*]** button and then press the **[#]** button.
- If “Direct Entry” is configured in *** and # Buttons**, pressing the **[*]** button or **[#]** button directly enters the “*” or “#” tone.
In this case, the above operations are unavailable.



4 Press the **PTT** switch or the **Menu** (**[□]**) button.

The connection request for a Telephone Call to the repeater is executed by Individual Call.

“Individual” and “Calling” appear.



5 Receive the response from the repeater.

The “**📞**” icon blinks, and “PABX” or “PSTN” appears.

The communication state of Individual Call is entered, and the entered DTMF code is sent.

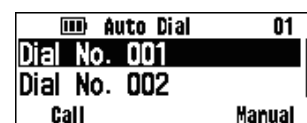


● Redialing

1 Press the **Autodial** button on the channel of the system with Autodial Telephone Interconnect enabled.

The transceiver enters Autodial Mode and then the Autodial List selection display appears.

The following operations are identical when the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.

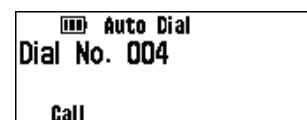


Note

- If **Store and Send** is enabled, the DTMF code entry display will appear. Pressing the **Back** ([↵]) button causes the transceiver to switch to the selection screen for the Autodial List.

2 Press the [*] button and then press the [0] button.

The name or DTMF code of the target transceiver of the last transmission appears.



3 Press the **PTT** switch or the **Menu** ([☐]) button.

The connection request for a Telephone Call to the repeater is executed by Individual Call.

“Individual” and “Calling” appear.



4 Receive the response from the repeater.

The “📞” icon blinks, and “PABX” or “PSTN” appears.

The communication state of Individual Call is entered, and the selected DTMF code is sent.



Note

- If **Transmit LED** is enabled, the LED lights red during the transmission of a Telephone Call. (Refer to Common Function Part [Transmit LED](#).)
- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when the **PTT** switch is pressed to execute the connection request of a Telephone Call to the repeater. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver while the transceiver is waiting for a response from the repeater. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for communications.
- If **Sidetone** of DTMF is enabled, the DTMF tone sounds from the speaker during the transmission of a DTMF code.
- Pressing the **Clear** button allows terminating the Telephone Call. For Mobile, if **On-hook Disconnect** is enabled, a Telephone Call terminates by placing the microphone in the on-hook state.
- For details on the information displayed on the display during transmission, refer to “[Transceiver behavior during transmitting](#)”.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Store and Send** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)
- Configuring **Autodial Telephone Interconnect** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional (DMR Site Roaming) > DMR > Autodial Telephone Interconnect)
- Configuring **Call Request Tone** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional (DMR Site Roaming) > DMR > Autodial Telephone Interconnect)
- Configuring **Call Processing Tone** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional (DMR Site Roaming) > DMR > Autodial Telephone Interconnect)
- Configuring **Call in Progress Tone** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional (DMR Site Roaming) > DMR > Autodial Telephone Interconnect)
- Configuring the DTMF codes corresponding to the **Call 1** to **Call 6** buttons or ports ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call)
- Configuring **Sidetone** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)
- Configuring **On-hook Disconnect** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > General > Control > Microphone-hook)

Receiving a Telephone Call

The transceiver can receive a Telephone Call from a telephone.

● Receiving a Telephone Call by using Individual Call

When a Telephone Call is received, the “📞” icon starts blinking, and “Telephone” and “PABX” or “PSTN” appear.



Note

- An Alert Tone sounds from the transceiver according to the configuration in **Alert Tone (Individual Call)** when the transceiver receives a Telephone Call by Individual Call.
- Pressing the **Clear** button terminates a Telephone Call, and the transceiver restores the previous channel display.

● Receiving a Telephone Call by using Group Call

When a Telephone Call is received, the “📞” icon starts blinking, and the received Group ID or the transmitting Unit ID (ID Name), and “PABX” or “PSTN” appear.



Note

- For a Telephone Call by using Group Call, a disconnection request is not sent to the system even if the **Clear** button is pressed. A Button Beep B (2 beeps) sounds from the transceiver, and the transceiver restores the previous channel display.
- The received Group ID or the transmitting Unit ID (ID Name) is displayed according to the configuration in **Group Call Display Type**.

Configuration using KPG-D3/ D3N

- Configuring **Alert Tone (Individual Call)** (See Radio Configuration > System Properties > ID/Status List > ID/Status List > DMR Individual ID > DMR Individual ID List)
- Configuring **Group Call Display Type** to be enabled or disabled (See Radio Configuration > Protocol Options > DMR > General > RX Options)

2.14 Sending a DTMF Code

DTMF (Dual Tone Multi-frequency) is the signaling type that uses 2 different frequency tones simultaneously.

DTMF signaling uses 2 different frequencies combined (one lower and one higher frequency) and consists of the 0 to 9, A to D, * and # tones.

Table 2-22 DTMF Tone Frequency List

DTMF Code	Frequency	
	Low Frequency	High Frequency
0	941 Hz	1336 Hz
1	697 Hz	1209 Hz
2	697 Hz	1336 Hz
3	697 Hz	1477 Hz
4	770 Hz	1209 Hz
5	770 Hz	1336 Hz
6	770 Hz	1477 Hz
7	852 Hz	1209 Hz
8	852 Hz	1336 Hz
9	852 Hz	1477 Hz
A	697 Hz	1633 Hz
B	770 Hz	1633 Hz
C	852 Hz	1633 Hz
D	941 Hz	1633 Hz
*	941 Hz	1209 Hz
#	941 Hz	1477 Hz

Various functions of DTMF Encode can be used in a DMR system.

The following are the methods for sending a DTMF code:

- Manual Dialing
- Keypad Auto PTT
- Store and Send
- Autodial List selection
- **Call** button
- Redial

Sending the DTMF Code While Transmitting (Manual Dialing)

The DTMF code corresponding to a particular button on the keypad can be sent when pressing the button while transmitting by pressing the **PTT** switch.

Operating the transceiver

- 1 Press the **PTT** switch.
- 2 Press the button corresponding to the DTMF code to be sent.

The transceiver sends the DTMF code.

- 3 Repeat Step 2 as necessary.

Configuration using KPG-D3/ D3N

Configuring **Manual Dialing** to be enabled or disabled ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)

Sending the DTMF Code by Pressing a Button on the Keypad without Using the PTT Switch (Keypad Auto PTT)

Pressing a button on the keypad allows the transceiver to start transmitting immediately and can send the DTMF code corresponding to the button. This function can be used to send the DTMF code just by pressing the buttons on the keypad without pressing the **PTT** switch.

Note

- To use this function, **Manual Dialing** needs to be enabled.

Operating the transceiver

- 1 Press the button corresponding to the DTMF code to be sent.

The transceiver sends the DTMF code.

- 2 Repeat Step 1 as necessary.

Configuration using KPG-D3/ D3N

- Assigning functions to **Keypad Operation** on the transceiver ( See Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring **Manual Dialing** to be enabled or disabled ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)

Sending Entered DTMF Codes All at Once (Store and Send)

The DTMF codes to be sent can be temporarily entered beforehand using the keypad, then sent all at once. A maximum of 34 digits can be transmitted in a single operation.

To use this function, **Store and Send** needs to be enabled using KPG-D3/ D3N.

The transceiver can enter Autodial Mode and the DTMF code can be entered using one of the following operations:

● Autodial Button

Pressing the **Autodial** button places the transceiver in Autodial Mode.

● Menu Button

Pressing the **Menu** button to enter Menu Mode and then selecting “Autodial” places the transceiver in Autodial Mode. (Refer to Common Function Part [Using Menu Mode](#).)

● Keypad entry

If “Autodial” is configured in **Keypad Operation**, pressing a button on the keypad causes the transceiver to enter Autodial Mode. The transceiver will be on hold as the first digit of the DTMF code is entered. (Refer to Common Function Part [Keypad Operation](#).)

Operating the transceiver

● If using the keypad:

1 Press the **Autodial** button.

The transceiver enters Autodial Mode and the DTMF code entry display appears.

The following operations are identical even if the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.

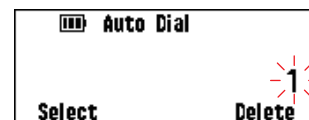


2 Enter using the keypad the DTMF code to be sent.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

Note

- To enter the DTMF “A” code, press and hold the [*] button and then press the [2] button.
- To enter the DTMF “B” code, press and hold the [*] button and then press the [5] button.
- To enter the DTMF “C” code, press and hold the [*] button and then press the [8] button.
- To enter the DTMF “D” code, press and hold the [*] button and then press the [0] button.
- To enter the DTMF “*” code, press the [*] button and then press the [*] button.
- To enter the DTMF “#” code, press the [*] button and then press the [#] button.
- If “Direct Entry” is configured in * and # Buttons, pressing the [*] or [#] button directly enters the “*” or “#” tone. In this case, the above operations are unavailable.



3 Enter the DTMF code by repeating step 2.



4 Press the **PTT** switch or the **Menu** ([]) button.

The transceiver sends the DTMF code.

● Without using the keypad

1 Press the **Autodial** button.

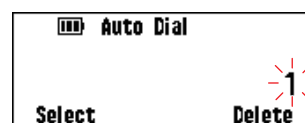
The transceiver enters Autodial Mode and the DTMF code entry display appears.

The following operations are the same even if the transceiver enters Autodial Mode by pressing the **Menu** button.



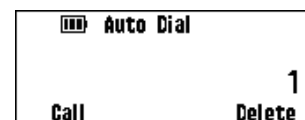
2 Enter the DTMF code to be sent by pressing the [] or [] button.

Characters are entered from the right end, and the character being entered blinks. Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

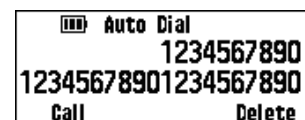


3 Confirm the entered DTMF code by pressing the **Menu** ([]) button.

An entered digit stops blinking and remains lighted.



4 Enter the DTMF code by repeating step 2 and 3.



5 Press the **PTT** switch or the **Menu** ([]) button.

The transceiver sends the DTMF code.

Configuration using KPG-D3/ D3N

- Configuring **Store and Send** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)
- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to **Keypad Operation** on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring *** and # Buttons** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

Sending a DTMF Code by Selecting from a List (Autodial List)

The DTMF code configured in **Autodial List** can be selected and sent.

To use this function, **Store and Send** needs to be disabled using KPG-D3/ D3N.

The transceiver can enter Autodial Mode and the DTMF codes can be selected using one of the following operations:

- **Autodial Button**

Pressing the **Autodial** button places the transceiver in Autodial Mode.

- **Menu Button**

Pressing the **Menu** button to enter Menu Mode and then selecting “Autodial” places the transceiver in Autodial Mode. (Refer to Common Function Part [Using Menu Mode.](#))

- **Keypad entry**

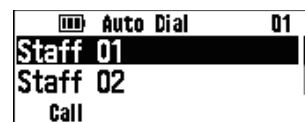
If “Autodial” is configured in **Keypad Operation**, pressing a button on the keypad causes the transceiver to enter Shortcut Entry Mode for Autodial Mode. (Refer to Common Function Part [Keypad Operation.](#))

Operating the transceiver

1 Press the **Autodial** button.

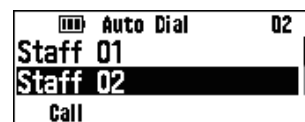
The transceiver enters Autodial Mode and then the **Autodial List** selection display appears.

The following operations are identical even if the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.



2 Press the [**▲**] or [**▼**] button to select the DTMF code to be sent from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **PTT** switch or the **Menu** (**[□]**) button.

The transceiver sends the DTMF code.

Configuration using KPG-D3/ D3N

- Configuring **Store and Send** to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)
- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to **Keypad Operation** on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

Sending the DTMF Code with a Single Touch (Call 1 to Call 6 Buttons)

Pressing one of the **Call 1** to **Call 6** buttons causes the transceiver to send the preconfigured DTMF code.

“Call 1” to “Call 6” can be assigned to the **PF** buttons using KPG-D3/ D3N and the DTMF code corresponding to each button can be selected from the **Autodial List**.

Note

- For Mobile, if one of the AUX Input ports to which “Call 1” to “Call 6” are assigned becomes active, the DTMF code preconfigured for the transceiver can be sent. (Refer to Common Function Part [Available Functions for AUX Input Ports](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring DTMF code corresponding to the **Call 1** to **Call 6** buttons ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call > Call 1~Call 6)

Redialing

A previously sent DTMF code can be sent again.

Operating the transceiver

- 1 Press the **Autodial** button while the transceiver is in standby mode.

The transceiver enters Autodial Mode.

- 2 Press the **[*]** button and then press the **[0]** button.

The DTMF code last sent appears.

- 3 Press the **PTT** switch or the **Menu** () button.

The transceiver sends the DTMF code.

Functions Related to DTMF Code Encoding

Functions related to DTMF code encoding are shown below.

- DTMF Speed
- First Digit Delay Time
- First Digit Time
- * and # Digit Time
- DTMF Hold Time
- D Code Assignment
- Sidetone

DTMF Speed

DTMF Speed is the speed to send out the DTMF codes. Transmission speed of the DTMF code can be configured by entering the number of digits to be sent per second. The transceiver sends the DTMF code at the configured speed. The number of digits of the DTMF code to be sent per second can be selected from 6, 8, 10, or 15 by using KPG-D3/ D3N. The following are durations for Digit Time (transmission duration) and Gap Time (silent duration) depending on the selected value.

Table 2-23 DTMF Speed

Range	Digit Time (Transmission Duration)	Gap Time (Silent Duration)
6 digits/sec	84 ms	84 ms
8 digits/sec	62 ms	62 ms
10 digits/sec	50 ms	50 ms
15 digits/sec	34 ms	34 ms

Configuration using KPG-D3/ D3N

Configuring **DTMF Speed** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

First Digit Delay Time

First Digit Delay Time is the length of time from when the transceiver starts transmitting until the transceiver starts sending the first digit of the DTMF code.

The transceiver transmits an unmodulated signal until the length of time configured in **First Digit Delay Time** elapses.

Configuration using KPG-D3/ D3N

Configuring **First Digit Delay Time** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

First Digit Time

First Digit Time is the function to extend the length of time to send the first digit of the DTMF code when the transceiver starts sending the DTMF code.

Extending the transmission time of the first digit of the DTMF code helps the receiving transceiver easily recognize the incoming DTMF code in order to avoid failure in receiving the DTMF code while the transceiver is in the battery saver mode or scanning.

The length of time to send the first digit of the DTMF code is the sum of the transmission time configured in **DTMF Speed** and the **First Digit Time**.

Transmission time for the 1st digit of DTMF = value configured in DTMF Speed (Digit Time) + value configured in First Digit Time

Example: First Digit Time: 100 ms, Encode Code: 123

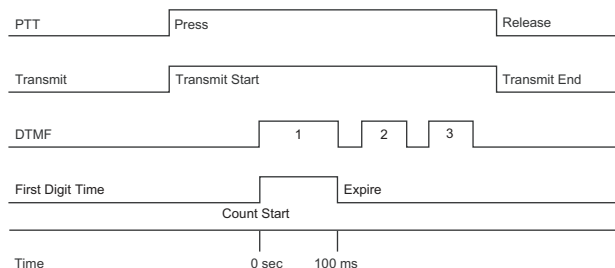


Figure 2-6 First Digit Time

Configuration using KPG-D3/ D3N

Configuring **First Digit Time** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

* and # Digit Time

*** and # Digit Time** is the function to extend the transmission time for the * tone and # tone of when the DTMF code is sent out.

Since * tone and # tone are more frequently used for special tasks than 0 to 9 tones, this function is used for the receiving transceiver to easily recognize the incoming DTMF code.

The length of time to transmit the * tone and # tone is the sum of the transmission time configured in **DTMF Speed** and the *** and # Digit Time**.

Transmission time for the * tone and # tone of DTMF = value configured in DTMF Speed (Digit Time) + value configured in * and # Digit Time

Example: * and # Digit Time: 100 ms, Encode Code: *01

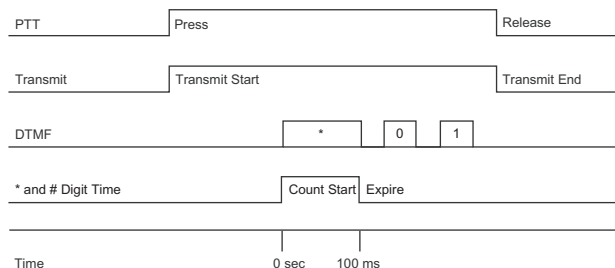


Figure 2-7 * and # Digit Time

Note

- If the first digit of the DTMF code is the * tone or # tone, the transceiver compares the extension time configured in **First Digit Time** with the extension time configured in *** and # Digit Time**, and uses the longer extension time to send the first digit.

Configuration using KPG-D3/ D3N

Configuring *** and # Digit Time** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

DTMF Hold Time

DTMF Hold Time is the length of time from when the keypad is disabled until the transceiver restores the receive mode while sending the DTMF code by using **Keypad Auto PTT** or **Manual Dialing**.

The DTMF signal received until its transmission is interrupted may be treated as one string of code depending on the devices on the receiving side. Therefore, the transceiver holds the transmission not to interrupt the digit sequence when transmitting a continuous DTMF signal.

Configuration using KPG-D3/ D3N

Configuring **DTMF Hold Time** ( **See** Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

D Code Assignment

D Code Assignment is the function to select whether the D Code is used for the D tone of DTMF or a dialing pause (unmodulated transmission).

Configuration using KPG-D3/ D3N

Configuring **D Code Assignment** ( **See** Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

Emitting the DTMF code tone (Sidetone)

Sidetone is the function to emit a DTMF code tone from the speaker while the transceiver transmits the DTMF code.

Note

- If “Silent” is configured in **Emergency Mode Type**, the transceiver does not emit a **DTMF Sidetone**. (Refer to [Emergency Mode Type](#).)
- If the transceiver sends the DTMF code while **PTT Proceed Tone** is enabled, the transceiver does not emit a **Proceed Tone**.
(Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Sidetone** to be enabled or disabled ( **See** Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)

Using Autodial List

Autodial List is the list in which the DTMF code used for Autodial Mode is configured.
Autodial List can be configured by using KPG-D3/ D3N.

Table 2-24 Autodial List Configuration

Configuration	Description
DTMF Name	A name can be assigned to the DTMF code. A maximum of 14 characters can be configured.
Code	The DTMF code to be sent can be configured. A maximum of 34 numeric digits can be configured.

Configuration using KPG-D3/ D3N

Configuring **Autodial List** ( See Radio Configuration > Protocol Options > DTMF > Autodial List)

Editing the Autodial List with the Transceiver (Autodial Programming)

In Autodial Programming Mode, data configured in **Autodial List** can be added, changed, or deleted by operating the transceiver.
Pressing the **Autodial Programming** button places the transceiver in Autodial Programming Mode.
Or, the transceiver enters Autodial Programming Mode if “Autodial Programming” is selected after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode.](#))

Note

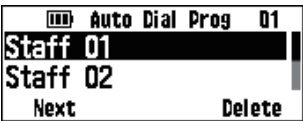
- If “Direct Entry” is configured in *** and # Buttons**, pressing the **[*]** or **[#]** button in Autodial Programming Mode directly enters the “*” or “#” tone. In this case, A to D tones cannot be entered by pressing the **[*]** button, and the characters entered by pressing the **[#]** button cannot be cleared.

Operating the transceiver

- Changing or adding data in the Autodial List

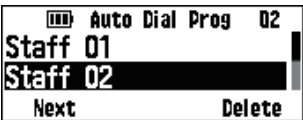
1 Press the **Autodial Programming** button.

The transceiver enters Autodial Programming Mode.
The following operations are the same even if the transceiver enters Autodial Programming Mode by pressing the **Menu** button.

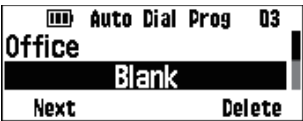


2 Press the **[▲]** or **[▼]** button and then select the target data from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for the selection methods.



If data is newly added to the **Autodial List**, “Blank” needs to be selected. Although the following procedure describes the operation with the displays that appear when changing the existing data in the **Autodial List**, the operation is identical.



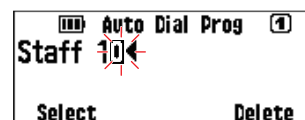
3 Press the **Menu** ([**□**]) or [*****] button.

The DTMF name edit display for the selected data appears.



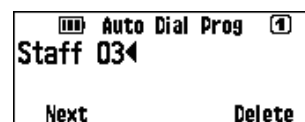
4 Enter a DTMF name.

Refer to Common Function Part “[Entering or Deleting Characters](#)” for the entry method.



5 Press the **Menu** ([**□**]) or [*****] button after entering the DTMF name.

The DTMF code edit display appears.

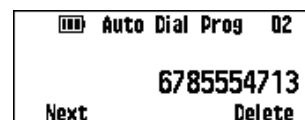


6 Enter a DTMF code.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for the entry method.



- A DTMF code can be entered with a maximum of 34 digits.



7 Press the **Menu** ([**□**]) or [*****] button after entering the DTMF code.

The writing completion message display appears.

“Over Write?” appears if the existing data in the **Autodial List** is changed.

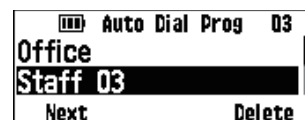


“Store?” appears if new data is added in the **Autodial List**.



8 Press the **Menu** ([**□**]) or [*****] button.

The data is written in the transceiver memory, and the **Autodial List** selection display appears.

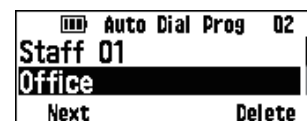


● Deleting data from the Autodial List

1 Press the **Autodial Programming** button.

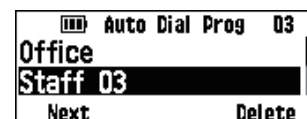
The transceiver enters Autodial Programming Mode.

The following operations are the same even if the transceiver enters Autodial Programming Mode by pressing the **Menu** button.



2 Press the **[▲]** or **[▼]** button and then select the target data from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for the selection methods.



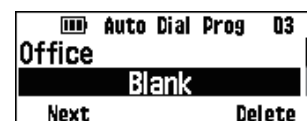
3 Press the **Back** (**[↩]**) or **[#]** button.

“Delete?” appears.



4 Press the **Menu** (**[□]**) or **[*]** button.

The selected data will be cleared.



Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring *** and # Buttons** to be enabled or disabled ([See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

2.15 Causing Transceivers Other than the Transceiver of the Specified ID to Participate in a Conversation (Open Voice Channel Mode)

Open Voice Channel Mode (OVCM) is the function to hear a conversation even if the received ID does not match when the transceiver receives various voice calls (Individual Call, Group Call, Broadcast Call).

When the use of OVCM is permitted for the transceiver receiving the various voice calls, the transceiver can hear the conversations even if the received ID does not match.

This function is used for transceivers other than the transceiver of the Specified ID to participate in a conversation.

To use this function, **Open Voice Channel Mode** must be enabled by using KPG-D3/ D3N. Also, to send out a signal that is applied with OVCM, press the **OVCM** button to enable **Open Voice Channel Mode**.

Or, calls by OVCM can be enabled if "OVCM" is selected from Menu Mode. (Refer to Common Function Part [Using Menu Mode](#).)

The "👤" icon blinks on the transceiver display when OVCM is enabled.

Table 2-25 Open Voice Channel Mode

Configuration	Description
Enabled	Transmit Operation: By pressing the OVCM button, or by selecting "OVCM" from Menu Mode, calls by OVCM can be enabled or disabled. The transceiver can transmit a signal with OVCM applied while calls by OVCM are in the enabled status. Receive Operation: Conversations can be heard even if the ID does not match when the transceiver receives a call with OVCM applied.
Disabled	Transmit Operation: Calls by OVCM cannot be enabled nor disabled even if the OVCM button is pressed or "OVCM" is selected from Menu Mode. Therefore, the transceiver cannot transmit a signal with OVCM applied. Receive Operation: Conversations cannot be heard if the ID does not match even when the transceiver receives a call with OVCM applied.

For example, Transceiver A specifies the ID of Transceiver B, and initiates a call with OVCM applied (refer to the figure below).

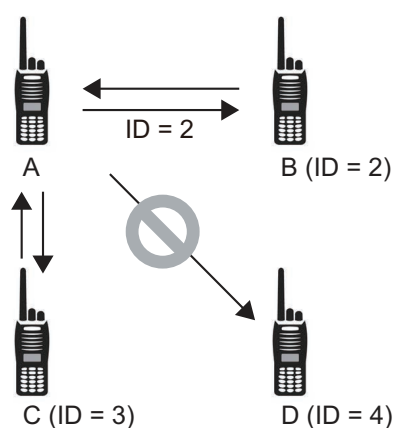


Figure 2-8 Operation Examples

Table 2-26 Configuration Examples

Transceivers	Open Voice Channel Mode	Call by OVCM
A	Enabled	Enabled
B	Disabled	Disabled
C	Enabled	Disabled
D	Disabled	Disabled

- Because the ID matches, Transceiver B can communicate with Transceiver A even if **Open Voice Channel Mode** is disabled.
- Because **Open Voice Channel Mode** is enabled, Transceiver C can communicate with Transceiver A even if the ID does not match.
- Because **Open Voice Channel Mode** is disabled and the ID does not match, Transceiver D cannot communicate with Transceiver A.

Also, even if calls by OVCM are disabled, Transceiver B or C receiving a call with OVCM applied transmits a signal with OVCM applied when replying.

Note

- If the transceiver is turned off and turned back on while calls by OVCM are enabled, calls by OVCM are disabled.
- OVCM does not function for the transmission of an Unaddressed Call or All Group Call.
- OVCM does not function while the transceiver is in Emergency Mode.
- Calls transmitted by OVCM are not stored in the stack memory of the transceiver.
- Even if a Unit ID is configured in the Individual ID List and if the ID name is not configured, the list number in the Individual ID List appears on the display when an Individual Call with OVCM applied is received. If a Unit ID is not configured in the Individual ID List, the received Unit ID appears.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)
- Configuring **Open Voice Channel Mode** to enabled or disabled
( See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > OVCM)
( See Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > OVCM)

2.16 Calling All Transceivers Having the Same Color Code (Unaddressed Call)

Unaddressed Call is the function to initiate 2-way voice communication with multiple transceivers without specifying a group. In a regular Group Call, the transceiver can communicate only with transceivers included in the Group ID specified. Unaddressed Call can initiate a call to all transceivers having the same Color Code on the same channel.

Using this function, such as during an emergency, the transceiver can initiate a call without distinguishing the group to share information with the users of multiple groups.

To use this function, “Off” needs to be configured in **Selcall on PTT** of the channel to be used for an Unaddressed Call by using KPG-D3/ D3N.

Note

- When an Unaddressed Call is sent, send a Group Call by specifying Default Unaddressed ID (\$FFFFE0) of Group ID as the destination ID.
- The receiving transceiver of an Unaddressed Call treats the call as an Unaddressed Call if the destination ID of the received Group Call is Default Unaddressed ID (\$FFFFE0 or \$FFFFE0), determines whether the Color Code matches, and unmutes the speaker.
- The transceiver can send the ID of the transmitting transceiver from the communication port on the transceiver when receiving an Unaddressed Call. (Refer to [Sending the Received Unit ID from the Communication Port \(Unit ID Serial Output\)](#).)
- An Unaddressed Call can also be started by receiving a PC command from the communication port. To use a PC command, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to a communication port 0 to 1 or the Bluetooth of the transceiver. (Refer to Common Function Part [Available Functions for COM Port](#).)

Configuration using KPG-D3/ D3N

- Configuring **Color Code**

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR)

( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR)

- Configuring **Selcall on PTT**

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR > Selcall on PTT)

( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR > Selcall on PTT)

Displaying the ID of the Communicating Caller on the LCD (Caller ID Display)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Caller ID Display is the function to display the received ID on the transceiver display when an Unaddressed Call is received.

While this function is enabled, the Unit ID Name or Unit ID of the transmitting transceiver appears if an Unaddressed Call is received and the received Color Code matches the Color Code preconfigured for the transceiver.

A user can identify the caller not only by voice, but also through the display.

Note

- If the Unit ID Name is stored in the transceiver, the stored Unit ID Name appears. If the Unit ID Name is not stored in the transceiver, the Unit ID Name configured in the Individual ID List appears. If the Unit ID Name is not configured in the Individual ID List, the Individual ID List number appears.
If the transceiver receives the Unit ID Name by **Over-the-Air Alias**, the received Unit ID Name appears.
- If the transceiver receives an Individual Call or Group Call, **Caller ID Display** does not function. If the transceiver receives an Individual Call, the Unit ID of the transmitting transceiver appears. If the transceiver receives a Group Call, the ID appears according to the configuration in **Group Call Display Type**. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)
- A user cannot reply to an ID on the transceiver while the ID appears on the main display.

Configuration using KPG-D3/ D3N

Configuring **Caller ID Display** ( [See](#) Radio Configuration > Protocol Options > DMR > General > RX Options)

2.17 Terminating Voice Communications by a Transceiver Other Than the Transmitting Transceiver (Call Interruption)

Call Interruption is the function to enable a transceiver other than the transmitting transceiver to terminate voice communications by sending and receiving the Call Interruption request message. A transceiver receiving the Call Interruption request message on the channel where the transceiver is performing voice communication terminates voice communication. After the voice communication is terminated, another voice communication, a data communication, or an Emergency Call can be initiated.

By pressing the **Call Interruption** button, a Call Interruption request message can be sent.

Also, a Call Interruption request message can be sent by the following functions: In addition, when the **Call Interruption** button is used while the transceiver is in Emergency Mode, “Off” needs to be configured in **Emergency Cycle**.

● Interrupt CALL (In-call Busy Channel Lockout)

The current incoming call can be interrupted by pressing the **PTT** switch to respond (Talkback) while receiving an Individual Call, Group Call, or Unaddressed Call addressed to the own transceiver on the channel where “Interrupt CALL” is configured in **In-call Busy Channel Lockout**.

If “Interrupt CALL” is configured for **In-call Busy Channel Lockout** of the channel used in Emergency Mode when the transceiver enters Emergency Mode, **Call Interruption** is executed and voice communication can be terminated if voice communication (including voice communication not addressed to the own station or Broadcast Call) is performed.

● Interrupt ALL CALL

Call Interruption is executed and voice communication can be terminated when an All Call is initiated during voice communication (including voice communication not addressed to the own transceiver) on the selected channel.

● Interrupt Message CALL

Call Interruption is executed and voice communication can be terminated when transmission of a message is initiated during voice communication (including voice communication not addressed to the own station) on the channel to send the message.

● Interrupt Emergency CALL

When the transceiver automatically transmits according to the configuration in **Emergency Cycle** in Emergency Mode, **Call Interruption** is executed and voice communication can be terminated if voice communication (including voice communication not addressed to the own station) is performed on the channel used for Emergency Mode.

To send a Call Interruption request message using these functions, **Encode (Call Interruption)** of the channel used needs to be enabled. To receive a Call Interruption request message, **Decode (Call Interruption)** of the channel used also needs to be enabled.

Note

- In DMR Direct Mode, Call Interruption does not function if the received Color Code does not match the Color Code configured in the transceiver, or if the slot number does not match. (Refer to [Communicating Without Using a Repeater \(Talk Around/ DMR Direct Mode\)](#), [About the Slot Numbers \(Slot Selection\)](#).)
- In Repeater Mode, Call Interruption does not function if the received Color Code does not match the Color Code configured in the transceiver. (Refer to [Communicating via a Repeater \(Repeater Mode\)](#).)
- When a signal encrypted by means of AES/ DES or Enhanced Encryption is received, Call Interruption does not function regardless of whether the Color Code or slot number matches or does not match. However, if a signal encrypted by means of bit scramble is received, Call Interruption functions according to the conditions for the Color Code or slot number matching or not matching. (Refer to [USING COMMUNICATION SECURITY](#).)
- If the receiving status cannot be determined such as during the scan or immediately after transmission of a request message ends, the transceiver may enter the following states:
 - Displays the indication of the Call Interruption behavior.
 - Emits a Tone.
- During Emergency Mode, voice communication continues even if the transceiver receives a Call Interruption request message during the voice communication.
- While the transceiver is receiving voice communication by Emergency Call, a Call Interruption request message is not sent even if Call Interruption operation is performed. The Call Interruption operation is determined as a failure.

Sending a Call Interruption Request Message

To send a Call Interruption request message, **Encode (Call Interruption)** of the channel used needs to be enabled.

Operating the transceiver

● Sending by using the Call Interruption button

1 Press the **Call Interruption** button during voice communication.

A Button Beep A (1 beep) sounds from the transceiver, and “Interrupt” appears on the display. A Call Interruption request message is sent to all IDs according to the conditions to terminate voice communications.



Note

- If the **Call Interruption** button is pressed while a signal encrypted by means of AES/ DES or Enhanced Encryption is received, a Call Fail Tone (2 beeps) sounds from the transceiver, and “Fail” appears on the display for 1 sec. In this case, a Call Interruption request message is not sent.
- When the **Call Interruption** button is pressed and “Interrupt” appears on the display, transmission of the Call Interruption request message can be canceled by pressing the **Clear** button.
- Although “Interrupt” appears on the display even when the **Call Interruption** button is pressed during Call Hangtime, a Call Interruption request message is not sent.
- If neither the conditions to terminate voice communications nor the conditions during Call Hangtime are satisfied, a Button-entry Error Tone (1 beep) sounds from the transceiver, and the transceiver does not respond.
- When the transceiver is not receiving signals while the transceiver is scanning or during the **Battery Saver** behavior, or if the transceiver is receiving another protocol such as analog and NXDN, “Interrupt” may appear on the display.

2 Sending the Call Interruption request message is completed.

When the received signal drops out, a Transaction Confirmed Tone (2 beeps) sounds from the transceiver, “Complete” appears on the display for 1 sec, and the voice communication terminates.



Note

- When a Call Interruption request message is the signal that cannot be received*¹, if the **PTT** switch of the transceiver is pressed at the start of signal reception, the start of the transmission behavior of Call Interruption is suspended for a maximum of 7 sec.
- If the transceiver becomes able to receive a Call Interruption request message during the suspended time, the transceiver starts the transmission behavior of Call Interruption.
- If the transceiver is still unable to receive a Call Interruption request message even if the suspended time elapses, the transceiver stops the transmission behavior of Call Interruption.

*¹ Specifically indicates the time when the transceiver receives a carrier other than DMR, or the time when the transceiver receives a signal which does not contain a synchronization signal or which cannot acquire a synchronization signal in DMR.

● Sending by using the Interrupt CALL (In-call Busy Channel Lockout) function

By using the **Interrupt CALL (In-call Busy Channel Lockout)** function, a Call Interruption request message is sent to terminate the voice communication during voice communication. "Interrupt CALL" needs to be configured in **In-call Busy Channel Lockout** of the channel in use. (Refer to [Avoiding Interference with Other Communications \(Busy Channel Lockout\)](#).)

1 Respond (Talkback) by pressing the **PTT** switch during voice communication.

"Interrupt" appears on the display. A Call Interruption request message is sent to all IDs according to the conditions to terminate voice communications.



Note

- If the **PTT** switch is pressed to respond (Talkback) while a signal encrypted by means of AES/ DES or Enhanced Encryption is received, a Call Fail Tone (2 beeps) sounds from the transceiver, and "Fail" appears on the display for 1 sec. In this case, a Call Interruption request message is not sent.
- Although "Interrupt" appears on the display even when the **PTT** switch is pressed during Call Hangtime, a Call Interruption request message is not sent.
- If **PTT** switch is pressed and held, the communication transmission is activated again.
- When the transceiver is not receiving signals while the transceiver is scanning or during the **Battery Saver** behavior, or if the transceiver is receiving another protocol such as analog and NXDN, "Interrupt" may appear on the display.

2 Sending the Call Interruption request message is completed.

When the received signal drops out, "Complete" appears on the display for 1 sec, and the voice communication terminates.

If **PTT** switch is pressed and held, the communication transmission is activated again.



If **Individual Call Acknowledge Request** is configured as enabled, "Calling" appears on the display when the received signal drops out, and a message requesting an acknowledgment is sent. (Refer to [Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications \(Individual Call Acknowledge Request\)](#).)



Note

- When a Call Interruption request message is the signal that cannot be received^{*1}, if the **PTT** switch of the transceiver is pressed at the start of signal reception, the start of the transmission behavior of Call Interruption is suspended for a maximum of 7 sec.
- If the transceiver becomes able to receive a Call Interruption request message during the suspended time, the transceiver starts the transmission behavior of Call Interruption.
- If the transceiver is still unable to receive a Call Interruption request message even if the suspended time elapses, the transceiver stops the transmission behavior of Call Interruption.

^{*1} Specifically indicates the time when the transceiver receives a carrier other than DMR, or the time when the transceiver receives a signal which does not contain a synchronization signal or which cannot acquire a synchronization signal in DMR.

● Sending by using the Interrupt Message CALL function

By using the Interrupt Message Call function, a Call Interruption request message is sent to terminate the voice communication before a message is sent.

1 Send a message during the voice communication.

“Send Data” appears on the display. A Call Interruption request message is sent to all IDs according to the conditions to terminate voice communications.



Note

- If a message is sent while a signal encrypted by means of AES/ DES or Enhanced Encryption is received, a Busy Tone 2 (3 beeps) sounds from the transceiver, and “Busy” appears on the display for 1 sec. In this case, a Call Interruption request message is not sent.

2 Sending the Call Interruption request message is completed.

When there is no more signal, a message is sent.

Note

- When a Call Interruption request message is the signal that cannot be received^{*1}, if the **PTT** switch of the transceiver is pressed at the start of signal reception, the start of the transmission behavior of Call Interruption is suspended for a maximum of 7 sec.
 - If the transceiver becomes able to receive a Call Interruption request message during the suspended time, the transceiver starts the transmission behavior of Call Interruption.
 - If the transceiver is still unable to receive a Call Interruption request message even if the suspended time elapses, the transceiver stops the transmission behavior of Call Interruption.

^{*1} Specifically indicates the time when the transceiver receives a carrier other than DMR, or the time when the transceiver receives a signal which does not contain a synchronization signal or which cannot acquire a synchronization signal in DMR.

Note

- A Call Interruption request message can also be sent by receiving a PC command from the communication port. To use a PC command, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Encode (Call Interruption)** to be enabled or disabled
( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR > Call Interruption)
- ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR > Call Interruption)
- Configuring **In-call Busy Channel Lockout**
( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR)
- ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR)
- Configuring **Interrupt ALL CALL** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > General > Call Interruption)
- Configuring **Interrupt Message CALL** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > General > Call Interruption)
- Configuring **Interrupt Emergency CALL** to be enabled or disabled
( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency)
- ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency)

Receiving a Call Interruption Request Message

To receive a Call Interruption request message, **Decode (Call Interruption)** of the channel used needs to be enabled.

Transceiver behavior

The transceiver receives a Call Interruption request message during voice communication, and the voice communication ends.

During the interval while the **PTT** switch is depressed, Button Beep A (1 beep) is emitted from the transceiver and “Interrupted” appears on the display.



Configuration using KPG-D3/ D3N

Configuring **Decode (Call Interruption)** to be enabled or disabled

- ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR > Call Interruption)
- ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR > Call Interruption)

2.18 Sending GPS Data

Global Positioning System (GPS) is the system to acquire the current location information of the own transceiver by receiving signals from the Global Positioning System satellites orbiting the earth.

The transceiver of the mobile station can send the acquired own location information (GPS data) to the base station. The base station can send received GPS data to the PC as serial commands.

A GPS receiver unit compatible with the NMEA-0183 standard is required for the communication port of the mobile station transceiver to send GPS data. The GPS receiver unit is built-in for Portable/ NX-3720G/ NX-3720HG/ NX-3820G/ NX-3820HG/ NX-3920G/ NX-3921G. The optional GPS receiver unit also can be connected with the transceiver.

Note

- To use the built-in GPS receiver unit, **Built-in GPS Receiver/Bluetooth** must be enabled when configuring data by using KPG-D3/ D3N. In this case, the configuration for the communication port is not required.
- To use the optional GPS receiver unit, "GPS" must be assigned to the communication port to which the GPS receiver unit is connected. For Mobile, an optional third-party GPS receiver unit is usable.

Transmission Method of GPS Data

The following are the methods to send GPS data:

● Automatic GPS data transmission

- [Sending GPS Data Automatically at Certain Intervals \(GPS Report Mode\)](#)
- [Sending GPS Data According to the Request from the Base Station \(GPS Report Mode\)](#)

● Manual GPS data transmission

- [Sending GPS Data Manually by Using a Button \(Send the GPS Data\)](#)

● GPS data transmission linked with a Status Call

- [Sending GPS Data Together With Status Call \(GPS Combination\)](#)

● GPS data transmission linked with an Emergency Call

- [Sending GPS Data Together With Emergency Call \(GPS Combination\)](#)

● GPS data transmission during voice communications

- [Sending GPS Data during Voice Communications \(GPS Report with Voice\)](#)

● GPS data transmission linked with travel distance

- [Sending GPS Data Based On Travel Distance \(GPS Distance Change\)](#)

ID of the Target Transceiver (ID (GPS > Base Station))

ID (GPS > Base Station) is the ID of the target transceiver used for sending GPS data.

By using KPG-D3/ D3N, either Unit ID or Group ID can be configured as **ID (GPS > Base Station)**. The ID of the base station which is responsible for operation and administration of system is normally configured.

Note

- If **Base ID** (GPS) is not configured, GPS data is sent to the **Base ID** to which data such as a Status Message and Short Message is to be sent. (Refer to [Base ID](#).)

Configuration using KPG-D3/ D3N

Configuring **ID Type (GPS > Base Station)** and **ID (GPS > Base Station)**

([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > MDC-1200/5-tone > Base Station)

([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > DMR > Base Station)

([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS > Base Station)

Sending GPS Data Automatically at Certain Intervals (GPS Report Mode)

GPS data can be sent automatically at the intervals configured in **GPS Report Interval Time**.

This function is used for controlling or monitoring vehicles on a time basis by periodically sending location information to the base station.

To use this function, “Auto” must be configured for **GPS Report Mode** by using KPG-D3/ D3N.

Note

- The transceiver sends the GPS data upon receipt of the GPS data transmission request from the base station even if “Auto” is configured for **GPS Report Mode**.
- If the transceiver is under the following conditions, the automatic transmission of GPS data at certain intervals will be canceled. The transceiver suspends transmission for the period of time configured for **Transmit Busy Wait Time**, to avoid collisions with GPS data transmissions by other transceivers. The transceiver does not suspend transmission by using **Transmit Busy Wait Time**. (Refer to [Transmit Busy Wait Time](#).)
 - While the transceiver is transmitting
 - While the transceiver is in busy state
 - While the transceiver unmutes the speaker
 - While the **Public Address** function is used (Mobile only)
 - If the transmit frequency is not configured
 - While transmission is disabled by the **Time-out Timer**
 - While the transceiver is sending or receiving the DMR data
 - Transceiver Password Mode
 - Emergency Mode
 - Out of Range
 - While the transceiver is waiting for a response by the reception of an Individual Call (FOACSU) (while “Incoming” appears)
 - During Passive Scan
- GPS data is not encrypted during encrypted communication.
- Even if non-positioning data is received from the GPS receiver unit, GPS data is sent.
- There is no ACK transmission by the base station for GPS data transmission from the transceiver of a mobile station.

Configuration using KPG-D3/ D3N

Configuring **GPS Report Mode**

([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > Common)

([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS)

Sending GPS Data According to the Request from the Base Station (GPS Report Mode)

The transceiver can automatically send GPS data when a GPS data transmission request is received from the base station. This function is used when the base station controls the timing to require GPS data. This function is also used to avoid a data collision if there are many transceivers.

To use this function, "Poll" must be configured for GPS Report Mode by using KPG-D3/ D3N.

Note

- The transceiver sends GPS data to the ID configured for **Base ID** (GPS) or **Base ID**, not to the ID that sent the data transmission request. However, if **Respond to Polling ID** is enabled, GPS data is sent to the ID that sent the data transmission request. (Refer to [Respond to Polling ID](#).)
- GPS data is not encrypted during encrypted communication.
- Even if non-positioning data is received from the GPS receiver unit, GPS data is sent.
- There is no ACK transmission by the base station for GPS data transmission from the transceiver of a mobile station.

Configuration using KPG-D3/ D3N

Configuring **GPS Report Mode**

( [See](#)) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > Common)

( [See](#)) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS)

Sending GPS Data Manually by Using a Button (Send the GPS Data)

GPS data can be sent manually by a user pressing the **Send the GPS Data** button. Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the GPS data can be sent manually by selecting the "Send GPS Data". (Refer to Common Function Part [Using Menu Mode](#).)

Note

- GPS data is not encrypted during encrypted communication.
- Even if non-positioning data is received from the GPS receiver unit, GPS data is sent.
- There is no ACK transmission by the base station for GPS data transmission from the transceiver of a mobile station.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#)) Radio Configuration > Global Options > Button Assignment)

Sending GPS Data Together With Status Call (GPS Combination)

The transceiver can send GPS data by adding the GPS data to a Status Message using DMR.

To use this function, **Status** for **GPS Combination** must be enabled by using KPG-D3/ D3N. The range of status numbers (**Combination Status Range**) to which GPS data can be added can be configured.

Note

- The GPS data added to a Status Message is sent to the ID configured for **Base ID (GPS)** or **Base ID**.
- GPS data is not encrypted during encrypted communication.
- Even if non-positioning data is received from the GPS receiver unit, GPS data is sent.

Configuration using KPG-D3/ D3N

- Configuring **Status (GPS Combination)**
- Configuring **Combination Status Range**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > DMR > GPS Combination)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > FleetSync > GPS Combination)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > GPS > MDC-1200/5-tone > GPS Combination)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS > GPS Combination)

Sending GPS Data Together With Emergency Call (GPS Combination)

The transceiver can transmit by adding the GPS data when sending an Emergency Status or audio data.

To use this function, **Emergency** for **GPS Combination** must be enabled by using KPG-D3/ D3N.

The relationship of Emergency Status transmission, audio data transmission, and GPS data transmission in Emergency Mode is as follows:

Table 2-27 Various Data Transmission in Emergency Mode (for Automatic Transmission)

Emergency Status Transmission	Automatic Transmission of Audio Data by the Transmit Duration Configuration	GPS Data Transmission
Not transmit	Not transmit (Transmit Duration: 0 sec)	Not transmit
Not transmit	Transmit (Transmit Duration: other than 0 sec)	Transmit
Transmit	Not transmit (Transmit Duration: 0 sec)	Transmit
Transmit	Transmit (Transmit Duration: other than 0 sec)	Transmit

Table 2-28 Various Data Transmission in Emergency Mode (for Transmission by the PTT Switch)

Emergency Status Transmission	Audio Data Transmission by the PTT Switch	GPS Data Transmission
Not transmit	Transmit	Not transmit
Transmit		

Note

- The GPS data added to a Status Message is sent to the ID configured for **Base ID (GPS)** or **Base ID**.
- Emergency Status can be configured in **Emergency Call Status**. If **Emergency Call Status** is not configured, an Emergency Status is not added to GPS data. (Refer to [ID Sent When Emergency Mode is Activated](#).)
- If "0" is configured in **Emergency Cycle**, **Emergency** of **GPS Combination** does not function even if the configuration is enabled.
- GPS data is not encrypted during encrypted communication.
- Even if non-positioning data is received from the GPS receiver unit, GPS data is sent.

Configuration using KPG-D3/ D3N

Configuring **Emergency (GPS Combination)**

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > DMR > GPS Combination)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > FleetSync > GPS Combination)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > MDC-1200/5-tone > GPS Combination)

( **See**) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS > GPS Combination)

Sending GPS Data during Voice Communications (GPS Report with Voice)

The transceiver can multiplex GPS data on audio data and send the data during voice communications.

When starting audio data transmission or while sending audio data, the transceiver multiplexes GPS data on the audio data and sends the data at regular time intervals.

The behavior for multiplexing GPS data varies as follows depending on the configuration in **Report (GPS Report with Voice)**:

Table 2-29 Behavior for Multiplexing GPS Data

Report	Description
Off	GPS data is not multiplexed during audio data transmission.
One-shot	GPS data is multiplexed at the start of audio data transmission.
Interval	GPS data is multiplexed at the start of or during audio data transmission according to the cycle that is calculated based on the value configured in Interval (GPS Report with Voice). The cycle for multiplexing GPS data can be calculated using the formula below. GPS data multiplex cycle [sec] = Interval (GPS Report with Voice) configuration value x 3.6 sec

Note

- Regardless of the configuration for **Report (GPS Report with Voice)**, GPS data will not be transmitted automatically according to **GPS Report Interval Time (Portable/ Ignition On)** and **GPS Report Interval Time (Ignition Off)** during audio data transmission.
- If **Report (GPS Report with Voice)** is configured to “One-shot” or “Interval”, Call Interruption request messages cannot be received.
- According to the DMR specifications, GPS data that is transmitted contains only the coordinates and Position Error information (Unknown), and GPS data is transmitted to the same destination as the audio data even if **Base ID (GPS)**, or **Base ID** is configured.
- During serial output of the location information, the Unit ID value inside Map Header KW 1/ KW 2/ KW 3 (\$PKNDS, \$PKNID, \$PKNSH) will be complemented using the Unit ID of the sender of the audio data.
- If data is received while voice communication is in progress, the LCD display, LED and Alert Tone will function according to the configurations during a voice call.
- GPS data is not encrypted during encrypted communication.
- If there exists unsent GPS data at the timing of GPS data transmission when GPS data is not received from the GPS receiver unit or when **Built-in GPS Receiver/Bluetooth** is disabled, the latest GPS data will be transmitted. If there exists only sent GPS data at the timing of GPS data transmission, GPS data will not be transmitted.
- GPS data is not transmitted when GPS data with no positioning information is received from the GPS receiver unit.
- If the GPS receiver unit connected to the COM port for the Portable 2 Pin Connector model is used, even if **GPS Report with Voice** is configured to “Interval”, the behavior is the same as when “One-shot” is configured.

Configuration using KPG-D3/ D3N

- Configuring **Report (GPS Report with Voice)**
- Configuring **Interval (GPS Report with Voice)**
 -  [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > DMR > GPS Report with Voice)
 -  [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > MDC-1200/5-tone > GPS Report with Voice)
 -  [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS > GPS Report with Voice)

Sending GPS Data Based On Travel Distance (GPS Distance Change)

GPS data can be sent when the distance between the location of the previous GPS data transmission and the current location exceeds the value configured in **Distance**.

The transceiver calculates the distance between the position where the GPS data was sent and the current position at regular time intervals (3 sec) after the transceiver automatically or manually sent GPS data. The GPS data is sent if the calculated distance exceeds the value configured for **Distance**. If no GPS data is sent after the transceiver is turned ON, the transceiver regards the location information first received from the GPS unit as the previous transmission position and calculates the distance to the current position. The distance is calculated from the latitudinal and longitudinal values.

Note

- GPS data is not encrypted during encrypted communication.
- GPS data is not transmitted when GPS data with no positioning information is received from the GPS receiver unit.
- In a system that supports Indoor Location, **GPS Distance Change** does not function if one of the following conditions is satisfied:
 - When a beacon signal (whether RF System or Bluetooth System is configured in **Send Location via** does not matter) is received
 - During GPS Delay Time

Configuration using KPG-D3/ D3N

- Configuring **GPS Distance Change** to be enabled or disabled

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > Common)

( **See**) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS)

- Configuring **Distance**

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > Common)

( **See**) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS)

Selecting the Transmission Method of GPS Data (GPS Report Channel)

GPS Report Channel is the function to lock analog mode or DMR mode for the transmission method of GPS data regardless of the mode used for voice communications when the transceiver automatically sends GPS data by using the **GPS Report on Data System-personality** function.

GPS Report Channel is enabled when GPS data is automatically sent by receiving a Polling request, when GPS data is automatically and periodically sent at the time configured in FPU, and when GPS data linked with the travel distance of the transceiver is automatically sent (**GPS Distance Change**).

The transceiver behaves as follows according to the configuration in **GPS Report Channel**.

Table 2-30 GPS Report Channel

Configuration	Description
Selected	If “Analog” is configured in Transmit Mode of the selected channel, GPS data is automatically sent by Data System-personality (Analog). If “DMR” is configured in Transmit Mode of the selected channel, GPS data is automatically sent by Data System-personality (DMR).
Analog	GPS data is automatically sent by Data System-personality (Analog) regardless of the configuration in Transmit Mode of the selected channel.
DMR	GPS data is automatically sent by Data System-personality (DMR) regardless of the configuration in Transmit Mode of the selected channel.

Note

- This function is not applicable to GPS data sent by pressing the **Send the GPS Data** button or GPS data sent using the **GPS Combination** function.
- If anything other than “Selected” is configured in **GPS Report Channel**, **Respond to Polling ID** becomes disabled.
- In an LTR Trunking system, analog mode or DMR mode cannot be locked for the transmission method of GPS data. In an LTR Trunking system, the transceiver always behaves by the configuration of “Selected”.
- Even if “Analog” or “DMR” is configured in **GPS Report Channel**, the transceiver behaves by the configuration of “Selected” for the first transmission when the transceiver receives a Polling request and sends GPS data. If the transceiver is to subsequently continue GPS data transmission, **GPS Report Channel** is enabled for automatic transmission, and the transceiver behaves by the configuration of “Analog” or “DMR”.

Configuration using KPG-D3/ D3N

- Configuring **GPS Report on Data System-personality** ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > GPS > Common > Data System-personality)
- Configuring **Data System-personality** ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications > Data System-personality)
- Configuring **GPS Report Channel** ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > GPS > Common > Data System-personality)

2.19 GPS Functions

The following functions are relevant to GPS data transmission:

- Number of Times
- GPS Report Interval Time
- GPS Time Mark
- GPS Message Type
- GPS Report on Data System-personality
- Respond to Polling ID
- GPS Data Storage

Number of Times

Number of Times allows the transceiver to automatically send GPS data for the configured number of times if “Poll” is configured for **GPS Report Mode**.

The transceiver sends GPS data for the number of times configured for **Number of Times** at the intervals configured for **GPS Report Interval Time**.

Configuration using KPG-D3/ D3N

Configuring **Number of Times**

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > MDC-1200/5-tone > Poll)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common > Poll)

( **See**) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS > Poll)

GPS Report Interval Time

GPS Report Interval Time allows the transceiver to send GPS data at the configured intervals if “Auto” is configured for **GPS Report Mode**.

GPS Report Interval Time (Portable)

GPS Report Interval Time is the interval to automatically send GPS data for Portable.

GPS Report Interval Time (Ignition On/ Ignition Off) (Mobile only)

GPS Report Interval Time (Ignition On) is the interval to send the GPS data while the vehicle’s engine is running.
GPS Report Interval Time (Ignition Off) is the interval to send the GPS data while the vehicle’s engine is stopped. Also, if the Ignition Sense function is not used (nothing is entered in the Ignition Sense port), GPS data is sent according to the configuration in **GPS Report Interval Time (Ignition Off)**. (Refer to Common Function Part [Turning the Transceiver ON or OFF According to the State of the Ignition Sense Port \(Ignition Sense\)](#).)

Note

- **GPS Report Interval Time** is used to configure the trigger cycle to start sending GPS data. The timing at which the receiving transceiver completes receiving GPS data may vary depending on the transmit conditions at the transmitting transceiver.
- GPS data will not be transmitted automatically according to **GPS Report Interval Time (Portable/ Ignition On)** and **GPS Report Interval Time (Ignition Off)** during audio data transmission.

Configuration using KPG-D3/ D3N

Configuring **GPS Report Interval Time**

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > MDC-1200/5-tone > Auto > GPS Report Interval Time)

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common > Auto > GPS Report Interval Time)

( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS > Auto > GPS Report Interval Time)

GPS Time Mark

GPS Time Mark is the offset time from UTC (Coordinated Universal Time) to send GPS data.

This function is useful for avoiding a data collision if there are many transceivers that send GPS data.

Configuring a different timing for each transceiver allows each transceiver to send GPS data with different timing. Using this function can avoid a data collision.

Configuration using KPG-D3/ D3N

Configuring **GPS Time Mark**

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > MDC-1200/5-tone > Auto)

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common > Auto)

( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS > Auto)

GPS Message Type

GPS Message Type allows the transceiver to change the length of the message to send GPS data.

Table 2-31 GPS Message Type

Configuration	Behavior
Full	The message to be sent is the GPS data corresponding to \$GPGGA, \$GPRMC and \$GPGLL.
Short	The message to be sent is the GPS data corresponding to \$GPGLL. When the base station receives this GPS data, a part of the data is sent as blank data even if \$GPGGA and \$GPRMC are configured for PC serial output at Base Station Setting .

Configuration using KPG-D3/ D3N

Configuring **GPS Message Type**

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > MDC-1200/5-tone)

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common)

( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS)

GPS Report on Data System-personality

GPS Report on Data System-personality is the function that allows the transceiver to automatically change the channel to the **Data System-personality** to send GPS data in a DMR Conventional system.

The transceiver automatically changes the channel to the channel of a DMR Conventional system configured in **Data System-personality** when sending GPS data. When the transmission ends, the transceiver restores the Zone-channel which was used before sending GPS data. **GPS Report on Data System-personality** can be used to send data by using a specific dedicated channel.

Note

- This function is not applied in the following cases:
 - GPS data transmission by GPS Combination (Emergency)
 - GPS data transmission by GPS Report with Voice

Configuration using KPG-D3/ D3N

- Configuring **GPS Report on Data System-personality** ( See Radio Configuration > System Properties > Systems > DMR Conventional > GPS > MDC-1200/5-tone > Data System-personality)
- Configuring **GPS Report on Data System-personality** ( See Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common > Data System-personality)
- Configuring **Data System-personality** ( See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications > Data System-personality)

Respond to Polling ID

Respond to Polling ID is the function that enables the receiving transceiver to send the GPS data to the ID of the transceiver, which sends a GPS Polling Request, upon receipt of the following GPS Polling Requests:

- GPS Data Single Polling Request
- GPS Data Multiple Polling Request

When the above-mentioned GPS Polling Request is received, the GPS data is sent to the ID of the transceiver which sends the GPS Polling Request, if this function is enabled.

If this function is disabled, the GPS data is sent to the ID configured in **Base ID** (GPS) or **Base ID** even when the above-mentioned **GPS Polling Request** is received.

Configuration using KPG-D3/ D3N

Configuring **Respond to Polling ID** to be enabled or disabled

( See Radio Configuration > System Properties > Systems > DMR Conventional > GPS > MDC-1200/5-tone > Poll)

( See Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common > Poll)

GPS Data Storage

GPS Data Storage is the function that allows GPS data to be stored in the internal memory.

The transceiver stores the GPS data at the intervals configured for **Interval**. The stored GPS data can be sent from the transceiver or can be read using a PC. (Refer to Common Function Part [Storing the GPS Data \(GPS Data Storage\)](#).)

Acquired GPS data is temporarily saved in the RAM in the transceiver. When the number of stored data items reaches 3, the GPS data is written on the internal memory. If the transceiver is turned OFF when the number of GPS data items temporarily saved in the RAM in the transceiver is 1 or 2, the GPS data is erased without being written on the internal memory.

The internal memory allows a maximum of 7,000 GPS data items to be written.

Configuration using KPG-D3/ D3N

- Configuring **GPS Data Storage** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > Stack/Recording > GPS Data)
- Configuring **Interval** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > Stack/Recording > GPS Data)

2.20 Receiving GPS Data

The base station receiving GPS data from the mobile station transceiver can send the GPS data to a PC as serial commands. If a PC installed with a mapping application is connected to the communication port of the base station transceiver, the location information of mobile station transceivers appears on a map on the PC display. This function enables a dispatch control or traffic control system.

Also, if a mobile station transceiver connecting to a GPS receiver unit or having a built-in GPS receiver unit receives location information (GPS data) from a GPS satellite, the current location information of the own transceiver can be displayed on the LCD.

Note

- The GPS data acquired from the GPS satellite can be stored at certain intervals in the internal memory of the transceiver. (Refer to Common Function Part [Storing the GPS Data \(GPS Data Storage\)](#).)
- For a transceiver receiving GPS data, "Data + GPS Data Output" or "Data + Location Data Output" needs to be assigned to the communication port to which a PC with the mapping application installed is connected. (Refer to Common Function Part [Available Functions for COM Port](#).)

Map Header

Whether to send data to the mapping application when the base station transceiver receives the GPS data from the mobile station transceiver can be configured.

The following are the type of data that can be sent to the mapping application.

Table 2-32 Map Header

Data	Description
\$GPGGA (NMEA)	Upon receipt of the GPS data, the base station transceiver extracts the \$GPGGA data in the NMEA-0183 format from the received GPS data and sends the extracted data from the communication port.
\$GPGLL (NMEA)	Upon receipt of the GPS data, the base station transceiver extracts the \$GPGLL data in the NMEA-0183 format from the received GPS data and sends the extracted data from the communication port.
\$GPRMC (NMEA)	Upon receipt of the GPS data, the base station transceiver extracts the \$GPRMC data in the NMEA-0183 format from the received GPS data and sends the extracted data from the communication port.
\$PKNDS (KW)	Upon receipt of the GPS data, the base station transceiver creates the \$PKNDS data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The \$PKNDS data contains the \$GPRMC data in the NMEA-0183 format, Unit ID, and the status information.
\$PKNID (KW)	Upon receipt of the GPS data, the base station transceiver creates the \$PKNID data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The base station transceiver extracts only Unit ID and the status information from the received GPS data and sends the extracted data from the communication port of the repeater. This sentence is recommended to be used along with \$GPGGA (NMEA), \$GPGLL (NMEA) or \$GPRMC (NMEA). For example, if \$GPGGA (NMEA) and \$PKNID are used simultaneously, the base station transceiver sends from the communication port of the repeater the \$GPGGA data in addition to the Unit ID and the status information extracted from the GPS data.
\$PKNSH (KW)	Upon receipt of the GPS data, the base station transceiver creates the \$PKNSH data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The \$PKNSH data contains the \$GPGLL data in the NMEA-0183 format and the Unit ID. In order to send GPS data in Emergency Mode or by pressing the PTT switch, this sentence is used.

Configuration using KPG-D3/ D3N

Configuring **Map Header** ( See [Radio Configuration > Global Options > External Device > General > Serial Interface > GPS Base Station Settings](#))

GPS Position Display

GPS Position Display is the function to display the current location information of the own transceiver on the LCD.

Refer to Common Function Part [“USING THE GPS POSITION DISPLAY FUNCTION”](#) for the details of **GPS Position Display**.

2.21 Remote Operation by Radio Communication (Remote Control)

Remote Control is the function to remotely operate using radio communication the control of an individually specified transceiver.

An individually specified transceiver can be controlled by sending various Remote Control messages and by making the transceiver receive the messages.

Remote Control has the following functions:

Table 2-33 Remote Control Functions

Function	Description
Remote Stun	This is the function to disable the use of an individually specified transceiver (Stun state) by making the transceiver receive a Remote Stun message. If the transceiver receives the Remote Revive message, the Stun state will be reset. (Refer to Disabling the Transceiver Capability by Remote Control (Stun/ Kill).)
Remote Kill	This is the function to inhibit the use of an individually specified transceiver and disable all operations by making the transceiver receive a Remote Kill message. (Refer to Disabling the Transceiver Capability by Remote Control (Stun/ Kill).)
Remote Monitor	This is the function to make an individually specified transceiver transmit continuously by making the transceiver receive a Remote Monitor message. (Refer to Monitoring the Situation Around Another Transceiver by Remote Control (Remote Monitor).)
Radio Check	This is the function to check whether or not an individually specified transceiver is being operated by making the transceiver receive a Radio Check message. (Refer to Checking Whether Another Transceiver Is in Operation (Radio Check).)

An individually specified transceiver can be controlled by sending various Remote Control messages in Remote Control Mode and by making the transceiver receive the messages.

Pressing the **Remote Control** button places the transceiver in Remote Control Mode. Or, pressing the **Menu** button to enter Menu Mode and then selecting “Remote Control” places the transceiver in Remote Control Mode. (Refer to Common Function Part [Using Menu Mode.](#))

Also, various Remote Control messages can be sent by sending a transmission command of the various Remote Control messages from a PC to the transceiver. In this case, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

Note

- To use the Remote Control function, the Radio Feature License for REMOTE CONTROL (KWD-3504RC) is additionally required.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Sending a Remote Control Message in Remote Control Mode

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Various Remote Control messages can be sent in Remote Control Mode.

Operating the transceiver

● Sending a Remote Control Message by list selection

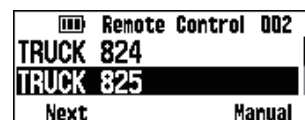
1 Press the **Remote Control** button.

The transceiver enters Remote Control Mode and then the Unit ID selection display will appear.

The following operations are identical even if the transceiver enters Remote Control Mode by pressing the **Menu** button.

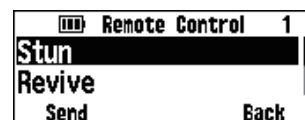
2 Press the **[▲]** or **[▼]** button to select a Unit ID from the Individual ID List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **Menu** (**[□]**) or **[*]** button.

The selection display of the options menu appears.



4 Press the **[▲]** or **[▼]** button to select the Remote Control message to send.

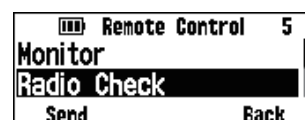
Stun: A Remote Stun message is sent.

Revive: A Remote Revive message is sent.

Kill: A Remote Kill message is sent.

Monitor: A Remote Monitor message is sent.

Radio Check: A Radio Check message is sent.



5 Press the **PTT** switch, the **Menu** (**[□]**) or **[*]** button.

The selected Remote Control message is sent.



● Sending a Remote Control message by using Manual Dialing

To send a Remote Control message by directly entering a Unit ID, Manual Dialing needs to be enabled.

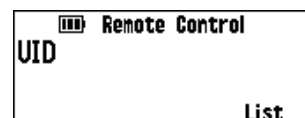
1 Press the **DMR Remote Control** button.

The transceiver enters Remote Control Mode and then the Unit ID selection display will appear.

The following operations are identical even if the transceiver enters Remote Control Mode by pressing the **Menu** button.

2 Press the **Back** ([↩]) button.

The Unit ID entry display appears.



3 Enter a Unit ID.

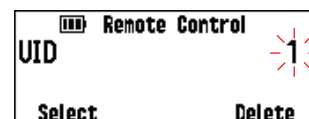
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

● Using the keypad

A Unit ID can be entered by pressing the [0] to [9] buttons.

● Using the PF buttons

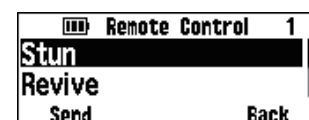
Press the [▲] or [▼] button to select a number and press the **Menu** ([□]) or [*] button to confirm the selected number.



4 Press the **Menu** ([□]) or [*] button.

The selection display of the options menu appears.

For the subsequent operations, refer to step 4 onwards in “[Sending a Remote Control Message by list selection](#)”.



Note

- If the Remote Control Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode by pressing the **Remote Control** button. A selection screen for the Individual ID List will appear by pressing the **Back** ([↩]) button.
- If no ID is registered in the Individual ID List, the transceiver enters Manual Dialing mode by pressing the **Remote Control** button if **Manual Dialing** is enabled. In this case, the transceiver cannot enter Remote Control Mode if **Manual Dialing** is disabled.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Manual Dialing** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > TX Options)
- ([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > TX Options)

Disabling the Transceiver Capability by Remote Control (Stun/ Kill)

The transceiver capability can be disabled by wireless remote control. This function allows a system administrator to remotely disable the transceiver, for instance, if the transceiver is lost.

The transceiver which has been disabled by this function can be enabled to be usable again by remote control from an external device using radio communication.

An individually specified transceiver can be controlled by sending a Remote Stun message, Remote Revive message, or Remote Kill message in Remote Control Mode and by making the transceiver receive the message. Also, each message can be sent by using a PC command.

(Refer to [Sending a Remote Control Message in Remote Control Mode.](#))

The following is the transceiver behavior when the transceiver receives a Remote Control message:

Table 2-34 Remote Control

Remote Control Message	Description
Remote Stun	The transceiver is disabled if the transceiver receives the Remote Stun message. Whether to accept a Remote Stun message when the transceiver receives the Remote Stun message can be configured using KPG-D3/ D3N. If the transceiver is configured not to accept a Remote Stun message, the transceiver sends a NACK and does not respond at all even if a Remote Stun message is received.
Remote Revive	If the transceiver is in the Stun state when receiving a Remote Revive message, the Stun state is reset. If the transceiver is configured not to accept a Remote Stun message, the transceiver sends a NACK and does not respond at all even if a Remote Stun message is received.
Remote Kill	If the transceiver receives the Remote Kill message, use of the transceiver is prohibited and all operations are disabled. All configuration data of the transceiver is cleared, hence the Kill state is not reset even if the transceiver receives the Remote Revive message. However, the configuration data can be written to the transceiver by using KPG-D3/ D3N. Also, whether to accept a Remote Kill message when the transceiver receives the Remote Kill message can be configured using KPG-D3/ D3N. If the transceiver is configured not to accept a Remote Kill message, the transceiver does not respond at all even if a Remote Kill message is received.

Note

- This function is applicable only when an individual call is initiated.
- The received Color Code and the Color Code configured for the transceiver need to match to receive the Remote Stun message, Remote Revive message, or Remote Kill message.
- The Stun state is identical to Stun for DTMF and FleetSync.
- The Stun state is reset by Remote Revive even if the transceiver entered the Stun state by receiving DTMF or FleetSync signaling.
- The Stun state is also reset by receiving the DTMF code (Stun Code + #) or FleetSync status (Status 92).

Configuration using KPG-D3/ D3N

Configuring **Remote Stun/Kill** to be enabled or disabled

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > RX Options > Remote Control)

( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > RX Options > Remote Control)

Monitoring the Situation Around Another Transceiver by Remote Control (Remote Monitor)

Remote Monitor is the function to remotely operate using radio communication an individually specified transceiver to transmit continuously.

Use of this function allows the base station to monitor the situation around the transceiver.

An individually specified transceiver can be controlled by sending a Remote Monitor message in Remote Control Mode and by making the transceiver receive the message. A Remote Monitor message can also be sent by using a PC command. (Refer to [Sending a Remote Control Message in Remote Control Mode.](#))

The transceiver which received the Remote Monitor message sends an acknowledgment to the transmitting transceiver, and then unmutes the speaker and initiates a continuous transmission using Individual Call. The duration of the continuous transmission is determined according to the configuration in **Remote Monitor Timer** (10 sec to 120 sec) of the transceiver which has received the message requesting the Remote transmission.

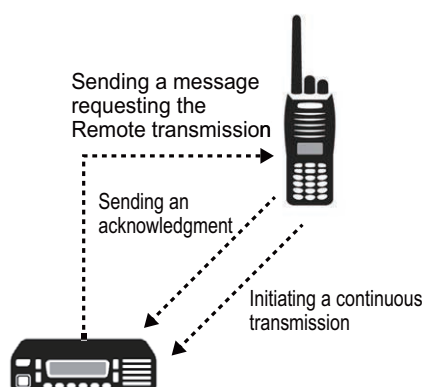


Figure 2-9 Remote Monitor

Remote Monitor has a Normal Mode and a Silence Mode: the former is a mode notifying a user of the transceiver's status of continuous transmission by an indication on the LCD and by lighting the Transmit LED, and the latter is a mode not notifying a user of the transceiver's status of continuous transmission. Which mode is used is determined according to the configuration in **Remote Monitor Display** of the transceiver which has received the message requesting the Remote transmission.

● If "On" is configured in Remote Monitor Display (Normal Mode)

The transceiver which received the Remote Monitor message sends an acknowledgment to the transmitting transceiver, and then displays "Remote TX" on the display and transmits with the Transmit LED lighting.

● If "Off" is configured in Remote Monitor Display (Silence Mode)

The transceiver which received the Remote Monitor message sends an acknowledgment to the transmitting transceiver, and then transmits without changing the indication of LCD and without lighting the Transmit LED.

Note

- To receive a Remote Monitor request message and accept the received message, **Remote Monitor** needs to be enabled.
- The transceiver initiates a continuous transmission only if a Remote Monitor message is received by an Individual Call. The transceiver does not initiate a continuous transmission even if a Remote Monitor message is received using anything other than Individual Call.
- While the transceiver is in the status of continuous transmission due to **Remote Monitor**, **Time-out Timer** and **Busy Channel Lockout** are disabled.
- The received Color Code and the Color Code configured for the transceiver need to match to receive a Remote Monitor message.

Configuration using KPG-D3/ D3N

- Configuring **Remote Monitor** to be enabled or disabled
- Configuring **Remote Monitor Timer**
- Configuring **Remote Monitor Display**

( See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > RX Options > Remote Control)

( See Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > RX Options > Remote Control)

Checking Whether Another Transceiver Is in Operation (Radio Check)

Radio Check can be used to check by using radio communication whether an individually specified transceiver is operated in the system.

Radio Check has two types of confirmations: the confirmation from Remote Control Mode and the confirmation by a PC command.

If Radio Check is selected in Remote Control Mode to execute **Radio Check** in Remote Control Mode, a Radio Check message proprietarily defined by Motorola is sent to the specified Unit ID. By making an individually specified transceiver receive the message, the transceiver can be controlled. (Refer to [Sending a Remote Control Message in Remote Control Mode.](#))

Checking Whether Another Transceiver Is in Operation by Using a PC command (Radio Check)

To use the **Radio Check** function, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to a communication port 0 to 2 or the Bluetooth of the transceiver. (Refer to Common Function Part [Available Functions for COM Port.](#))

- The transceiver sends the Status Inquiry Message proprietarily defined by JVCKENWOOD to the specified Unit ID if a PC sends the Radio Check transmission command (the Status Request Transmission (Digital Ver2) command) to the communication port of the transceiver.
- The transceiver that received the Status Inquiry Message sends a Status Message in response. (Refer to [Sending a Status Message.](#))
 - The transceiver sends a status configured in Default Status if the Status Inquiry Message is received when a status has never been selected, such as when the transceiver is turned on.
 - If the Status Inquiry Message is received when a status is selected in Status Mode, the transceiver sends the selected status.
 - The transceiver sends the last selected status (the backed up status) if the transceiver migrates to normal mode after selecting the status in Status Mode.
 - If the transceiver in the Stun state receives the Status Inquiry Message when **Stun Response Status** is not configured, the transceiver sends a status in the same manner as when the transceiver is in the normal state.
- The transceiver behaves in the same manner as when the normal status is received when the status sent back from the transceiver that received the Status Inquiry Message is received. (Refer to [Sending a Status Message.](#)) However, Horn Alert and AUX Output Status Message 1 to AUX Output Status Message 3 do not function even if the status sent from the transceiver is the same status as Horn Alert Status and AUX Output Status Message 1 to AUX Output Status Message 3.

Note

- Whether to accept a Radio Check message when the transceiver receives the Radio Check message can be configured using KPG-D3/ D3N.
- The received Color Code and the Color Code configured for the transceiver need to match to receive the Radio Check message.

Configuration using KPG-D3/ D3N

Configuring **Radio Check** to be enabled or disabled

( See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > RX Options > Remote Control)

( See Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > RX Options > Remote Control)

2.22 Migrating Automatically to the Site Providing Better Radio Environment (Site Roaming)

Site Roaming is the function to migrate automatically to the site (channel) providing better radio environment if the transceiver is operated in a DMR Conventional system.

The transceiver receives a synchronization signal transmitted from the repeaters in multiple sites at regular time intervals, and detects the RSSI level. Therefore, the transceiver migrates automatically to the channel providing better radio environment.

A maximum of 16 sites can be configured for the KENWOOD repeater. For this reason, operating the Site Roaming system with a maximum of 16 channels is recommended.

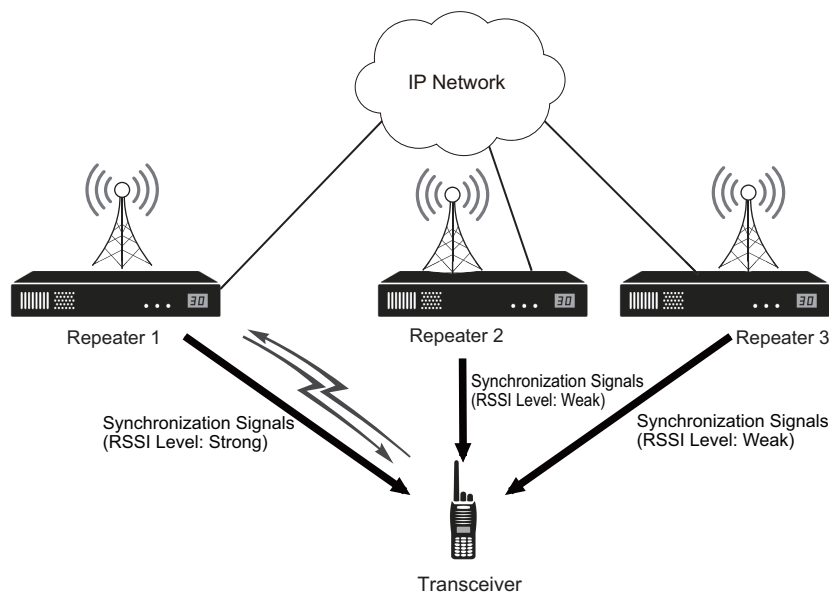


Figure 2-10 Image of Communications of Site Roaming

This function can be used by configuring the "DMR Site Roaming" channels for each system by using KPG-D3/ D3N.

Site Roaming Behaviors

If a Zone-channel or System-Personality in a system with “DMR Site Roaming” configured is selected, Site Roaming is automatically initiated. The “” icon appears and then “Site Roaming” is displayed. If **Revert Channel Display** is enabled, the Revert Channel is displayed. Also, for Portable, the LED flashes according to the configuration in **Site Roaming LED**.



Selecting a channel to which a Personality of a system with “DMR Site Roaming” configured is assigned starts Site Roaming for the Personality in the same system. At this time, the Personality name appears.

When the transceiver transmits, the configurations in **Slot Selection** and **Color Code** of the Personality which becomes a Revert Channel are applied. Because the Scan is executed for a Personality, one Personality is backed up as a Revert Channel for each system.

The Personality the transceiver received last time is retained even if the transceiver is turned OFF. When the transceiver is turned ON and transmits next time, the Personality is used as the Revert Channel. If no Revert Channel exists, the Personality configured for the selected Zone-channel is used as the Revert Channel. While the transceiver is receiving, or if the transceiver transmits while the **Dropout Delay Time** or **Dwell Time** is counting down, the transceiver transmits using the Revert Channel.

When the transceiver receives a synchronization signal from the repeater, the transceiver basically behaves as follows.

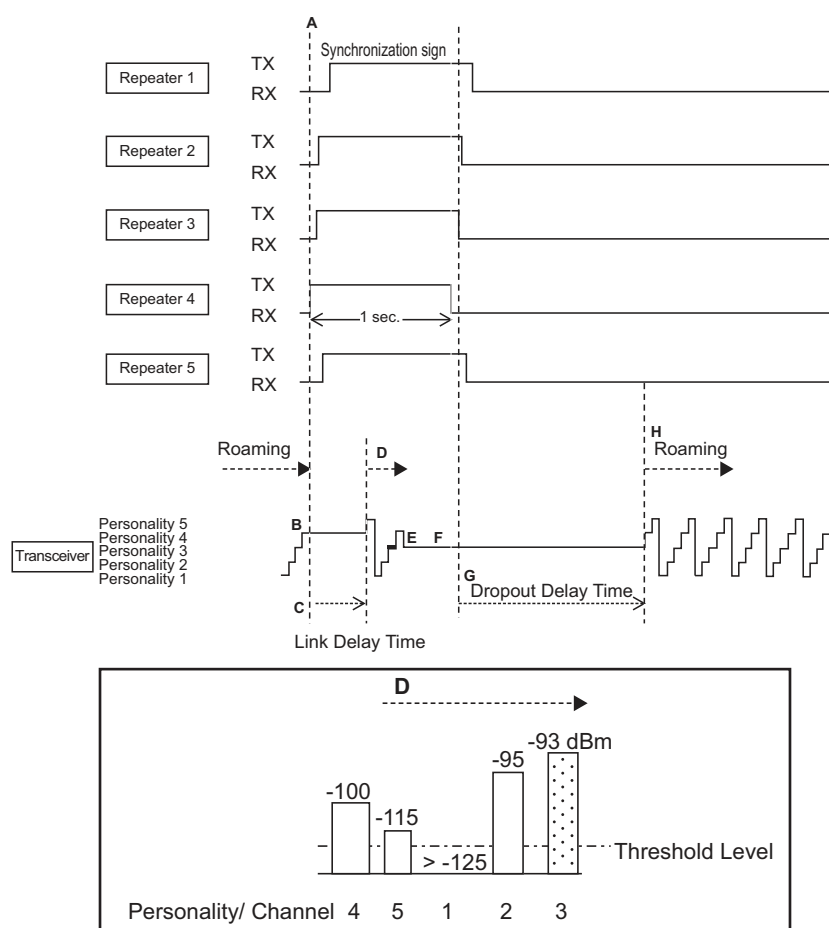


Figure 2-11 Basic Behaviors of Site Roaming

- A:** The repeater in a DMR Conventional system transmits a synchronization signal at regular time intervals. Or, the repeater in a DMR Conventional system transmits a call signal according to a transmission request from another transceiver.
- B:** For example, the transceiver in a system with “DMR Site Roaming” configured detects an adequate RSSI level on Personality 4.
- C:** The transceiver activates **Link Delay Time**.
- D:** Upon elapse of the length of time configured in **Link Delay Time**, the transceiver checks all Personalities in the same system and searches for the Personality having the strongest RSSI level.
- E:** After checking all the Personalities, the transceiver migrates to the Personality having the strongest RSSI level (for example, Personality 3) and checks whether the received Color Code matches the Color Code preconfigured for the Personality.
 If the Color Code matches, the transceiver unmutes the speaker and changes the Revert Channel to Personality 3.
 For a voice call, if an ID and **Slot Selection** match, the Revert Channel is changed and the speaker is unmuted.
 If the Color Code does not match, the transceiver migrates to the Personality having the second strongest RSSI level (for example, Personality 2) and checks whether the Color Code matches. If the Color Code matches in this step, the transceiver unmutes the speaker and changes the Revert Channel to Personality 2.
- F:** While the Color Code matches, the transceiver remains on the Personality and does not resume Site Roaming.
- G:** If the received signals disappear or the Color Code does not match, Dropout Delay Time is activated.
- H:** After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Site Roaming.

 Note

- For a system with “DMR Site Roaming” configured, 2 or more Personalities and a maximum of 250 Personalities can be configured (a maximum of 16 Personalities for Portable (Basic Model)). Also, if 1000 Channel (KWD-3000CH) is enabled, a maximum of 512 Personalities can be configured.
- The following functions cannot be configured for a Personality with “DMR Site Roaming” configured:
 - Scan Add
 - Scan List Number
- A Personality with “DMR Site Roaming” configured cannot be configured for the following functions:
 - Home Channel
 - Scan List Members
 - Data System-personality (DMR)
 - Emergency Zone-Channel
- The transceiver does not respond at all even if the following buttons are operated in a Personality with “DMR Site Roaming” configured:
 - Home Channel** button
 - Home Channel Select** button
 - Scan** button

Configuration using KPG-D3/ D3N

- Configuring **Revert Channel Display** to be enabled or disabled ( **See** Radio Configuration > Global Options > Scan > General > Indicator)
- Configuring **Site Roaming LED** ( **See** Radio Configuration > Global Options > Scan > Site Roaming > DMR Conventional > Indicator)

Behaviors When an Asynchronous State Occurs

If the transceiver cannot detect a synchronization signal from the repeater, the transceiver sends a Wakeup message to the repeater to prompt synchronization when the transmission is on the Revert Channel or a selected channel. The wait time until a synchronization signal is sent and the number of times for the transceiver to send the Wakeup message are determined by the configurations of **Sync Wakeup Wait Time** and **Number of Wakeup Message Retries**.

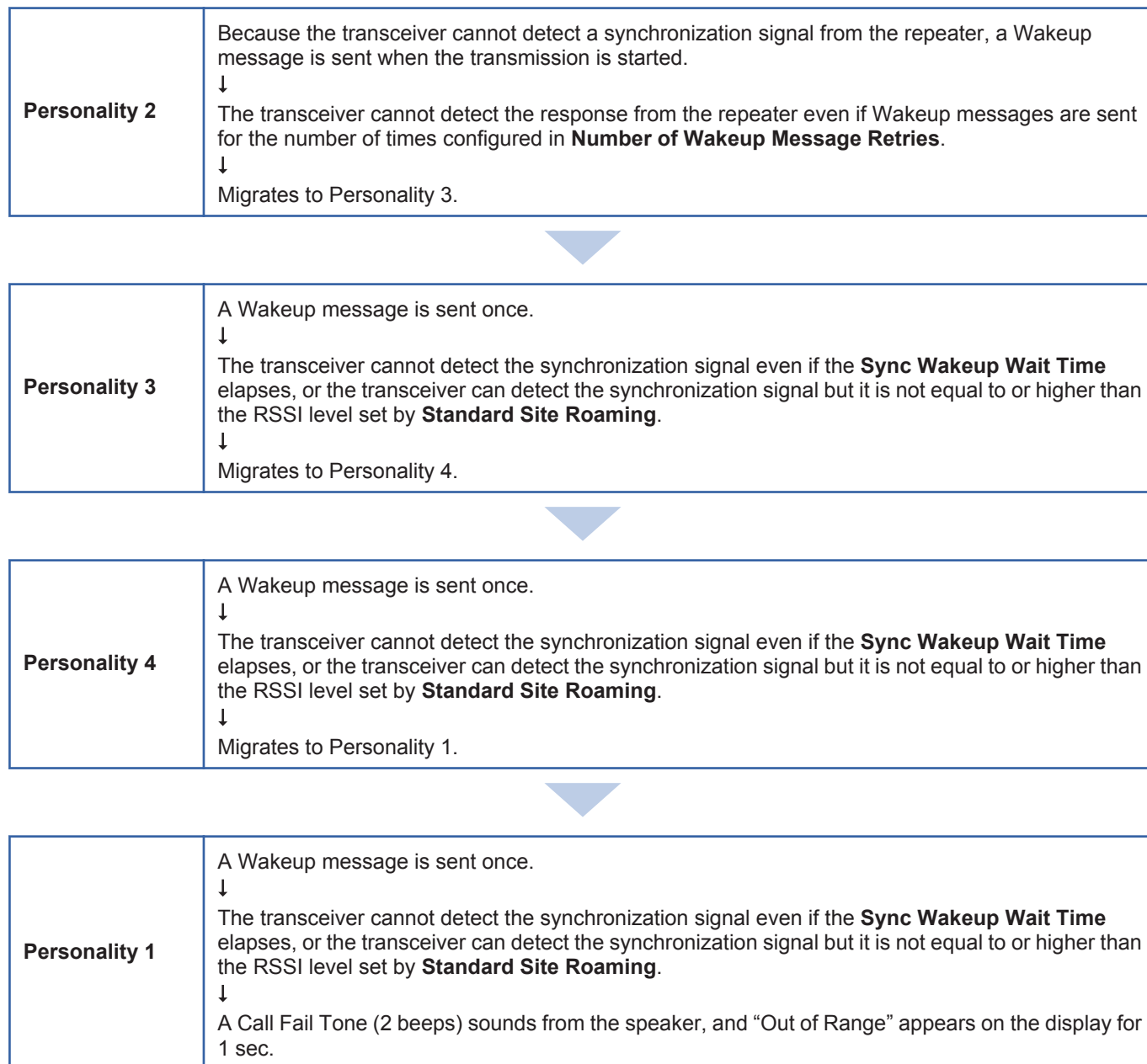
A Wakeup message is sent as follows according to the configuration of **Active Site Hunt**:

Table 2-35 Active Site Hunt

Configuration	Description
Enabled	If the transceiver cannot detect a synchronization signal from the repeater, the transceiver sends a Wakeup message to the repeater to prompt synchronization when the transmission is on the Revert Channel or a selected channel. If the transceiver cannot detect a response from the repeater after the transceiver sends the Wakeup message for the number of times configured in Number of Wakeup Message Retries, the transceiver migrates to another Personality with “DMR Site Roaming” configured in the same system, sends the Wakeup message once, and searches for the repeater available for synchronization. The Wakeup message is sent once in each Personality in order from the Personality that follows the Revert Channel or the selected channel. (Refer to Behavior example of Active Site Hunt.) The transceiver searches for the repeater available for synchronization, and if there is a synchronized Personality that is equal to or higher than the RSSI level set by Standard Site Roaming Level, the search for the repeater terminates at the time. The synchronized Personality becomes the Revert Channel.
Disabled	If the transceiver cannot detect a synchronization signal from the repeater, the transceiver sends a Wakeup message to the repeater to prompt synchronization when the transmission is on the Revert Channel or a selected channel. If a response from a repeater cannot be detected after a Wakeup message is sent for the number of times configured in Number of Wakeup Message Retries, a Call Fail Tone (2 beeps) sounds from the speaker of the transceiver, and “Out of Range” appears on the display for 1 sec.

Behavior example of Active Site Hunt

The following is a behavior example of **Active Site Hunt** when **Active Site Hunt** is enabled and the transmission is started on the Revert Channel (Personality 2). The following assumes that the Personalities registered for the transceiver are Personality 1 to Personality 4.



Note

- A Wakeup message is not sent if the transceiver is synchronized with the repeater.
- The number of times for the transceiver to send a Wakeup Message in other Personalities is 1 time, regardless of the configuration in **Number of Wakeup Message Retries**.
- The Revert Channel appears on the display while the transceiver searches for the repeater available for synchronization.
- Because the transceiver searches for the repeaters one by one in other Personalities, the time required for the audio connection by transmission may increase.
- When the transceiver is sending the status by using the **Power-on Status** or **Power-off Status** function, or when the transceiver is in Emergency Mode, the transceiver behaves with **Active Site Hunt** disabled. In addition, "Out of Range" does not appear on the display even if the transceiver cannot detect the response from the repeaters.
- The transceiver determines whether to migrate to the Revert Channel based on the RSSI level set by **Standard Site Roaming**. The transceiver does not determine it based on the RSSI level set by **Quick Site Roaming**.

Configuration using KPG-D3/ D3N

- Configuring **Active Site Hunt** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Active Site Hunt)
- Configuring **Sync Wakeup Wait Time**
( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > DMR Parameters)
( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > DMR Parameters)
- Configuring **Number of Wakeup Message Retries**
( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > DMR Parameters)
( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > DMR Parameters)

Migrating to Another Site Where a Repeater That Can Be Synchronized Exists (Manual Site Hunt)

Manual Site Hunt is the function to search for the repeater available for synchronization regardless of the synchronization status with the repeaters.

As well as **Active Site Hunt**, the transceiver can send a Wakeup message once in other Personalities with “DMR Site Roaming” configured in the same system to search for the repeater available for synchronization.

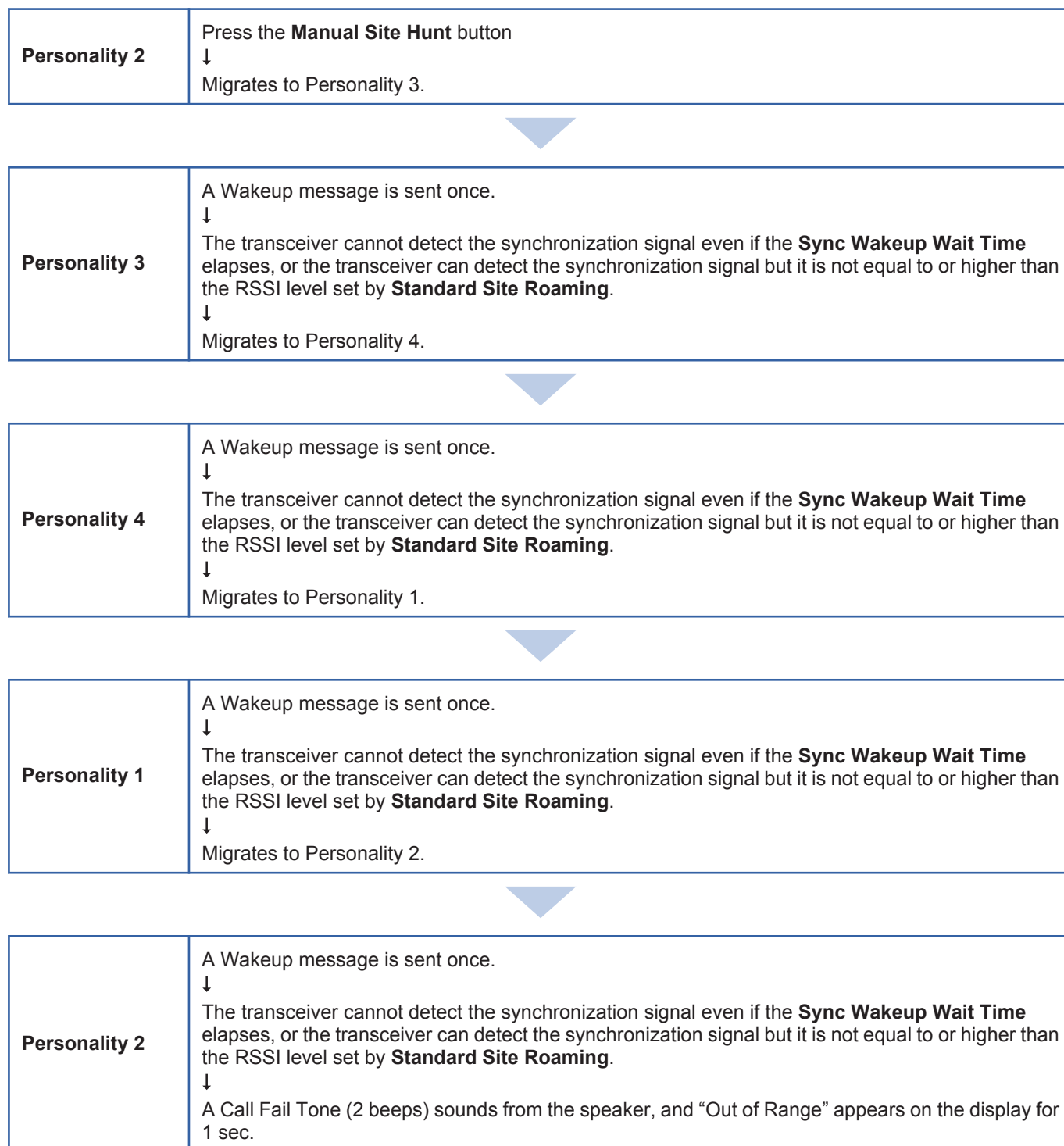
Manual Site Hunt is used to migrate to a Personality of other sites from the current Revert Channel.

A Search Mode Tone (1 beep) sounds from the speaker and the search for the repeaters available for synchronization is initiated if the **Manual Site Hunt** button or the **Menu** button is pressed to enter Menu Mode and then “Manual Site Hunt” is selected. A Wakeup message is sent once in each Personality in order from the Personality that follows the Revert Channel when the search for the repeater starts. (Refer to [Behavior example of Manual Site Hunt](#).)

The transceiver searches for the repeater available for synchronization, and if a Personality is synchronized and equal to or higher than the RSSI level set by **Standard Site Roaming**, the search for the repeater terminates at that time and a System Select Tone (4 beeps) sounds. The synchronized Personality becomes the Revert Channel.

Behavior example of Manual Site Hunt

The following is a behavior example of **Manual Site Hunt** when the **Manual Site Hunt** button is pressed on the Revert Channel (Personality 2). The following assumes that the Personalities registered for the transceiver are Personality 1 to Personality 4.



 Note

- **Manual Site Hunt** functions regardless of the configuration of **Active Site Hunt**. In addition, **Manual Site Hunt** functions even if the transceiver synchronizes with the repeater.
- **Manual Site Hunt** functions only if the channel in a DMR Conventional system with “DMR Site Roaming” configured is selected.
- **Manual Site Hunt** functions even on the channel where **Talk Around** is enabled.
- **Manual Site Hunt** does not function while the transceiver is in Emergency Mode.
- “Search” appears on the display while the transceiver searches for the repeater available for synchronization.
- If the following buttons are pressed or various operations are executed while the transceiver searches for the repeater available for synchronization, the transceiver behavior is suspended and the applicable function functions.
 - **Call 1 to Call 6** buttons (only if the functions related to DMR are configured)
 - **Channel Down** button
 - **Channel Up** button
 - **Clear** button
 - **Direct Channel 1 to Direct Channel 5** buttons
 - **Zone Down** button
 - **Zone Up** button
 - **PTT** switch
 - **Hook** (Mobile only)
 - **Selector** (Portable only)
 - **Emergency** button
 - **Front Panel Programming** button
- If the **Volume** control for Portable is turned or the following buttons are pressed even while the transceiver searches for the repeater available for synchronization, the applicable function functions without the suspension of the behavior.
 - **Backlight** button
 - **LCD Brightness** button
- The transceiver determines whether to migrate to the Revert Channel based on the RSSI level set by **Standard Site Roaming**. The transceiver does not determine it based on the RSSI level set by **Quick Site Roaming**.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( **See** Radio Configuration > Global Options > Button Assignment)

Site Roaming LED

Supported Models: Portable

Site Roaming LED is the function to notify a user visually that the transceiver is executing Site Roaming.

When the transceiver starts Site Roaming, LED can flash with one of the following 7 colors:

- Yellow
- Purple
- Blue
- Light Blue
- Red
- Green
- White

Configuration using KPG-D3/ D3N

Configuring **Site Roaming LED** to be enabled or disabled ( **See** Radio Configuration > Global Options > Scan > Site Roaming > DMR Conventional > Indicator)

Link Delay Time

The length of time until the repeater in each site is activated may vary depending on the site. **Link Delay Time** is the function to configure the length of time to tolerate a variation in time of when each repeater is activated by delaying the time to start searching for a signal on other channels.

If the transceiver detects a signal on a Personality channel after Site Roaming is initiated, **Link Delay Time** is activated. Upon the elapse of the length of time configured in **Link Delay Time** after detecting a signal, the transceiver checks all Personalities in the same system or the other channels in the same zone to search for a signal. The transceiver checks all Personalities, migrates to the Personality having the strongest RSSI level, and checks whether the Color Code matches. If the Color Code does not match or if a Color Code is not configured for the Personality, the transceiver migrates to the Personality having the second strongest RSSI level and checks whether the Color Code matches.

Configuration using KPG-D3/ D3N

Configuring **Link Delay Time** ( See Radio Configuration > Global Options > Scan > Site Roaming > DMR Conventional > Timer)

Dropout Delay Time

If the transceiver receives a synchronization signal or call from the repeater during Site Roaming, Site Roaming pauses. **Dropout Delay Time** is the length of time from when the transceiver finishes receiving signals until the transceiver resumes Site Roaming.

If the received signals disappear or the Color Code does not match, **Dropout Delay Time** is activated. After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Site Roaming.

Configuration using KPG-D3/ D3N

Configuring **Dropout Delay Time** ( See Radio Configuration > Global Options > Scan > Site Roaming > DMR Conventional > Timer)

Dwell Time

When the transceiver starts transmitting by pressing the **PTT** switch during Site Roaming, Site Roaming pauses. **Dwell Time** is the length of time from when the transceiver terminates transmission until the transceiver resumes Site Roaming. After the transceiver terminates the transmission, **Dwell Time** is activated. After the length of time configured in **Dwell Time** elapses, the transceiver resumes Site Roaming.

Configuration using KPG-D3/ D3N

Configuring **Dwell Time** ( See Radio Configuration > Global Options > Scan > Site Roaming > DMR Conventional > DMR Conventional > Timer)

Quick Site Roaming

Quick Site Roaming is the function to allow Site Roaming to behave faster when the transceiver is in an area with a strong signal. If the transceiver receives a signal with a level higher than the value configured in **Quick Site Roaming** during Site Roaming, the channel becomes the Revert Channel. In this case, **Link Delay Time** becomes disabled, and if the Color Code matches, the transceiver unmutes the speaker.

If the transceiver receives a signal with a level equal to or higher than the value configured in **Quick Site Roaming** while **Link Delay Time** is counting down or while a Personality is being checked, the behavior is also the same.

However, if "Off" is configured in **Quick Site Roaming** and **Standard Site Roaming**, the transceiver initiates Site Roaming using the threshold value preconfigured in the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Quick Site Roaming** ( See Radio Configuration > Global Options > Scan > Site Roaming > DMR Conventional > Roaming Level)

Standard Site Roaming

Standard Site Roaming is the function to allow Site Roaming to behave faster when the transceiver is in an area with a strong signal.

The transceiver searches for a signal with a level higher than the value configured in **Standard Site Roaming** during Site Roaming.

Since a Personality having a signal with a level lower than the value configured in **Standard Site Roaming** is excluded from Site Roaming, the transceiver does not search the Personality. If the transceiver receives a signal with a level higher than the value configured in **Standard Site Roaming** during Site Roaming, Site Roaming pauses and then **Link Delay Time** is activated. Then, if the Color Code matches, the transceiver unmutes the speaker.

However, if "Off" is configured in **Quick Site Roaming** and **Standard Site Roaming**, the transceiver initiates Site Roaming using the threshold value preconfigured in the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Standard Site Roaming** ( See Radio Configuration > Global Options > Scan > Site Roaming > DMR Conventional > Roaming Level)

Site Roaming Resume

Site Roaming Resume is the threshold value of the RSSI level used for determining whether to resume Site Roaming according to the rise and fall of the RSSI level for the signal received by the transceiver.

If the RSSI level of the received signal is lower than the level configured in **Site Roaming Resume** while the transceiver remains on the channel synchronized by Site Roaming, **Dropout Delay Time** is activated.

After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Site Roaming. If the RSSI level of the received signal becomes higher than the level configured in **Site Roaming Resume** while the **Dropout Delay Time** is counting down, the **Dropout Delay Time** is automatically extended and the transceiver does not resume Site Roaming.

Also, if **Auto Reset Timer** is activated by receiving a call, Site Roaming does not resume if the receiving status continues even if the **Dropout Delay Time** elapses. After the reception ends and the length of time configured in **Auto Reset Timer** elapses, the transceiver resumes Site Roaming.

Configuration using KPG-D3/ D3N

Configuring **Site Roaming Resume** ( See Radio Configuration > Global Options > Scan > Site Roaming > DMR Conventional > Roaming Level)

Off-hook Site Roaming

Supported Models: Mobile

Off-hook Site Roaming is the function to start Site Roaming depending on the status of microphone, either on-hook or off-hook.

The transceiver behaves as follows according to the configuration in **Off-hook Site Roaming**.

Table 2-36 Off-hook Site Roaming

Configuration	Description
Enabled	The transceiver can start Site Roaming while the microphone is in either the on-hook state or off-hook state. Even if the microphone changes from the on-hook state to off-hook state during Site Roaming, Site Roaming does not pause.
Disabled	The transceiver can start Site Roaming if the microphone is in the on-hook state. The transceiver cannot start Site Roaming if the microphone is in the off-hook state. If the microphone changes from the on-hook state to off-hook state during Site Roaming, Site Roaming pauses on the Revert Channel. Even if the microphone changes from the on-hook state to off-hook state while Site Roaming pauses, the channel does not change. When the microphone goes to on-hook state, the transceiver resumes Site Roaming. However, if the microphone goes to on-hook state when the audio sounds, the transceiver continues the audio output status without resuming Site Roaming. Thereafter, the transceiver resumes Site Roaming when the signal disappears and the time configured in Dropout Delay Time elapses. If the Auto Reset Timer is also counting down at the same time, the transceiver resumes Site Roaming after the timer configured with the longer countdown ends.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Site Roaming** ( **See** Radio Configuration > Global Options > Scan > Site Roaming > DMR Conventional > Site Roaming)

2.23 Out of Range Indicator

Out of Range Indicator is the function to notify a user of being outside the service area if the transceiver is outside the service area.

If the transceiver cannot receive a synchronization signal (Beacon) or other DMR signals periodically sent by the repeater within a certain period of time, **Out of Range Indicator** is activated and notification of being outside the service area is made.

If **Out of Range Indicator** is enabled, "Out of Range" appears on the display if a synchronization signal (Beacon) and other DMR signals cannot be received within the time configured in **In-service Check Time**.



Out of Range Tone

Out of Range Tone is the function to notify a user of being outside the service area by a tone if the transceiver is outside the service area.

The transceiver emits an Out of Range Tone (1 beep) if a synchronization signal (Beacon) and other DMR signals cannot be received within the time configured in **In-service Check Time**. The transceiver behaves as follows according to the configuration in **Out of Range Tone**:

Table 2-37 Out of Range Tone

Configuration	Description
Off	An Out of Range Tone (1 beep) does not sound from the transceiver.
One-shot	If a synchronization signal (Beacon) and other DMR signals cannot be received within the time configured in In-service Check Time , the transceiver emits an Out of Range Tone (1 beep) only once. After that, an Out of Range Tone (1 beep) does not sound from the transceiver even if an available control channel has still not been found.
Cycle	The transceiver emits an Out of Range Tone (1 beep) at 30-sec intervals while the transceiver continuously fails to receive a synchronization signal (Beacon) and other DMR signals.

In-service Check Time

In-service Check Time is the amount of time for **Out of Range Indicator** and **Out of Range Tone** to initiate if the transceiver cannot receive a synchronization signal (Beacon) and other DMR signals sent from the repeater within the amount of time configured in **In-service Check Time**.

In-service Check Time is configured to be longer than **Beacon Transmit Interval Time** of the repeater.

Note

- **Out of Range Indicator**, **Out of Range Tone**, and **In-service Check Time** stop counting down if the channel and zone are changed. If **Out of Range Indicator** and **Out of Range Tone** are enabled in the target system, **In-service Check Time** starts counting down.
- **Out of Range Indicator** does not stop and continues to function when the transceiver transmits. Also, **Out of Range Tone** does not sound. However, if a Wakeup Message is sent to the repeater and the response is received when the transceiver transmits, the transceiver starts transmission after **Out of Range Indicator** and **Out of Range Tone** stop.

Configuration using KPG-D3/ D3N

- Configuring **Out of Range Indicator** in DMR Conventional to be enabled or disabled ( [See](#) Radio Configuration> System Properties> Systems> DMR Conventional> DMR> Indicator> Out of Range)
- Configuring **Out of Range Tone** in DMR Conventional ( [See](#) Radio Configuration> System Properties> Systems> DMR Conventional> DMR> Indicator> Out of Range)
- Configuring **In-service Check Time** in DMR Conventional ( [See](#) Radio Configuration> System Properties> Systems> DMR Conventional> DMR> Indicator> Out of Range)
- Configuring **Out of Range Indicator** in DMR Site Roaming to be enabled or disabled ( [See](#) Radio Configuration> System Properties> Systems> DMR Site Roaming> DMR> Indicator> Out of Range)
- Configuring **Out of Range Tone** in DMR Site Roaming ( [See](#) Radio Configuration> System Properties> Systems> DMR Site Roaming> DMR> Indicator> Out of Range)
- Configuring **In-service Check Time** in DMR Site Roaming ( [See](#) Radio Configuration> System Properties> Systems> DMR Site Roaming> DMR> Indicator> Out of Range)

2.24 Indoor Location (DMR)

Indoor Location is the function to manage the position of the transceiver by using Bluetooth.

After beacon data from each beacon transmitter is received by using the BLE Scan function, the transceiver managed by Indoor Location selects the data of the strongest signal strength level among the latest received signals, and sends the information of the beacon transmitter (hereafter referred to as BLE data) to the location server.

In a DMR Conventional system, the Indoor Location function has the following functions related to sending and receiving BLE data:

- BLE Report on Data System-personality
- BLE Base ID
- Send the Location Data
- BLE Combination
- BLE Report Mode
- Number of Times
- BLE Report Interval Time
- BLE Time Mark
- Respond to Polling ID
- BLE Report with Voice
- Map Header



- Refer to Common Function Part “[INDOOR LOCATION](#)” for details about the Indoor Location function.

BLE Report on Data System-Personality (Indoor Location)

Supported Models: Portable

BLE Report on Data System-personality is the function to send BLE data by Data System-personality.

BLE Report on Data System-personality is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method. This function is used when data communication needs to be performed on a specific dedicated channel.

A configuration value is shared with GPS Report on Data System-personality. GPS Report on Data System-personality and BLE Report on Data System-personality function with the same configuration.

By using this function, the transceiver automatically changes the channel to the Data System-personality to send BLE data. After transmission, the transceiver returns to the Zone-Channel which was used for reception before sending the BLE data. If **Data System-personality** is not configured, the transceiver sends the BLE data on the Current Zone-Channel.



- If both Analog and DMR Data System-personality are configured, the DMR Data System-personality is always used for sending the BLE data. The BLE does not have the configuration item equivalent to a GPS Report Channel, and the behavior is fixed to DMR.

Configuration using KPG-D3/ D3N

Configuring **GPS/BLE Report on Data System-personality** in a DMR Conventional system to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Data System-personality)

The ID of the Target Transceiver (BLE Base ID (Indoor Location))

Supported Models: Portable

BLE Base ID is the target ID for BLE data only.

BLE Base ID is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with GPS Base ID. GPS Base ID and BLE Base ID function with the same configuration.

ID of the base station that manages operations is normally configured for BLE Base ID.

The BLE data is sent to the BLE Base ID. This is used to separate the BLE data destination from the other data destinations.

The following configurations are available for the BLE Base ID:

- **ID Type**
Either a value for Unit ID or for Group ID can be configured in ID Type.
- **ID**
An ID can be configured in the range of 0 (All Group ID: only available when a Group ID is selected) and 1 to 16776415.
For Blank, the BLE data is sent to the ID configured for the Base ID.

The ID Type and ID configured for the current System are enabled.

Configuration using KPG-D3/ D3N

- Configuring **ID Type** in a DMR Conventional system ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Base Station)
- Configuring **ID Type** in a DMR Site Roaming system ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Base Station)
- Configuring **ID** in a DMR Conventional system ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Base Station)
- Configuring **ID** in a DMR Site Roaming system ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Base Station)

Sending BLE Data Manually by Using a Button (Send the Location Data (Indoor Location))

Supported Models: Portable

Send the Location Data is the function to send the location information of the own station by the user button operation. Either BLE data or GPS data is sent as location information. When a valid beacon signal is received, the BLE data is preferentially sent. **Send the Location Data** is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

Location information is sent to the Base ID or BLE Base ID (GPS Base ID) by using one of the following button operations:

- **Send the Location Data** button

By pressing the **Send the Location Data** button, the transceiver sends location information.

- **Menu** button

By pressing the **Menu** button to enter Menu Mode and then executing “Send the Location Data”, the transceiver sends location information.

To use this function, the GPS function needs to be enabled to receive GPS data, or the Bluetooth function needs to be enabled to receive a valid beacon signal.

If both the GPS function and Bluetooth function are disabled, a Button-entry Error Tone (1 beep) sounds from the transceiver, and location information cannot be sent.

If neither GPS data nor a valid beacon signal is received, a Button-entry Error Tone (1 beep) sounds from the transceiver, and location information cannot be sent.

If a beacon signal (**Send Location via** configuration: “RF System”) is received, the BLE data is sent. GPS data is not sent even if GPS data is received.

If a beacon signal (**Send Location via** configuration: “Bluetooth System”) is received, a Button-entry Error Tone (1 beep) sounds from the transceiver, and location information cannot be sent. GPS data is not sent even if GPS data is received.

During GPS Delay Time, a Button-entry Error Tone (1 beep) sounds from the transceiver, and location information cannot be sent. GPS data is not sent even if GPS data is received.

When GPS data is received without receiving a beacon signal, GPS data is sent. Even if non-positioning data is received from the GPS receiver, GPS data is sent. Refer to “[Sending GPS Data Manually by Using a Button \(Send the GPS Data\)](#)”.

For a channel with no Indoor Location supported, and when BLE Scan is not functioning, the behavior is the same as when the **Send the GPS Data** button is pressed.

For DMR Conventional, ACK is not sent for location information transmission.

For DMR-based Trunking, if the **PTT** switch is pressed during the transmission of GPS data by the **Send the Location Data** button, GPS data transmission stops, and voice transmission starts.

For DMR-based Trunking, because the RF System in Indoor Location is not supported, BLE data is not sent when the **Send the Location Data** button is executed. Only the GPS data transmission behavior is performed when the GPS data transmission condition is satisfied.

Refer to “[Sending GPS Data Manually by Using a Button \(Send the GPS Data\)](#)” for the display, operation method, and behavior of DMR-based Trunking.

Transceiver behavior

● For location information transmission (DMR Conventional)

By pressing the **Send the Location Data** button while GPS data or a valid beacon signal (**Send Location via** configuration: “RF System”) is received, the transceiver sends location information to the Base ID or BLE Base ID (GPS Base ID).



“Send Data” appears on the LCD while location information is being sent. The Transmit LED lights while location information is being sent.



When the location information transmission is complete, the transceiver emits the Complete Tone and displays “Complete” on the LCD for 1 second.



● If location information transmission is busy (DMR Conventional)

If the transceiver cannot transmit because the transmission is busy, a Busy Tone 2 sounds from the transceiver, and “Busy” appears on the LCD for 1 second, and then the transceiver restores the standby display.



Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver (See Radio Configuration > Global Options > Button Assignment)
- Configuring **Bluetooth** to be enabled or disabled (See Radio Configuration > Global Options > Basics > GPS/Bluetooth > Preset Activation)
- Configuring **Built-In GPS Receiver** to be enabled or disabled (See Radio Configuration > Global Options > Basics > GPS/Bluetooth > Built-in Device Activation)
- Configuring **COM Port** (See Radio Configuration > Global Options > External Device > General > Serial Interface > COM Port 0, COM Port Bluetooth)
- Configuring BLE Base ID (**ID Type**, **ID**) in a DMR Conventional system (See Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Base Station)
- Configuring BLE Base ID (**ID Type**, **ID**) in a DMR Site Roaming system (See Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Base Station)

Sending the BLE Data Linked With the Configured Mode (BLE Combination (Indoor Location))

Supported Models: Portable

BLE Combination is the function to configure the timing of BLE data transmission.

BLE Combination is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method. A configuration value is shared with GPS Combination. GPS Combination and BLE Combination function with the same configuration.

When a BLE Combination behavior trigger occurs, the following behaviors occur:

- If a beacon signal (**Send Location via** configuration: “RF System”) is received, the BLE data is sent. GPS data is not sent even if GPS is received.
- If a beacon signal (**Send Location via** configuration: “Bluetooth System”) is received, location information is not sent. GPS data is not sent even if GPS is received.

During GPS Delay Time, location information is not sent. GPS data is not sent even if GPS is received.

If the above conditions are not satisfied, GPS Combination functions. Refer to “[Sending GPS Data Together With Status Call \(GPS Combination\)](#)”.

BLE data can be added and sent when a Status Message is sent or when an Emergency Status or audio data is sent in Emergency Mode. The display follows each state.

Table 2-38 BLE Combination

Mode	Description
Status Message Transmission	If the Status configuration is enabled, Combination Status Range can be configured. The transceiver transmits by adding the BLE data when sending the Status Number within the specified range.
Combination Status Range	The range of Statuses sent by adding the BLE data is configured in Status. Among the status numbers 0 to 1023, the range of Status Messages to which the BLE data is added can be configured.
Emergency Status Transmission (For DMR Conventional)	The transceiver transmits by adding the BLE data when sending an Emergency Status or audio data during Emergency Mode. For the relationship of the transmissions of an Emergency Status, audio data, and BLE data during Emergency Mode, refer to the tables below. If Emergency Call Status is not configured, an Emergency Status is not sent.

Table 2-39 For Automatic Transmission (Emergency Status Transmission)

Emergency Status Transmission	Automatic Transmission of Audio Data by the Transmit Duration Configuration	BLE Data Transmission
Not transmit	Not transmit (Transmit Duration configuration: “0 (s)”)	Not transmit
Not transmit	Transmit (Transmit Duration configuration: other than “0 (s)”)	Transmit
Transmit	Not transmit (Transmit Duration configuration: “0 (s)”)	Transmit
Transmit	Transmit (Transmit Duration configuration: other than “0 (s)”)	Transmit

If the BLE Report with Voice function is enabled, BLE Report with Voice functions when the condition is that audio data is sent. Refer to “[Sending BLE Data during Voice Communications \(BLE Report with Voice \(Indoor Location\)\)](#)” for the BLE Report with Voice function.

Table 2-40 Transmission by the Switch (Emergency Status Transmission)

Emergency Status Transmission	Audio Data Transmission by the PTT Switch	BLE Data Transmission
Not transmit	Transmit	Not transmit
Transmit	Transmit	Transmit

If the BLE Report with Voice function is enabled, BLE Report with Voice functions. Refer to “[Sending BLE Data during Voice Communications \(BLE Report with Voice \(Indoor Location\)\)](#)” for the BLE Report with Voice function.

The added BLE data is sent to the target configured in Base ID Type and Base ID.

If a BLE Base ID is configured, the transmission occurs to the BLE Base ID as the target.

The Base ID and BLE Base ID configured for the current system are enabled.



- For DMR Conventional, if “0” is configured in Emergency Cycle, BLE Combination (Emergency) does not function even if the configuration is enabled.

Configuration using KPG-D3/ D3N

- Configuring **Status** in a DMR Conventional system ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > GPS/BLE Combination)
- Configuring **Status** in a DMR Site Roaming system ([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > GPS/BLE Combination)
- Configuring **Emergency** in a DMR Conventional system ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > GPS/BLE Combination)
- Configuring **Emergency** in a DMR Site Roaming system ([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > GPS/BLE Combination)

Sending the BLE Data With the Timing of Automatic Transmission Configured (BLE Report Mode (Indoor Location))

Supported Models: Portable

BLE Report Mode is the function to configure whether to send BLE data automatically or after receiving a request.

BLE Report Mode is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with GPS Report Mode. GPS Report Mode and BLE Report Mode function with the same configuration.

ID of the base station that manages operations is normally configured for Base ID.

The following behaviors occur according to the configuration in **BLE Report Mode**:

Table 2-41 BLE Report Mode

Configuration	Description
Poll	The data transmission is performed at the timing of when a BLE data transmission request is received from the base station. This is used when the base station controls the timing to require location information. This is useful to avoid data collision with multiple mobile station transceivers. Note Instead of sending the data to the ID that issued the request, the data is sent to the ID configured in Base ID. Therefore, the requestor does not necessarily match the data destination. However, if Respond to Polling ID is configured, the data is sent to the requestor.
Auto	The transceiver sends the BLE data at the time interval configured in BLE Report Interval Time. This configuration is useful for controlling or monitoring vehicles on a time basis by periodically sending location information. The data transmission is performed at the timing of when a BLE data transmission request is received from the base station. The first response when a BLE data transmission request from the base station is received behaves as follows: If a beacon signal (Send Location via configuration: "RF System") is received, the BLE data is sent. If a beacon signal (Send Location via configuration: "Bluetooth System") is received, neither the BLE data nor the GPS data is sent. During GPS Delay Time, neither the BLE data nor the GPS data is sent. When GPS data is received without receiving a beacon signal, GPS data is sent. Refer to "Sending GPS Data Automatically at Certain Intervals (GPS Report Mode)" for the behavior in this case.

The following behaviors occur at the timing of the BLE Report transmission. The second and subsequent responses when a BLE data transmission request from the base station is received are also included in the following contents:

- If a beacon signal (**Send Location via** configuration: "RF System") is received, the BLE data is sent.
However, if synchronization information is not received from KAS-20E, the BLE data is not sent. Refer to "[BLE Time Mark \(Indoor Location\)](#)" for details.
- If a beacon signal (**Send Location via** configuration: "RF System") is not received, the BLE data is not sent.

The following requests from the base station are for both GPS data and BLE data:

- GPS Data Auto Report Start Request
- GPS Data Auto Report Stop Request
- GPS Data Single Polling Request
- GPS Data Multiple Polling Request

Automatic BLE data transmission is canceled under the following conditions. In this case, display and tone behavior are not performed.

Also, the transceiver does not suspend transmission using **Transmit Busy Wait Time** to avoid collisions with BLE data transmissions from other mobile station transceivers.

- While the transceiver is transmitting
- During the Busy state (Refer to "[Random Access \(Contention\)](#)".)
- While unmuted
- When Transmit Frequency is not configured
- While transmission is prohibited by TOT
- During data communications
- During Transceiver Password Mode
- During Emergency Mode

For DMR Conventional, ACK is not sent for BLE data transmission.

The Base ID and BLE Base ID configured for the current system are enabled. Refer to “[Base ID](#)” and “[The ID of the Target Transceiver \(BLE Base ID \(Indoor Location\)\)](#)” for details.

For BLE data by Poll on a Mixed Channel, the first transmission at the timing of when a Polling request is received is the location information transmission by the signal (FleetSync or DMR) that received the Polling request. If BLE data transmission continues thereafter, BLE data transmission according to the Transmit Mode configuration for the Mixed Channel is performed.

On an Analog Channel, GPS data is sent.

Transceiver behavior

● BLE data transmission (DMR Conventional):

Refer to “[Sending GPS Data Automatically at Certain Intervals \(GPS Report Mode\)](#)” for the behavior when BLE data is determined to be sent in the first response when a GPS data transmission request is received. If it is determined that GPS data and BLE data are not to be sent in the first response when a BLE data transmission request is received, or if it is determined that BLE data is not to be sent at the timing of the BLE Report transmission, no change occurs.

If it is determined that BLE data is to be sent in the first response when a BLE data transmission request is received, or if it is determined that BLE data is to be sent at the timing of the BLE Report transmission, the BLE data is sent.

“Send Data” appears while BLE data is being sent.

When the BLE data transmission is complete, “Complete” appears on the LCD of the transceiver.

The Transmit LED lights while BLE data is being sent.



BLE data transmission trigger occurs.



BLE data transmission completes.

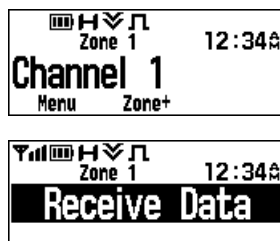


● BLE data reception (DMR Conventional):

When BLE data is being received from other transceivers, the transceiver behaves as follows:

The Busy LED lights while BLE data is being received.

“Receive Data” appears on the LCD of the transceiver while BLE data is being received.



When the BLE data reception is complete, “Complete” appears on the LCD of the transceiver.



Note

- To send BLE data, the behavior is based on the time information (hereafter, referred to as synchronization information) received from KAS-20E. Therefore, if the mobile station transceiver does not receive synchronization information from KAS-20E, the second and subsequent BLE data transmission for a Polling request from KAS-20E and the BLE data transmission by BLE Auto Report do not occur.

Configuration using KPG-D3/ D3N

- Configuring **GPS/BLE Report Mode** in a DMR Conventional system (See Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE)
- Configuring **GPS/BLE Report Mode** in a DMR Site Roaming system (See Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE)

Number of Times (Indoor Location)

Supported Models: Portable

Number of Times is the function to configure the number of times to send BLE data if “Poll” is configured in BLE Report Mode.

Number of Times is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with Number of Times for GPS. Number of Times for GPS and Number of Times for BLE function with the same configuration.

If “Poll” is configured in BLE Report Mode and if a GPS data request is received using Air, BLE data is sent automatically for the number of times configured in Number of Times.

BLE data is sent for the number of times configured in **Number of Times** at the intervals configured in **BLE Report Interval Time** after the request is received.

If a beacon signal (**Send Location via** configuration: “RF System”) is not received at the timing of the BLE Report transmission, the BLE data is not sent.

The configuration range of **Number of Times** is from 1 to 60. BLE data and GPS data are sent for the configured number of times.

Configuration using KPG-D3/ D3N

- Configuring **Number of Times** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Poll)
- Configuring **Number of Times** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Poll)

BLE Report Interval Time (Indoor Location)

Supported Models: Portable

BLE Report Interval Time is the function to configure the transmission interval of BLE data.

BLE Report Interval Time is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with GPS Report Interval Time. GPS Report Interval Time and BLE Report Interval Time function with the same configuration.

If “Auto” is configured in BLE Report Mode, the transceiver sends the BLE data at the time interval configured in **BLE Report Interval Time**.

The BLE Report Interval Time configuration ranges from 1 second to 3600 seconds, and the following behaviors occur:

- BLE data is sent at the configured time interval.
- BLE Report Interval Time can also be changed using the Air Command.
- Configuring a value that is divisible by 3600 is recommended.
- BLE Report Interval Time is used to configure the trigger cycle to start sending BLE data. The timing at which the receiving transceiver completes receiving BLE data may vary depending on the transmit conditions of the transmitting transceiver.

Note

- Automatic transmission of BLE data by BLE Report Interval Time is not performed during audio data communication.

Configuration using KPG-D3/ D3N

- Configuring **GPS/BLE Report Interval Time** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Auto)
- Configuring **GPS/BLE Report Interval Time** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Auto)

BLE Time Mark (Indoor Location)

Supported Models: Portable

BLE Time Mark is the function to configure the offset time until the transceiver actually sends BLE data based on the time information (hereafter, referred to as synchronization information) received from KAS-20E. By configuring the offset time, data collisions can be avoided when many transceivers sending BLE data exist.

BLE Time Mark is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method. A configuration value is shared with GPS Time Mark. GPS Time Mark and BLE Time Mark function with the same configuration.

Configuring a different timing for the transceivers in the same area allows the transceivers to send BLE data with different timing. This prevents data collisions due to transmissions at the same timing.

The configuration range of **BLE Time Mark** is from 0 second to 3599 seconds.

The timing of transmission is delayed by the time configured in **BLE Time Mark**. However, the value equal to or higher than BLE Report Interval cannot be configured.

KAS-20E periodically notifies synchronization information to the All Group ID.

- When receiving synchronization information, the mobile station displays “Receive Data” followed by “Complete”.
- When BLE Scan is enabled, each time the mobile station receives synchronization information from KAS-20E, the mobile station updates and stores it in the internal memory.
- When BLE Scan is disabled, even if the mobile station receives synchronization information from KAS-20E, the mobile station discards the information.
- The mobile station does not perform the BLE transmission behavior related to Time Mark until the mobile station receives synchronization information from KAS-20E.

In the following cases, the mobile station initializes the synchronization information stored in the internal memory:

- Upon deactivating BLE Scan
- When a channel is changed with a System change

Note

- When a channel is changed without a System change, because the mobile station does not initialize the synchronization information, the reference time of the BLE Report will be slightly different from that of other mobile stations at the destination channel. This may cause the BLE Report transmission timing to conflict with other mobile stations until the synchronization information is received at the destination channel.

Configuration using KPG-D3/ D3N

- Configuring **GPS/BLE Time Mark** in a DMR Conventional system ( See Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Auto)
- Configuring **GPS/BLE Time Mark** in a DMR Site Roaming system ( See Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Auto)

Respond to Polling ID (Indoor Location)

Supported Models: Portable

Respond to Polling ID is the function to send BLE data to the Polling requestor, not to the Base ID, when a Polling request is received.

Respond to Polling ID is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with Respond to Polling ID for GPS. Respond to Polling ID for GPS and Respond to Polling ID for BLE function with the same configuration.

If Respond to Polling ID is configured, BLE data is sent to the Polling requestor.

If Respond to Polling ID is not configured, BLE data is sent to the Base ID.

The following Polling requests are applicable:

- GPS Data Single Polling Request
- GPS Data Multiple Polling Request

The Base ID and BLE Base ID configured for the current System are enabled.

Configuration using KPG-D3/ D3N

- Configuring **ID Type** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Base Station)
- Configuring **ID Type** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Base Station)
- Configuring **ID** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Base Station)
- Configuring **ID** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Base Station)
- Configuring **Respond to Polling ID** in a DMR Conventional system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > Poll)
- Configuring **Respond to Polling ID** in a DMR Site Roaming system to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > Poll)

Sending BLE Data during Voice Communications (BLE Report with Voice (Indoor Location))

Supported Models: Portable

BLE Report with Voice is the function to simultaneously send BLE data when audio data is sent.

BLE Report with Voice is an item to configure for the mobile station in Indoor Location, and is the function of the RF System method.

A configuration value is shared with GPS Report with Voice. GPS Report with Voice and BLE Report with Voice function with the same configuration.

BLE data is multiplexed on the audio data and sent at the start of audio data transmission or at regular time intervals during audio data transmission.

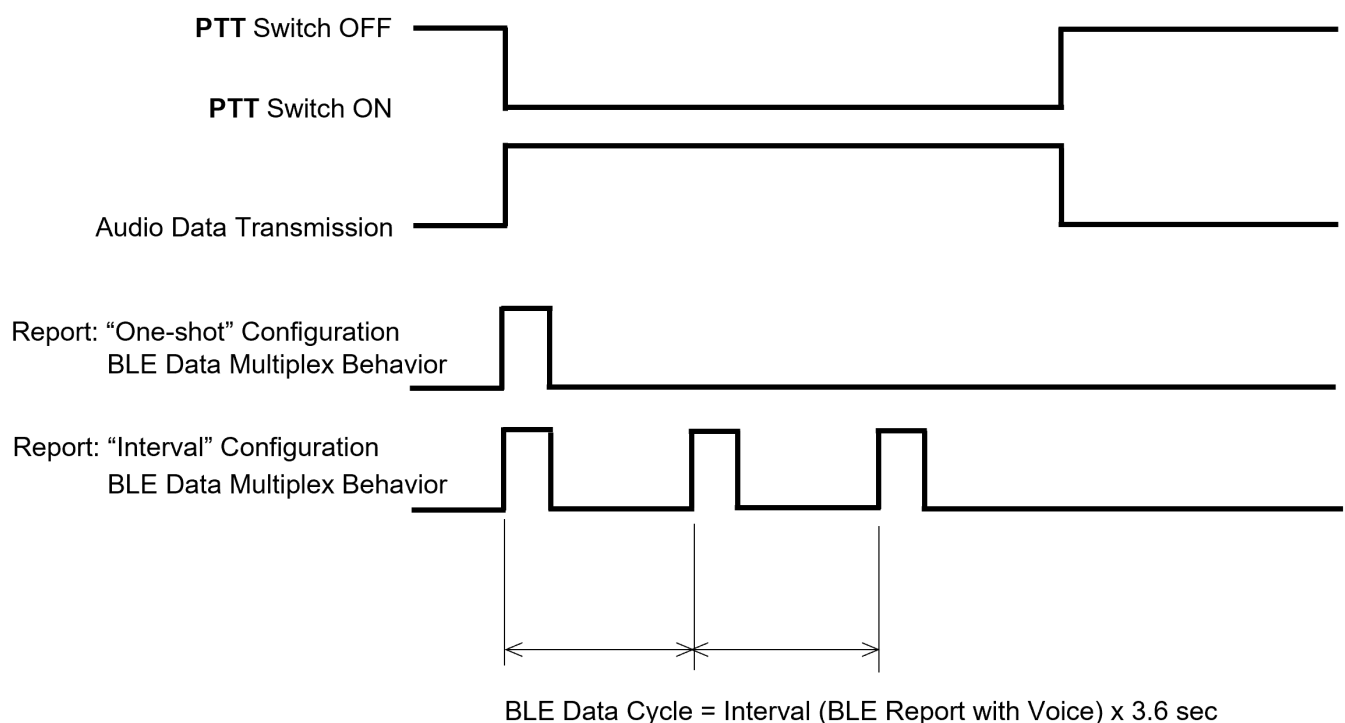


Figure 2-12 Report (BLE Report with Voice) Configuration and BLE Data Multiplex Behavior

The behavior for multiplexing BLE data is as follows according to the configuration in Report (BLE Report with Voice):

Table 2-42 Report (BLE Report with Voice)

Configuration	Description
Off	BLE data is not multiplexed during audio data transmission.
One-shot	BLE data is multiplexed at the start of audio data transmission.
Interval	The Interval (BLE Report with Voice) configuration is enabled, and BLE data is multiplexed at the start of or during audio data transmission according to the cycle that is calculated based on the value configured in Interval (BLE Report with Voice).

The cycle (s) for multiplexing BLE data can be calculated using the formula below:

- BLE data multiplex cycle (s) = Interval (BLE Report with Voice) configuration value x 3.6 (s)

The location information to be multiplexed is determined by the BLE priority at the start of audio transmission.

GPS data multiplex and BLE data multiplex are not switched during audio transmission.

The multiplex data determination at the start of audio transmission is as follows:

- If a beacon signal (**Send Location via** configuration: “RF System”) is received, the BLE data is multiplexed. GPS data is not multiplexed even if GPS is received.
- If a beacon signal (**Send Location via** configuration: “Bluetooth System”) is received, location information is not multiplexed. GPS data is not multiplexed even if GPS is received.
- During GPS Delay Time, location information is not multiplexed. GPS data is not multiplexed even if GPS is received.

If the above conditions are not satisfied, GPS Report with Voice functions. Refer to “[Sending GPS Data during Voice Communications \(GPS Report with Voice\)](#)”.

Data is not multiplexed even if GPS or a beacon signal is received during audio transmission (without data multiplexed).

If GPS cannot be captured during audio transmission (with GPS data multiplexed), the GPS data received last is multiplexed.

If a beacon signal (**Send Location via** configuration: “RF System”) cannot be received during audio transmission (with BLE data multiplexed), BLE data is not multiplexed.

Note

- Regardless of the Report (BLE Report with Voice) configuration, automatic transmission of BLE data by BLE Report Interval Time is not performed during audio data transmission.
- For DMR Conventional, if “One-shot” or “Interval” is configured in Report (BLE Report with Voice), the Decode behavior of Call Interruption is not performed.
- According to the DMR specifications, BLE data is sent to the audio transmission destination as a target even if BLE Base ID, Base ID Type, and Base ID are configured.
- During serial output of the location information, the Unit ID value inside Map Header is complemented using the Unit ID of the sender of the audio data.
- If data is received while voice communication is in progress, the LCD display, LED, and Alert Tone behave according to the configurations during voice communication.
- BLE data is not encrypted during encrypted communication.

Configuration using KPG-D3/ D3N

- Configuring **Report** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > DMR > GPS/BLE Report with Voice)
- Configuring **Report** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > GPS/BLE Report with Voice)
- Configuring **Interval** in a DMR Conventional system ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS/BLE > DMR > GPS/BLE Report with Voice)
- Configuring **Interval** in a DMR Site Roaming system ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > GPS/BLE > GPS/BLE Report with Voice)

Map Header (Indoor Location)

Map Header is an item to configure for the base station transceiver in Indoor Location, and is the function of the RF System method. Whether to send data to the mapping application when the base station transceiver receives the BLE data from the mobile station transceiver can be configured.

Table 2-43 Map Header (Indoor Location)

Data	Description
\$PKPBD (KW)	Upon receipt of the BLE data, the base station transceiver creates the \$PKPBD data which is the KENWOOD proprietary sentence from the received BLE data and sends the created data from the communication port. BLE beacon data is included in the \$PKPBD data.

Configuration using KPG-D3/ D3N

Configuring **\$PKPBD (KW)** in a DMR Conventional system to be enabled or disabled ( [See](#) Radio Configuration > Global Options > External Device > General > Serial Interface > BLE Base Station Settings)

DMR is a generic name for a digital communication system protocol utilizing 4-level FSK. Using DMR, the transceiver can make an individual call or group call for voice calls, communicate each message, or communicate GPS data, etc. Also, connecting a transceiver to an external device (such as a PC) allows communication because the transceiver supports serial command communication.

In a DMR-based Trunking system, 2 types of channels, control channels and traffic channels, are used (these are referred to collectively as a system).

A control channel is used for sending various messages to control a system. A control channel is also used for calls, such as Status Call or Short Data Call.

A traffic channel is used for sending various types of communication information of users.

Via a system, the transceiver can establish communications using DMR IDs (Unit ID and Group ID), such as an individual call or group call.

Note

- The support for “S-Trunking” and “S-Trunking system” as described in this chapter (DMR-BASED TRUNKING SYSTEM) ended in March 2022.

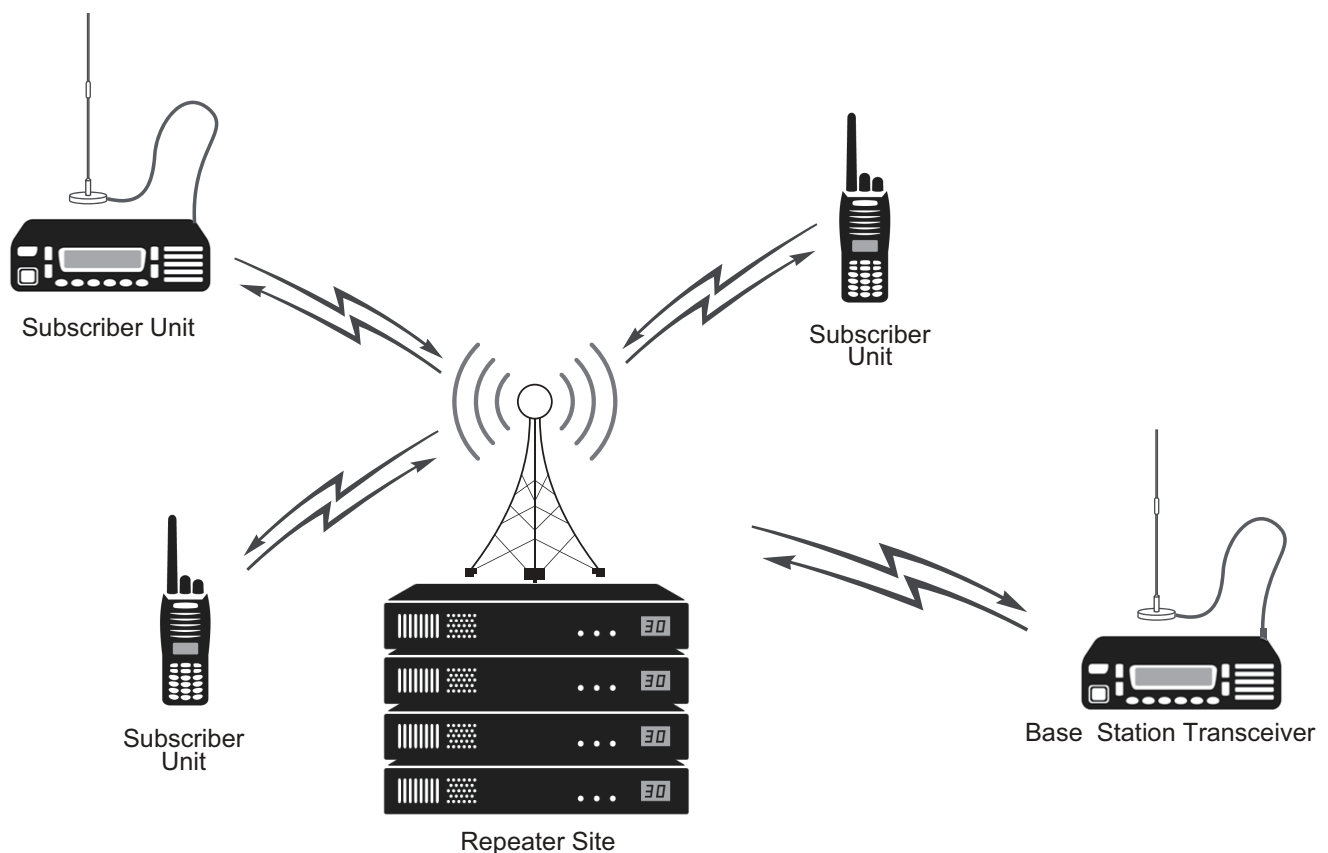


Figure 3-1 Image of Communications in a DMR-based Trunking System

About the Trunking format in a DMR-based Trunking system

There are the following 3 Trunking formats for a DMR-based Trunking system:

- Trunking 2.5
- DMR Tier III Trunking
- S-Trunking

The image of each Trunking format is below.

● Trunking 2.5

For a system, Trunking 2.5 has 2 types of behavior: Hibernating Station Mode and Continuous Station Mode.

Corresponding to the system behavior, the transceiver automatically switches between the Hibernating Station Mode and Continuous Station Mode behaviors.

● Hibernating Station Mode

Intermittent transmission is made on a control channel.

The control channel migrates to another repeater periodically or when interfering frequencies occur.

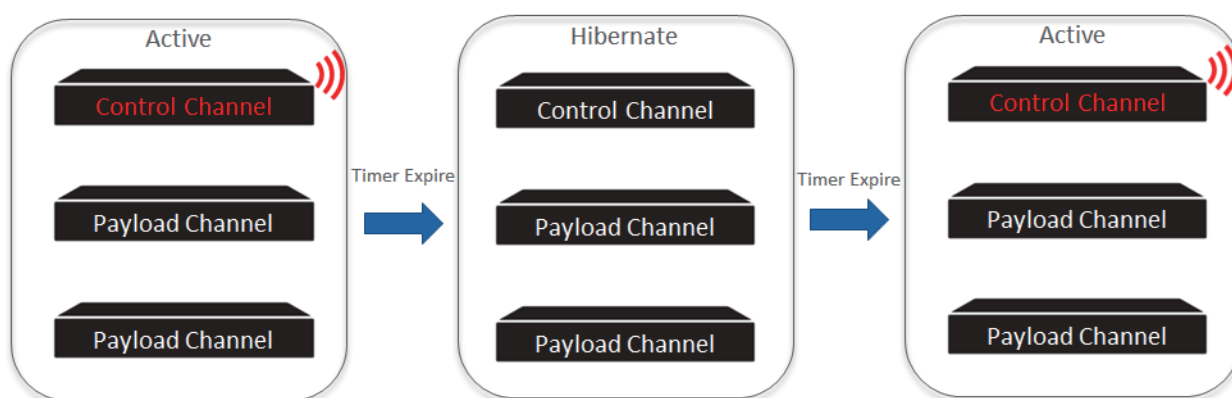


Figure 3-2 Image of the Trunking 2.5 (Hibernating Station Mode) Format

● Continuous Station Mode

Continuous transmission continues on a control channel.

The control channel migrates to another repeater periodically or when interfering frequencies occur.

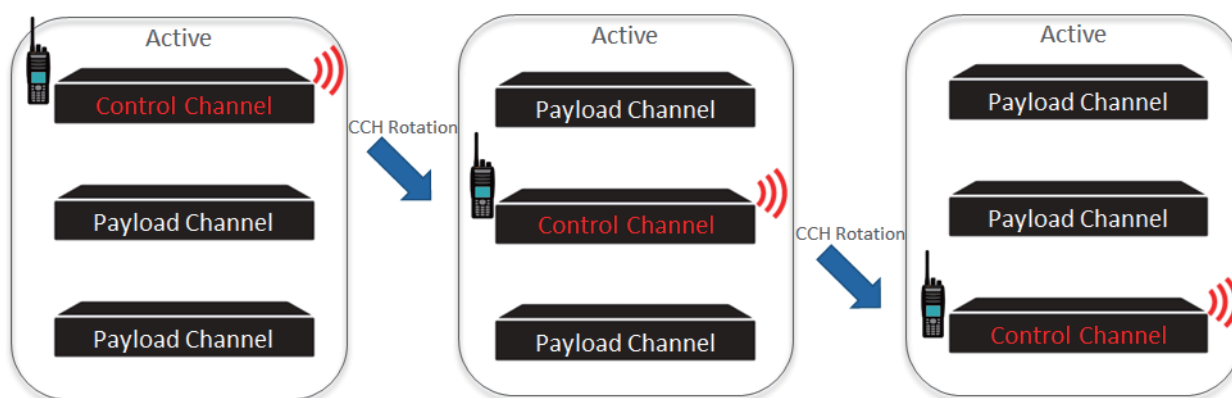


Figure 3-3 Image of the Trunking 2.5 (Continuous Station Mode) Format

● DMR Tier III Trunking

For DMR Tier III Trunking, continuous transmission continues on a control channel.

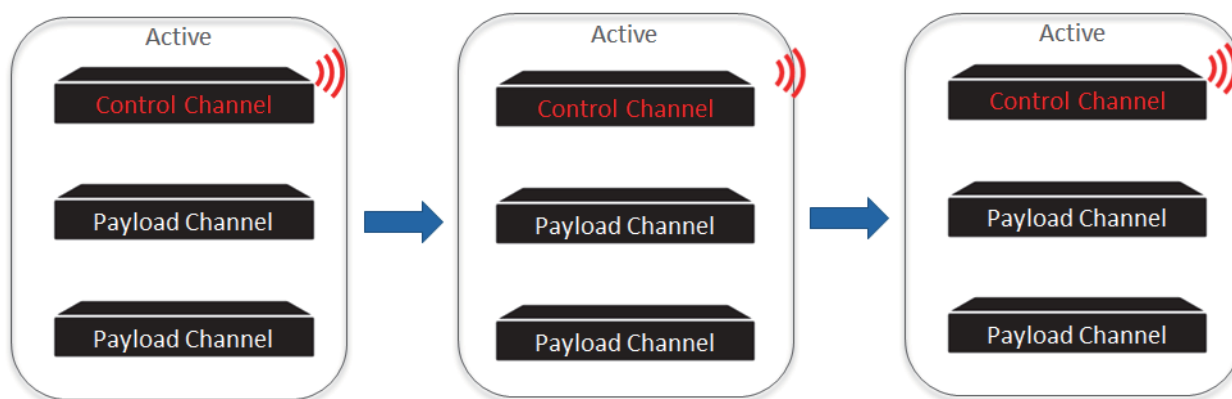


Figure 3-4 Image of the DMR Tier III Trunking Format

● S-Trunking

For S-Trunking, intermittent transmission is made on a control channel.

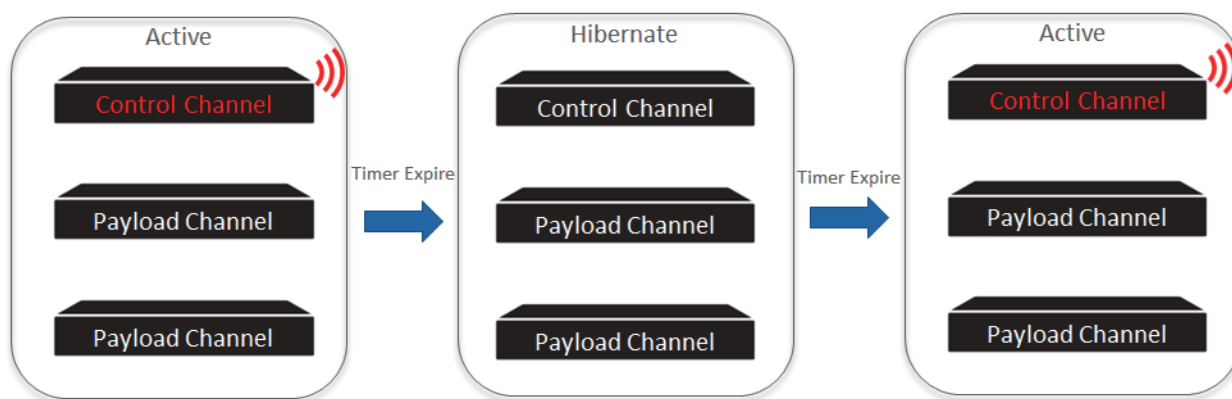


Figure 3-5 Image of the S-Trunking Format

The transceiver needs to be configured to the same Trunking format as a system. If a Trunking format which is different from that of a system is configured, the transceiver does not behave.

The main differences of Trunking 2.5, DMR Tier III Trunking, and S-Trunking are as follows:

Table 3-1 Differences of Trunking 2.5, DMR Tier III Trunking and S-Trunking

Item	Trunking 2.5	DMR Tier III Trunking	S-Trunking
Standard	Tait/ JVCKENWOOD proprietary (Proprietary specifications based on the DMR Standard ETSI TS 102 361-4)	DMR Standard ETSI TS 102 361-4	JVCKENWOOD proprietary (Proprietary specifications based on the DMR Standard ETSI TS 102 361-4)
FCC Station Class Code	FB6	FB8	FB6
Output Signal on a Repeater Control Channel	Hibernating: Intermittent output Continuous: Continuous output (Rotation)	Continuous output	Intermittent output
Rotation of the Control Channel	Supported	Supported	Supported
Busy Channel Lockout Behavior	Supported (Only for the behavior with "Carrier Only" configured in Busy Channel Lockout)	Not supported	Supported (Behaves according to the configuration of Busy Channel Lockout)
Power Save	Not supported	Compliant with DMR Standard ETSI TS 102 361-4	Not supported
Enhanced Encryption	Not supported	Supported	Not supported
Comprehensive Hunt	Not supported	Supported	Not supported
Alternate Zone-Channel	Not supported	Supported	Not supported
Vote Now	Supported	Supported	Not supported
Composite Control Channel	Supported	Supported	Not supported

The function differences of Trunking 2.5, DMR Tier III Trunking, and S-Trunking are as follows:

Table 3-2 Functions for Trunking 2.5, DMR Tier III Trunking and S-Trunking

Function Name	Difference	Trunking 2.5	DMR Tier III Trunking	S-Trunking
Active Hunt	Exists	Supported Refer to Active Hunt .	Not supported	Not supported
Alert LED Color (Broadcast Group Call)	None	Refer to Receiving a Broadcast Group Call .		
Alert LED Color (Group Call)	None	Refer to Transceiver behavior when receiving a Group Call .		
Alert LED Color (Individual Call Incoming)	None	Refer to About the transceiver behavior when receiving an Individual Call .		
Alert LED Color (Individual Call)	None	Refer to About the transceiver behavior when receiving an Individual Call .		
Alert LED Color (Telephone Group Call)	None	Refer to Receiving a Group Call .		
Alert LED Color (Telephone Individual Call)	None	Refer to Receiving a Telephone Call .		
Alert Tone (Broadcast Group Call)	None	Refer to Tones that Sound When the Transceiver Receives a Call .		
Alert Tone (Emergency Response)	None	Refer to Tones that Sound When the Transceiver Receives a Call .		
Alert Tone (Group Call)	None	Refer to Tones that Sound When the Transceiver Receives a Call .		
Alert Tone (Individual Call Incoming)	None	Refer to Tones that Sound When the Transceiver Receives a Call .		

Function Name	Difference	Trunking 2.5	DMR Tier III Trunking	S-Trunking
Alert Tone (Individual Call)	None	Refer to Tones that Sound When the Transceiver Receives a Call .		
Alert Tone (Status/ Short Message Call)	None	Refer to Tones that Sound When the Transceiver Receives a Call .		
Alert Tone (Task Request)	Exists	Not supported	Refer to Tones that Sound When the Transceiver Receives a Call .	
Alert Tone (Telephone Individual Call)	None	Refer to Tones that Sound When the Transceiver Receives a Call .		
Alert Tone Inhibit from 2nd Call	None	Refer to Restricting an Alert Tone When Consecutively Receiving a Call (Alert Tone Inhibit from 2nd Call) .		
Alert Tone (Telephone Group Call)	None	Refer to Tones that Sound When the Transceiver Receives a Call .		
Alternate Zone-Channel	Exists	Not supported	Supported Refer to Communicating on a Zone-channel in DMR Conventional while Outside the Communication Area (Alternate Zone-Channel) .	Not supported
Authentication	None	Refer to Authentication Function of a System and Transceiver (Authentication) .		
Auto Reset Timer	None	Refer to Auto Reset Timer .		
AUX Input Status Message	None	Refer to AUX Input Status Message .		
AUX Output Status Message	None	Refer to AUX Output Status Message .		
Background Hunt	Exists	Not supported	Refer to Background Hunt .	
Base ID	None	Refer to Base ID .		
Beacon Interval Time	Exists	Not supported	Not supported	Supported Refer to Configuring the Length of Time to Retain the In Service State (Beacon Interval Time) .
Broadcast Group Call	None	Refer to Making an Informative Group Call (Broadcast Group Call) .		
Busy Channel Lockout	Exists	Supported Refer to Avoiding Interference with Other Communications (Busy Channel Lockout) .	Not supported	Supported Refer to Avoiding Interference with Other Communications (Busy Channel Lockout) .
Call Interruption	None	Refer to Prioritizing Own Voice Communications by Terminating Other Voice Communications (Call Interruption) .		
Call Processing Tone	None	Refer to Notifying the User with a Tone That a Call Request Has Been Initiated (Call Request Tone)/ Notifying the User with a Tone That a Call Request Is in Progress (Call Processing Tone) .		
Call Request Tone	None	Refer to Notifying the User with a Tone That a Call Request Has Been Initiated (Call Request Tone)/ Notifying the User with a Tone That a Call Request Is in Progress (Call Processing Tone) .		
Caller ID Stack	None	Refer to Caller ID Stack .		
Clear Caller ID Stack on Reply	None	Refer to Clear Caller ID Stack on Reply .		
Composite Control Channel	Exists	Supported Refer to Composite Control Channel .		Not supported
Comprehensive Hunt	Exists	Not supported	Supported Refer to Comprehensive Hunt .	Not supported

Function Name	Difference	Trunking 2.5	DMR Tier III Trunking	S-Trunking
Control Channel Hunt	None	Refer to Control Channel Hunt (Control Channel Hunt) .		
Control Channel Switching	None	Refer to Matching a Channel of the Transceiver to a Channel of the System (Control Channel Switching) .		
Dialing	Exists	Not supported	Refer to Executing Various Communications by Using the Dialing Function .	
Dialing Codes	Exists	Not supported	Refer to Various configurations for Dialing Codes .	
Dialing Mode	Exists	Not supported	Refer to Initiating a Communication in Dialing Mode .	
DMR IP Addressing	Exists	Supported Refer to DMR IP Addressing .		Not supported
Encodable Unit ID Range	None	Refer to Restricting IDs for Which the Transceiver Can Initiate a Call (Encodable Unit ID Range) .		
Enhanced Encryption	Exists	Not supported	Supported Refer to USING COMMUNICATION SECURITY .	Not supported
Fleet Dialing Plan	Exists	Not supported	Refer to Configurations for Using the Dialing Function .	
GPS Base ID	None	Refer to Sending GPS Data during Voice Communications (GPS Report with Voice) .		
GPS Combination	None	Refer to Sending GPS Data Together With Status Call (GPS Combination) . Refer to Sending GPS Data Together With Emergency Call (GPS Combination) .		
GPS Distance Change	None	Refer to Sending GPS Data Based On Travel Distance (GPS Distance Change) .		
GPS Message Type	None	Refer to GPS Message Type .		
GPS Report Interval Time (Ignition Off)	None	Refer to GPS Report Interval Time (Ignition On/ Ignition Off) (Mobile only) .		
GPS Report Interval Time (Portable/ Ignition On)	None	Refer to GPS Report Interval Time (Ignition On/ Ignition Off) (Mobile only) .		
GPS Report Mode	None	Refer to Sending GPS Data According to the Request from the Base Station (GPS Report Mode) .		
GPS Report Priority over Group Call	None	Refer to Sending GPS Data Preferentially While Receiving a Group Call (GPS Report Priority over Group Call) .		
GPS Report with Voice	None	Refer to Sending GPS Data during Voice Communications (GPS Report with Voice) .		
GPS Time Mark	None	Refer to GPS Time Mark .		
Group Call	None	Refer to Making a Group Call .		
Group Call Alert Inhibit	None	Refer to Preventing the Functions Working with Group Call Reception from Activating (Group Call Alert Inhibit) .		
Group Call Display	None	Refer to Display When the Transceiver Receives a Group Call (Group Call Display Type) .		
Group ID List	None	Refer to Group ID List .		
Group Subscription	None	Refer to Registering the Group ID Used by the Own Transceiver in a System (Group Subscription) .		
ICMP Echo	Exists	Supported Refer to Confirming Whether the Transceiver Is in Operation (ICMP Echo) .		Not supported
Ignore Group Call during Individual Call	None	Refer to Preventing Reception of a Group Call While the Transceiver Is Receiving an Individual Call (Ignore Group Call during Individual Call) .		
Individual Call	None	Refer to Making an Individual Call .		

Function Name	Difference	Trunking 2.5	DMR Tier III Trunking	S-Trunking
Individual ID List	None	Refer to Individual ID List .		
IP Packet Data Services	Exists	Supported Refer to IP Based Packet Data .		Not supported
Last Control Channel	None	Refer to Retaining the Information of the Control Channel Used When the Transceiver Is Turned OFF (Last Control Channel) .		
Late Entry	None	Refer to Participating in an On-going Voice Call Midway Through the Call (Late Entry) .		
Late Entry Cancel Time	None	Refer to Late Entry Cancel Time .		
Long Data Call	Exists	Not supported	Refer to Sending and Receiving a Long Message (Long Data Call) .	
Manual Dialing	None	Refer to Sending a Remote Control Message in Remote Control Mode .		
Map Header	None	Refer to Map Header .		
Maximum ACK Wait Time	None	Refer to Maximum ACK Wait Time .		
Network Failure Indicator	None	Refer to Notifying the Status of Communications with Other Sites (Network Failure Indicator) .		
Number of Retries	None	Refer to Number of Retries .		
Out of Range Indicator	None	Refer to Out of Range Indicator .		
Over-the-Air Alias	None	Refer to Over-the-Air Alias .		
Passive Scan	Exists	Supported Refer to Passive Scan .	Not supported	Not supported
Power Save	Exists	Not supported	Supported Refer to DMR Tier III Trunking (Power Save) .	Not supported
Power-off Status	None	Refer to Power-off Status .		
Power-on Status	None	Refer to Power-on Status .		
Priority Monitor ID	Exists	Supported Refer to Receiving a High-priority Call (Priority Monitor ID) .		Not supported
PTT Hold Inhibit	None	Refer to PTT Hold Inhibit .		
Redial Mode	None	Refer to Communicating with a Telephone (Telephone Call) .		
Registration	None	Refer to Registering the Own Unit ID in a System (Registration) .		
Registration Timer	Exists	Supported Refer to Registration Timer .		Not supported
Remote Control Mode	None	Refer to Remote Operation by Radio Communication (Remote Control) .		
Selective Call Alert LED	None	Refer to Selective Call Alert LED .		
Send the GPS Data	None	Refer to Sending GPS Data Manually by Using a Button (Send the GPS Data) .		
Short Data Call	None	Refer to Sending and Receiving a Short Message (Short Data Call) .		
Short Message Serial Output	None	Refer to Sending the Received Short Message from the Communication Port (Short Message (Serial Output)) .		
Short Message Stack	None	Refer to Short Message Stack .		
Site Lock	None	Refer to Locking the Site to Be Used (Site Lock) .		
Status Call	None	Refer to Sending and Receiving a Status Message (Status Call) .		

Function Name	Difference	Trunking 2.5	DMR Tier III Trunking	S-Trunking
Status Hold	None	Refer to Storing the Selected or Sent Status (Status Hold) .		
Status List	None	Refer to Status List .		
Status Message (Serial Output)	None	Refer to Sending the Received Status Message from the Communication Port (Status Message (Serial Output)) .		
Status Message Stack	None	Refer to Status Message Stack .		
System Parameter	None	Refer to About the system parameters in a DMR-based Trunking system .		
System Search Policy	Exists	Behaves when receiving an output signal from the repeater	Always behaves Refer to System Search Policy .	Behaves when receiving an output signal from the repeater
Telephone Call	None	Refer to Communicating with a Telephone (Telephone Call) .		
Telephone Call Alert LED	None	Refer to Receiving a Telephone Call .		
Traffic Timer	None	Refer to Restricting the Communication Time on a Traffic Channel (Traffic Timer) .		
Unit ID (Own)	None	Refer to About Own ID .		
Unit ID Name (Own)	None	Refer to About Own ID .		
Unit ID Serial Output	None	Refer to Sending the Received Unit ID from the Communication Port (Unit ID Serial Output) .		
Vote Now	Exists	Supported Refer to Vote Now .		Not supported

About Trunking Format

Trunking Format is the configuration with which format among Trunking 2.5, DMR Tier III Trunking, and S-Trunking the transceiver behaves in a DMR-based Trunking system.

To configure Trunking Format, the system and transceiver need to match with the same format.

Trunking Format is configured in **Type**.

The following are the transceiver behaviors by the configuration in **Type**:

Table 3-3 Type

Configuration	Description
Trunking 2.5	Behaves in a Trunking 2.5 system.
Tier III	Behaves in a DMR Tier III Trunking system.
S-Trunking	Behaves in an S-Trunking system.

Configuration using KPG-D3/ D3N

Configuring **Type** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > General > System)

About the system parameters in a DMR-based Trunking system

The transceiver can roam in a site connected to a network by using the network information included in the system information. System operation in a wide range becomes available, such as communication between mobile stations of different sites.

A DMR-based Trunking system has System Codes to distinguish networks and sites. A System Code is notified by a DMR-based Trunking system. The transceiver determines whether to register and to roam by comparing the System Code to the System Code stored in the own station according to the configuration in **Coverage Type**.

The System Code consists of 16 bits as follows:

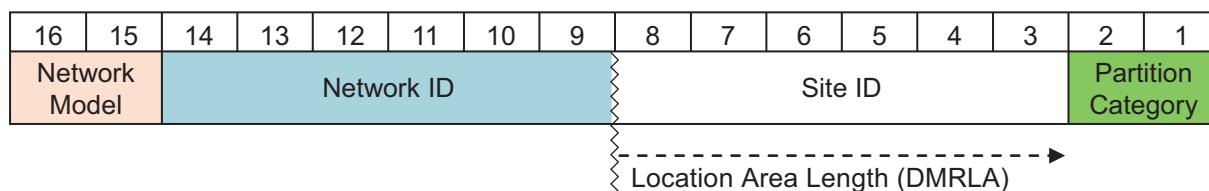


Figure 3-6 System Code Structure

Also, the configuration ranges of **Network ID**, **Site ID**, and **Location Area Length (DMRLA)** vary depending on **Network Model**.

Table 3-4 Configuration Range of Various Parameters

Network Model	Network ID Range	Site ID Range	DMRLA Range
Tiny	0 to 511	0 to 7	0 to 3
Small	0 to 127	0 to 31	0 to 5
Large	0 to 15	0 to 255	0 to 8
Huge	0 to 3	0 to 1023	0 to 10

The following are the various parameters in a DMR-based Trunking system:

Table 3-5 System Parameter

Parameter	Description
Network Model	This is the parameter that shows the scale of the network (Tiny, Small, Large, Huge). The configuration ranges of Network ID and Site ID vary depending on Network Model .
Network ID	Configures the ID to distinguish the network. The configuration range varies depending on Network Model .
Site ID	Configures the ID to distinguish the site. The configuration range varies depending on Network Model .
Location Area Length (DMRLA)	Configures the configuration range (number of bits) of the Location Area ID. The configuration range varies depending on Network Model .
Location Area ID	Configures the ID to distinguish the site group. The site group can be structured in Location Area ID. The range determined by Location Area Length (DMRLA) in the Site ID field can be configured as the Location Area ID. If "0" is configured in Location Area Length (DMRLA), the transceiver behaves as if all sites are within the same Location Area. However, the transceiver always executes Registration if the transceiver migrates to another site. Note If the transceiver roams from one site to another site, the transceiver always executes Registration even if the site where the transceiver migrated has the same Location Area ID as the site where the transceiver most recently executed Registration, or even if the site has a different Location Area ID.
Location Site ID	The part excluding the Location Area ID in the Site ID field is configured as the Location Site ID .

Parameter	Description
Partition Category	In a site using 2 control channels, Partition Category is configured to distribute the transceivers on the 2 control channels and not to concentrate the transceivers on 1 control channel. If “A” is configured in Partition Category, the control channel configured as “A” or “AB” in the same manner accepts. If “B” is configured in Partition Category, the control channel configured as “B” or “AB” in the same manner accepts.
Coverage Type	Configures the roaming area of the transceiver. Single Site: The transceiver behaves on 1 site only, such as a system not connected to a network. Roaming is unavailable because Network Model, Network ID, Location Area ID, and Location Site ID need to match. Intra-Location Area: Roaming is available within the Location Area to which multiple sites belong. Network Model, Network ID, and Location Area ID need to match. Intra-Network: Roaming is available within the network to which multiple Location Areas belong. Network Model and Network ID need to match.
Lowest Frequency Number	Configures the lowest Frequency Number to be used among the frequency numbers configured in the Channel Plan.
Highest Frequency Number	Configures the highest Frequency Number to be used among the frequency numbers configured in the Channel Plan.

 Note

- A maximum of 24 systems can be configured by reading system parameter files.

Configuration using KPG-D3/ D3N

- Configuring various parameters in a DMR-based Trunking system ( **See** Radio Configuration > System Properties > Trunking Network > DMR-based Trunking > General > System)
- Configuring **Partition Category (PAR)** ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > General > System)

3.1 Initiating Voice Communications (Basic Transmission and Reception)

The following describes the basic methods for transmission and reception in a DMR-based Trunking system and the relevant functions.

About Own ID

To initiate various communications by using DMR, **Unit ID (Own)**, the identification code of a transceiver, needs to be configured for the transceiver.

If the transceiver is configured not to use the Dialing function, a Unit ID can be configured in the range between 000001 and FFFCDF (hexadecimal), or between 1 and 16776415 (decimal).

If the transceiver is configured to use the Dialing function in a DMR Tier III Trunking system or S-Trunking system, a Unit ID is configured in the format divided into Number Prefix (NP), Fleet Individual Number (FIN), and Individual Number (IN). The configuration ranges are as follows:

Number Prefix (NP): 328 to 806

Fleet Individual Number (FIN): 20 to 89

Individual Number (IN):

200 to 899 (if the FIN value is 20 to 41)

200 to 549 (if the FIN value is 42 to 89)

If **Global ID** is enabled, one Unit ID is shared by all DMR-based Trunking systems.

If **Global ID** is disabled, one Unit ID needs to be configured for each DMR-based Trunking system.

Also, a name specific to the transceiver can be configured for **Unit ID (Own)**.

Note

- Since the management system of own ID in NXDN is different from the management system of own ID in DMR, each own ID needs to be configured separately.

Configuration using KPG-D3/ D3N

- Configuring **Unit ID (Own)** and **Unit ID Name (Own)** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > General > ID (Own))
- Configuring **Global ID** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > General > ID (Own))

About Communication Security (Encryption)

The transceiver is equipped with the Encryption function, which can enhance the confidentiality of communications by encrypting communication data when making various communications on a DMR digital channel. (Refer to [USING COMMUNICATION SECURITY](#).)

Control Channel Acquisition and Registration

To establish various types of communications in a DMR-based Trunking system, the transceiver needs to acquire a control channel and register in a system before starting communication. The control channel acquisition and registration are automatically executed when the transceiver is turned ON or when a system to be used is changed with site roaming.

Refer to “[Control Channel Hunt \(Control Channel Hunt\)](#)” for details on the transceiver behavior of control channel acquisition.

Refer to “[Registration in a DMR-based Trunking System](#)” for details on the transceiver behavior of registration.

Receiving

Received audio sounds from the speaker if the transceiver receives a message requesting various types of communications on a control channel from a system and the received DMR ID matches the DMR ID preconfigured for the transceiver.

Auto Reset Timer

Auto Reset Timer is the amount of time from when the received Unit ID or Group ID matches the Unit ID or Group ID preconfigured for the transceiver until the LCD, blinking of LED and emission of Alert Tone will automatically be reset.

Auto Reset Timer can be configured by using KPG-D3/ D3N. Also, how the transceiver behaves after the length of time configured in **Auto Reset Timer** elapses can be configured.

Whether different **Auto Reset Timer** configurations are applied to voice communications and data communications can be configured.

Table 3-6 Auto Reset Timer

Configuration		Description
Auto Reset Timer (Voice or Message)	Off	Auto Reset Timer will not be activated.
	0 sec to 300 sec	After the configured time elapses, the matching state of the Unit ID or Group ID is automatically reset.
LED (Voice only)		If this function is enabled, the flashing LED for the Selective Call Alert LED turns off when the length of time configured in Auto Reset Timer elapses.
Alert Tone (Voice or Message)		If this function is enabled, the intermittently emitted Alert Tone stops when the length of time configured in Auto Reset Timer elapses.
LCD (Voice or Message)		When this function is enabled and the time configured in Auto Reset Timer has elapsed, the flashing LED light triggered by Optional Signaling LED goes off and the display changes from the following display to the previous channel display: • ID display after receiving an Individual Call or Group Call • Status Message display after receiving a Status Message • Short Message display after receiving a Short Message

Configuration using KPG-D3/ D3N

- Configuring **Auto Reset Timer** (Voice) ( See Radio Configuration > Protocol Options > DMR > General > Common Options > Auto Reset > Voice)
- Configuring **Auto Reset Timer** (Message) ( See Radio Configuration > Protocol Options > DMR > General > Common Options > Auto Reset > Message)

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a call using a DMR ID. A user can tell from the LED that the transceiver is receiving a call.

One of the 7 colors can be used to make the LED flash, and the flashing color can be configured for each type of call.

- Yellow
- Purple
- Blue
- Light Blue
- Red
- Green
- White

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** (Voice) ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/LED)
- Configuring **Alert LED Color** (Individually) ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Personalities > Individually > General)

Optional Signaling LED

Optional Signaling LED is the function to make the LED flash yellow when the Optional Signaling matches.

A user can tell from the LED that the transceiver is receiving a call.

If the matching state of Optional Signaling is disabled when the buttons on the transceiver are pressed, or when the time configured in **Auto Reset Timer** elapses, the LED is turned off.

However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED** even when **Optional Signaling LED** is enabled.

Configuration using KPG-D3/ D3N

Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/LED)

Over-the-Air Alias

Over-the-Air Alias allows the receiving transceiver to display the ID Name of the transmitting transceiver when receiving a call even if the ID Name of the transmitting transceiver is not configured for the receiving transceiver.

Using this function, Unit ID Name of the added unit does not need to be configured such as when a unit is added to the system in service.

The transmitting transceiver sends Unit ID Name when making voice calls. If the receiving transceiver receives a call such as an Individual Call, the Unit ID Name stored in the reception frame will appear on the display.

The transmitting transceiver converts the Unit ID Name to the data for transmission in the transceiver as follows according to the characters entered for Unit ID Name and according to the character code of Language 1 configured in FPU, and then sends the data:

- ASCII characters only
7-bit
- When those other than ASCII characters are included and the Language 1 character code is ISO-8859-1
ISO 8-bit
- When those other than ASCII characters are included and Language 1 uses a character code other than ISO-8859-1
UTF-16BE

Table 3-7 Language Configuration of Language 1 and Character Code

Language Configuration of Language 1	Character Code to Display
English, Spanish (Spain), Spanish (Latin America), German, Dutch, Italian, Portuguese (Brazil)	ISO 8859-1
Russian	ISO 8859-5
French	ISO 8859-15

Note

- If **Over-the-Air Alias** is enabled, the transceiver does not execute the **Call Interruption** reception behavior.
- The received Unit ID Name appears after displaying differently from the received Unit ID Name in the following cases:
 - The Unit ID of the transmitting transceiver is not configured in the Individual ID List.
 - The Unit ID of the transmitting transceiver is not stored as Caller ID.
 - The received Unit ID Name is different from the ID Name configured in the Individual ID List or the ID Name stored in the transceiver.
- If **Caller ID Stack** is enabled, received Unit ID Name also is stored in the transceiver stack memory. The stored Unit ID Name is also reflected to ID Name with Individual ID List selected.
- The Unit ID Name (Own) configured for the current system is used for the Unit ID Name to be transmitted.
- The following is the time required for receiving signals to receive and display the text string of **Over-the-Air Alias**: The received text string does not appear if the communication time is shorter than the time listed below. Also, if the transceiver participates in an on-going call by Late Entry, or if the transmitting transceiver sends the GPS data, it may take longer to display a text string depending on the signal strength.

Table 3-8 Data Format and Time Needed for Over-the-Air Alias Reception

Data Format	Approximately 1 sec	Approximately 2 sec	Approximately 2.5 sec	Approximately 3 sec
7-bit	7 characters	14 characters	23 characters	31 characters
ISO 8-bit	6 characters	13 characters	20 characters	27 characters
UTF-16BE	3 characters	6 characters	10 characters	13 characters

Configuration using KPG-D3/ D3N

- Configuring **Over-the-Air Alias** to be enabled or disabled
( See Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > TX Options)
- ( See Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > TX Options)
- Configuring **Unit ID Name (Own)**
( See Radio Configuration > System Properties > Systems > DMR Site Roaming > General > ID (Own))

Receiving a High-priority Call (Priority Monitor ID)

Priority Monitor ID is the ID that the transceiver preferentially receives when the transceiver is making voice calls using Group Call on a traffic channel in a Trunking 2.5 system or DMR Tier III Trunking system.

If a Group Call of a **Priority Monitor ID** is initiated on another traffic channel during the Hang Time after a Group Call, Broadcast Call, or Individual Call of anything other than a **Priority Monitor ID** is received, the transceiver participates in a communication by receiving the Group Call of a **Priority Monitor ID**. If a Group Call of a **Priority Monitor ID** having higher priority is initiated on another traffic channel during the Hang Time after a Group Call of a **Priority Monitor ID** is received, the transceiver participates in a communication by receiving the Group Call of a **Priority Monitor ID** having higher priority.

In addition, **All Group ID** (\$FFFFFF (ALLMSID)/ \$FFFFFFD (ALLMSIDL)/ \$FFFFFFE (ALLMSIDZ)) functions in the same manner as **Priority Monitor ID**.

Priority Monitor ID, the transceiver participates in a communication of higher priority on another traffic channel by immediately migrating from the channel.

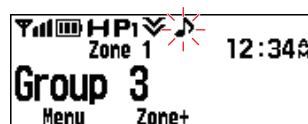
All Group ID functions with higher priority than **Priority Monitor ID**. **Priority Monitor ID** is received, the transceiver participates in a communication of higher priority by immediately migrating from the channel.

KPG-D3/ D3N can be used to configure up to 4 zone channels used as Priority Monitor ID.

Transceiver behavior

The transceiver receives a Priority Monitor ID during the Hang Time after a Group Call is received on a traffic channel.

The “” icon blinks and the transceiver starts communicating using the Priority Monitor ID.



The following icons will be displayed:

Priority Monitor ID 1: **P1**

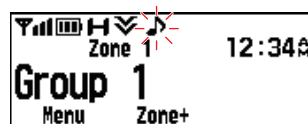
Priority Monitor ID 2: **P2**

Priority Monitor ID 3: **P3**

Priority Monitor ID 4: **P4**

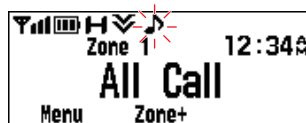
The transceiver can respond to the received Group ID by pressing the **PTT** switch. When a button other than the **PTT** switch is pressed, the configured function will be activated.

After a Group Call voice communication on a channel not configured in Priority Monitor ID, the transceiver enters the Hang Time state.



3.1 Initiating Voice Communications (Basic Transmission and Reception)

During the Hang Time after a Group Call voice communication on a traffic channel, the transceiver switches to communication by an All Group ID. When the transceiver switches to communication by an All Group ID, the green LED on the transceiver lights.



Note

- This function is applicable only during the Hang Time after a voice call by Group Call, Broadcast Call, or Individual Call is received. This function is not applicable to data communications.
- If the transceiver is in the Hang Time after a Group Call, Broadcast Call, or Individual Call by a Group ID not configured in **Priority Monitor ID** is received, the transceiver can receive only a Group Call or All Call of a **Priority Monitor ID** by switching to **Priority Monitor ID** communication. If the transceiver is in the Hang Time after a Group Call of a **Priority Monitor ID** is received, the transceiver can receive only a Group Call of a **Priority Monitor ID** having higher priority.
- The transceiver that is transmitting or receiving on a traffic channel cannot participate in Group Call communication even if a Group Call of a **Priority Monitor ID** is initiated on another traffic channel. However, some systems may instruct the transceiver to stop transmission. In this case, the transceiver participates in communication on other traffic channels after transmission stops.
- If the transceiver receives a **Priority Monitor ID** during scanning, the transceiver behaves according to the configuration in **Revert Channel** because the scan behavior is prioritized.
If "Last Called + Selected" is configured in **Revert Channel**, the transceiver behaves with Talkback by **Priority Monitor ID** in the same manner as when the scan is disabled.
- Regardless of whether own station or another station is in Emergency state, the transceiver remains on the current traffic channel while participating in an Emergency Call even if communication by **Priority Monitor ID** or All Group ID occurs on other traffic channels. The following are the basic behaviors of the transceiver when a call by a Priority Monitor ID is received when the scan is enabled or disabled:

Table 3-9 Behaviors of the Transceiver When a Call by a Priority Monitor ID Is Received

Scan Status	Transceiver Behavior	
When the scan is enabled	Display upon Receipt	Display by Priority Monitor ID *1
	Transmission upon Receipt	Transmission by Revert Channel
When the scan is disabled	Display upon Receipt	Display by Priority Monitor ID *2
	Transmission upon Receipt	Talkback by Priority Monitor ID

*1 Channels configured as Priority Monitor ID will be scanned every time during scanning independent of Scan Delete/ Add configuration.

*2 After the call of Priority Monitor ID ends, the transceiver returns to the selected channel after the Auto Reset Timer elapses.

- **Priority Monitor ID** is mainly the function on a traffic channel, but a Group Call of a channel configured in **Priority Monitor ID** is received even on a control channel if **Priority Monitor ID** is configured.

However, for a control channel, a Group Call is received without applying the priority of a Priority Monitor ID number (priority order).

(Example: Even if a Group Call of Priority Monitor ID 1 is received on a traffic channel, the Group Call of Priority Monitor ID 2 is received after the migration to a control channel when a Group Call configured for Priority Monitor ID 2 is received.)

- The Priority Monitor ID icon, Alert Tone, and Alert LED are cleared by Auto Reset Timer.
- Even if All Group ID is configured as the Priority Monitor ID, the Priority icon does not appear.

Using selected channel as Priority Monitor ID (Selected Channel)

Selected Channel is a function that the channel selected during scanning is used as Priority Monitor ID.

From the 4 channels configured as Priority Monitor ID, a single Priority Monitor ID in Selected Channel can be configured by using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

- Configuring **Priority Monitor ID** ( See Radio Configuration> System Properties> Systems> DMR-based Trunking> Other Options> Hunt Options> Priority Monitor ID)
- Configuring **Selected Channel** ( See Radio Configuration> System Properties> Systems> DMR-based Trunking> Other Options> Hunt Options> Priority Monitor ID)

Participating in an On-going Voice Call Midway Through the Call (Late Entry)

The transceiver can participate in an on-going voice call even if the transceiver receives this call midway through.

In a DMR-based Trunking system, the transceiver sends a communication request on the control channel, and the transceiver will migrate to the specified traffic channel to communicate. A transceiver that is turned ON after the traffic channel assignment is completed or a transceiver that migrated from another site cannot participate in on-going communications on a traffic channel in the current state because the transceiver has not received the traffic channel assignment message. The transceiver can migrate to a traffic channel and participate in on-going communications by receiving the same traffic channel assignment message that is periodically sent from the system on the control channel.

Also, if **Late Entry Cancel Time** is configured, the transceiver can be prevented from participating in on-going communications by canceling the traffic channel assignment message that is periodically sent from the system on the control channel.

Late Entry Cancel Time

Late Entry Cancel Time is the function to cancel the traffic channel assignment message of a specific Group Call.

By canceling the traffic channel assignment message which is sent on a control channel, the transceiver does not participate in a Group Call even if the call is receivable, and the transceiver can remain on the control channel. This allows a call prioritized over a Group Call to take place.

The countdown of **Late Entry Cancel Time** starts when the transceiver migrates to a control channel by the following operations while the transceiver is receiving a Group Call on a traffic channel.

- Pressing the **Clear** button
- Placing the microphone for Mobile in the on-hook state (if **On-hook Disconnect** is enabled)

While **Late Entry Cancel Time** is counting down, the traffic channel assignment message of the last-received Group Call is canceled.

Configuration using KPG-D3/ D3N

Configuring **Late Entry Cancel Time** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > RX Options)

Searching Whether the Transceiver Receives a Call (Scan)

The transceiver searches on whether the transceiver has received a call on a control channel.

The Single Scan function can be used in a DMR-based Trunking system.

Refer to “[USING SCAN](#)” for details of Scan.

Transmitting

Pressing the **PTT** switch, or selecting a DMR ID and then pressing the **PTT** switch sends a message requesting various types of communications to a system on a control channel. The transceiver can start communications after the system assigns a traffic channel to the transceiver.

Restricting the Continuous Transmission Duration (Time-out Timer)

Time-out Timer (TOT) is the function to restrict the duration for the transceiver to continuously transmit.

This function is used to prevent communication channel occupancy by a specific user for a long duration of time. The transceiver automatically stops transmitting if it continuously transmits longer than the configured time.

Also, **TOT Pre-alert**, the timer configuration relevant to the **Time-out Timer** function, can be configured.

TOT Pre-alert

TOT Pre-alert is the function to notify a user that a continuous transmission is about to end by the **Time-out Timer**. A TOT Pre-alert Tone (3 beeps) sounds from the transceiver before the transceiver stops the continuous transmission by the **Time-out Timer**.

Example: Time-out Timer: 30 sec, TOT Pre-alert: 4 sec

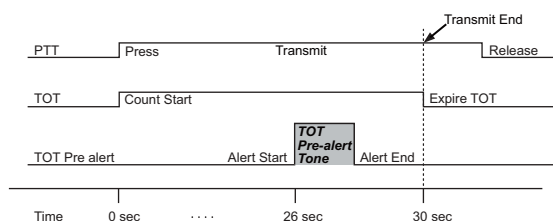


Figure 3-7 TOT Pre-alert

Note

- If "Off" is configured for **TOT Pre-alert**, no TOT Pre-alert tone sounds from the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Time-out Timer** (See Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > TX Options)
- Configuring **TOT Pre-alert** (See Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > TX Options)

Avoiding Interference with Other Communications (Busy Channel Lockout)

Busy Channel Lockout is the function to automatically restrict the transmission so as not to interfere with the communications of other systems.

This function is only supported in a Trunking 2.5 system and S-Trunking system.

Busy Channel Lockout functions before the transceiver makes a random access if the transceiver has not received an output signal from the repeater.

If the conditions for transmission are satisfied in **Busy Channel Lockout**, the transceiver sends a Wakeup Message to the repeater and makes a random access.

If the transceiver receives an output signal from the repeater, Busy Channel Lockout does not function.

The following are the transceiver behaviors by the configuration in **Busy Channel Lockout**:

Table 3-10 Busy Channel Lockout

Configuration	Description
No	Busy Channel Lockout does not function. The transceiver makes a random access if the PTT switch is pressed.
Carrier Only	The transceiver cannot transmit while the transceiver is receiving a carrier.

Transceiver behavior during Busy Channel Lockout

The following are the transceiver behaviors of when **Busy Channel Lockout** is executed:

- “Calling” appears and the transmission is suspended during the **Busy Channel Lockout** behavior.
- For voice communication, if **Call Request Tone** is enabled, a Call Request Tone sounds.
- If **Call Processing Tone** is enabled, a Call Processing Tone sounds while the transceiver is waiting for a response.
- If the **Busy Channel Lockout** behavior is disabled, the transceiver starts transmitting.

Configuration using KPG-D3/ D3N

Configuring **Busy Channel Lockout** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > TX Options)

3.2 Control Channel Hunt (Control Channel Hunt)

The control channel hunt is the function to search for and acquire automatically an available control channel on a system when the transceiver is turned ON.

By searching for a control channel according to the hunt sequence, the transceiver can acquire a control channel providing better communication conditions, such as a control channel having better signal strength or higher priority.

The control channel hunt is automatically started when the transceiver is in the following states.

- When the transceiver is turned ON
- When a channel in a DMR-based Trunking system is selected
- When the transceiver cannot receive a signal on a control channel

Trunked Channel Plan and Normal Hunt Control Channel need to be configured in KPG-D3/ D3N to execute Control Channel Hunt.

Note

- When the transceiver enters the following states in an S-Trunking system, if the transceiver has not received an output signal from the repeater, the transceiver sends a Wakeup Message to the repeater and starts the control channel hunt from the Resuming a Control Channel Sequence.
 - When the transceiver is turned ON
 - When a channel in a DMR-based Trunking system is selected
- In a DMR Tier III Trunking system, if **Out of Range Indicator** is enabled, "Search" appears on the display when 10 sec elapse after starting to search for a control channel.
- If **Out of Range Indicator** is configured, the Out of Range Indicator function is activated when no available control channel has been found even after 60 sec of the control channel search. (Refer to [Out of Range Indicator](#).)

Trunked Channel Plan

In **Trunked Channel Plan**, 16 Trunked Channel Plans can be configured. For each Trunked Channel Plan, "Fixed" or "Flexible" is selected as the **Plan Type**.

Table 3-11 Plan Type

Plan Type	Description
Fixed	Configures the receive frequency and transmit frequency for Channel 1 in Base Receive Frequency and Base Transmit Frequency . Configures the channel spacing in Step . Receive Frequency and Transmit Frequency in each of the 4094 channels are frequencies calculated in the following manner: Receive Frequency = Base Receive Frequency + (channel number - 1) x Step Transmit Frequency = Base Transmit Frequency + (channel number - 1) x Step
Flexible	Configures Receive Frequency and Transmit Frequency for each channel. A maximum of 4094 channels can be configured. Multiple channels can be configured at the same time by using Auto Setting .

Normal Hunt Control Channel

In **Normal Hunt Control Channel**, a maximum of 1024 control channels can be configured as the control channels for which the transceiver executes Short Hunt.

Table 3-12 Normal Hunt Control Channel Configuration

Configuration	Description
Frequency No.	Configures the frequency for which the transceiver executes Short Hunt. The channel number in Trunked Channel Plan is selected. The channel number can be selected within the range between Lowest Frequency Number and Highest Frequency Number .
Color Code	Configures the Color Code of a control channel for which the transceiver executes Short Hunt.
Slot Selection	Configures the Slot of a control channel for which the transceiver executes Short Hunt. The transceiver transmits and receives on the configured Slot.

Control channel hunt sequence

The transceiver searches for a control channel based on a frequency configured in **Trunked Channel Plan**. The following are the types of control channel hunt sequences:

Table 3-13 Control Channel Hunt Sequence (For a Trunking 2.5 System)

Order	Control channel hunt sequence	Description
1	Resuming a Control Channel Sequence	The control channel search which was stopped before the transceiver was turned OFF is resumed.
2	Active Hunt	A control channel is acquired after a Wakeup Message is sent to the control channels of the site currently in use and adjacent sites.

Table 3-14 Control Channel Hunt Sequence (For a DMR Tier III Trunking System or S-Trunking System)

Order	Control channel hunt sequence	Description
1	Resuming a Control Channel Sequence	The control channel search which was stopped before the transceiver was turned OFF and the search for the control channel which was acquired immediately before are resumed. Also, for each site that was connected in the past, a control channel of the adjacent site is searched.
2	Preferential Hunt Sequence	2 channels configured as Preferential Hunt Control Channel are searched. Preferential Hunt Control Channel is the channel having the highest priority when searching for a control channel.
3	Short Hunt Sequence	A channel configured in Normal Hunt Control Channel is searched. For every 16 channels configured in Normal Hunt Control Channel , a search is executed in this order: for the control channel for which the search was stopped before the transceiver was turned off, for the control channel of the site that is adjacent to each site that was connected in the past, and for the control channel that was acquired immediately before the control channel for which the search was stopped before the transceiver was turned off.
4	Comprehensive Hunt Sequence (DMR Tier III Trunking system only)	The channels available as control channels are searched based on all frequencies used in the network among frequencies configured in Trunked Channel Plan .

Note

- In a Trunking 2.5 system, “the behavior specifying only the site” of Preferential Hunt Control Channel is supported, and the priority level of “the behavior specifying only the site” is used in **Vote Now**.
- The control channel of the site that is adjacent to each site that was connected in the past, which is searched by Resuming a Control Channel Sequence, is initialized when the control channel is registered in a system on a different network.

Active Hunt

Active Hunt is the function for the transceiver to acquire a control channel. The transceiver acquires a control channel after a Wakeup Message is sent to the control channels of the site currently in use and adjacent sites.

The overall flow of Active Hunt is as follows:

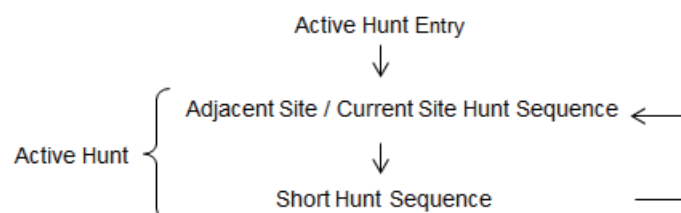


Figure 3-8 Flow of Active Hunt

For Adjacent Site/ Current Site Hunt Sequence, the transceiver is periodically notified from a system of “the information on all channels that can be the control channels of the site currently in use and adjacent sites”. Based on this information, if a control channel with Registration completed is lost, the transceiver sends a Wakeup Message to a channel to be the next control channel in the order of receipt of notification from a system.

- If a communication (C_Aloha or C_BCAST) from a system is found after a Wakeup Message is sent, the transceiver determines that the channel communicated from the system is a control channel, and returns to the communication area.
- If a communication (P_Move) from a system is found after a Wakeup Message is sent, the transceiver migrates to the channel specified by a notification from a system, and returns to the communication area if the migration target is a control channel.
- If a communication (C_Aloha, C_BCAST, or P_Move) from a system cannot be found after a Wakeup Message is sent, the transceiver does not send a Wakeup Message again on the same channel, and sends a Wakeup Message after migrating to the next channel.

Backup of the information on each channel is as follows:

- The information on the control channel of the site currently in use and “the information on all channels that can be the control channels” are backed up even if the transceiver is turned off. For this reason, Resuming a Control Channel Sequence and Current Site Hunt function even after the transceiver restarts.
- “The information on all channels that can be the control channels” of adjacent sites is not backed up if the transceiver is turned off. For this reason, Adjacent Site Hunt is skipped while “the information on all channels that can be the control channels” cannot be acquired from a system after the transceiver restarts.

A maximum of 5 adjacent sites are used in Active Hunt.

The transceiver restarts Active Hunt from the beginning if the time configured in **Wakeup Message Resend Timer** elapses. The transceiver does not send a Wakeup Message for the second or later cycle of Active Hunt if **Wakeup Message Resend Timer** is disabled. (However, the number of cycles of Active Hunt counting down is initialized if the transceiver is temporarily within the communication area. When the transceiver is temporarily within the communication area and in the state of Active Hunt again, a Wakeup Message is sent from the first cycle of Active Hunt.)

When Active Hunt cycles once while a Wakeup Message is sent after **Wakeup Message Resend Timer** elapses, the transceiver temporarily pauses the transmission of Wakeup Message again from the next cycle and starts the Wakeup Message Resend Timer from the beginning. The transceiver repeats this behavior during Active Hunt.

Note

- By shortening **Wakeup Message Resend Timer**, the transceiver increases the frequency of Wakeup Message transmission by Active Hunt, and reconnection to a system becomes easier.
- The frequency of Wakeup Message transmission by the transceiver is decreased by disabling **Wakeup Message Resend Timer** or by increasing the configured time. In this case, although reconnection to a system becomes harder, the frequency of LED flashes by the transceiver that is outside of the communication area is reduced.

Background Hunt

Background Hunt is the function to periodically attempt to acquire a control channel providing better conditions while the transceiver is in the standby state on a control channel.

When the transceiver receives the information of an adjacent site from the system on the control channel, the transceiver stores the information as the channel information of the adjacent site (a maximum of 16 entries) in memory.

The transceiver executes the **Background Hunt** to acquire a control channel providing better conditions, such as a control channel having better signal strength or higher priority, at the intervals configured in **Search Interval Time**.

If the transceiver finds a site providing better conditions compared with the current control channel by using **Background Hunt**, the transceiver migrates to the control channel having better conditions and starts the process to acquire the control channel to be in the standby state.

The behavior of **Background Hunt** varies depending on the configuration of the most preferentially searched channel (**Preferential Hunt Control Channel**), the currently acquired control channel, and the channel information of a registered adjacent site.

The conditions for **Background Hunt** to function are as follows:

Table 3-15 Conditions for Background Hunt to Function 1

Configuration of the Most Preferentially Searched Channel (Preferential Hunt Control Channel)		Currently Acquired Control Channel	
Priority 1	Priority 2	For Priority 1	For Priority 2
Enabled	Enabled	Background Hunt does not function.	The transceiver can migrate to a new control channel only if the channel information of an adjacent site is the same as the information for the configuration of Priority 1. When Background Hunt functions, the transceiver executes the acquisition process of a new control channel regardless of the configuration of Level Margin (the signal strength level difference for migration conditions). After that, the transceiver migrates to the acquired control channel and enters the standby state.
	Disabled	Background Hunt does not function.	-
Disabled	Enabled	-	Background Hunt does not function.
	Disabled	-	-

Table 3-16 Conditions for Background Hunt to Function 2

Configuration of the Most Preferentially Searched Channel (Preferential Hunt Control Channel)		Currently Acquired Control Channel
Priority 1	Priority 2	For Anything Other Than Priority 1/ Priority 2
Enabled	Enabled	Background Hunt functions, and the channel information of an adjacent site is checked in the following order: in the case where the information is the same as the configuration for Priority 1, in the case where the information is the same as the configuration for Priority 2, and in other cases. If the channel information of an adjacent site is the same as the configuration for Priority 1 or Priority 2: The transceiver migrates to a new control channel regardless of the configuration in Level Margin. If the channel information of an adjacent site is not the same as the configuration for Priority 1 or Priority 2: If the signal strength level of the control channel to be newly acquired is stronger than the signal strength level of the current control channel by the value equal to or greater than the value configured in Level Margin, the transceiver executes the acquisition process of the new control channel. After that, the transceiver migrates to the acquired control channel and enters the standby state.
	Disabled	Background Hunt functions, and the channel information of an adjacent site is checked in the following order: in the case where the information is the same as the configuration for Priority 1, in the case where the information is different from the configuration for Priority 1. If the channel information of an adjacent site is the same as the configuration for Priority 1: The transceiver migrates to a new control channel regardless of the configuration in Level Margin. If the channel information of an adjacent site is different from the configuration for Priority 1: If the signal strength level of the control channel to be newly acquired is stronger than the signal strength level of the current control channel by the value equal to or greater than the value configured in Level Margin, the transceiver executes the acquisition process of the new control channel. After that, the transceiver migrates to the acquired control channel and enters the standby state.
Disabled	Enabled	Background Hunt functions, and the channel information of an adjacent site is checked in the following order: in the case where the information is the same as the configuration for Priority 2, in the case where the information is different from the configuration for Priority 2. If the channel information of an adjacent site is the same as the configuration for Priority 2: The transceiver migrates to a new control channel regardless of the configuration in Level Margin. If the channel information of an adjacent site is different from the configuration for Priority 2: If the signal strength level of the control channel to be newly acquired is stronger than the signal strength level of the current control channel by the value equal to or greater than the value configured in Level Margin, the transceiver executes the acquisition process of the new control channel. After that, the transceiver migrates to the acquired control channel and enters the standby state.
	Disabled	Background Hunt functions and checks the channel information of an adjacent site. If the signal strength level of the control channel to be newly acquired is stronger than the signal strength level of the current control channel by the value equal to or greater than the value configured in Level Margin, the transceiver executes the acquisition process of the new control channel. After that, the transceiver migrates to the acquired control channel and enters the standby state.

 Note

- For the site for which the network control function with other sites becomes unavailable, the control channel migration by using Background Hunt is not executed.

Vote Now

Vote Now is the function to migrate to a new control channel if the transceiver checks the priority level and RSSI value of a new control channel candidate notified from a system, and the new control channel has better conditions than the currently acquired control channel. Because the notification specifying control channel confirmation (hereafter, the Vote Now notification) is periodically received from a system, the transceiver can always acquire a good communication environment.

To use this function, **Vote Now** is enabled, and "MS Priority" or "TS Priority" is configured in **Vote Now Priority**.

For the transceiver to follow the site priority level configured by using KPG-D3/ D3N, "MS Priority" is configured in **Vote Now Priority**. To follow the site priority level included in the Vote Now notification from a system, "TS Priority" is configured.

If "MS Priority" is configured in Vote Now Priority, the transceiver behaves as follows according to the priority level configured in **Preferential Site** by using KPG-D3/ D3N (for a DMR Tier III Trunking system, the transceiver follows the priority level configured in Site ID of Preferential Hunt Control Channel):

- If the Vote Now notification is received from a system while the transceiver is on a Priority 1 site, the transceiver does execute site migration.
- If the Vote Now notification for a Priority 1 site is received from a system while the transceiver is on a Priority 2 site, the transceiver immediately migrates from the current site. If the Vote Now notification for a site of the same Priority as or lower Priority than the current site is received, the transceiver does not execute site migration.
- If the Vote Now notification for a Priority 1 or Priority 2 site is received while the transceiver is on a site where Priority is not configured (Priority 1 or Priority 2 is not configured), the transceiver immediately migrates to the site indicated by the Vote Now notification.
- If the Vote Now notification for another site where Priority is not configured is received while the transceiver is on a site where Priority is not configured, the transceiver compares the RSSI value of the control channel of the current site and the RSSI value of the new control channel candidate indicated by the Vote Now notification. If the RSSI value of the new control channel candidate is higher than that of the control channel of the current site, the transceiver migrates to the new control channel. If the RSSI value of the new control channel candidate is lower than that of the control channel of the current site, the transceiver remains on the control channel of the current site. Also, the conditions for the RSSI value can be adjusted in **Level Margin**.

If "TS Priority" is configured in **Vote Now Priority** the transceiver behaves as follows according to the priority level included in the Vote Now notification from a system:

- If the Vote Now notification for a site of higher Priority than the current site is received, the transceiver immediately migrates to the site.
- If the Vote Now notification for a site of the same Priority as or lower Priority than the current site is received, the transceiver does not execute site migration.
- If the Vote Now notification for another site where Priority is not configured is received while the transceiver is on a site where Priority is not configured, the transceiver compares the RSSI value of the control channel of the current site and the RSSI value of the new control channel candidate. If the RSSI value of the new control channel candidate is higher, the transceiver migrates to the new control channel. If the RSSI value of the new control channel candidate is lower, the transceiver remains on the control channel of the current site. Also, the conditions for the RSSI value can be adjusted in **Level Margin**.

The following is the transceiver behavior for **Vote Now**:

Table 3-17 Transceiver Behavior for Vote Now

Priority Level of Preferential Site/ Priority Level of Vote Now Notification		Priority Level of New Control Channel Candidate		
		No Priority	Priority Low (Priority 1)	Priority High (Priority 2)
Priority Level of Current Control Channel	No Priority	(Depends on the RSSI value) *1	Immediate migration	Immediate migration
	Priority Low (Priority 1)	(No Roaming) *2	(No Roaming) *2	Immediate migration
	Priority High (Priority 1)	(No Roaming) *2	(No Roaming) *2	(No Roaming) *2

*1 Migrates to the new control channel if the RSSI value of the new control channel candidate is higher than the RSSI value of the current control channel + Level Margin.

*2 Does not migrate to the new control channel.

Level Margin is the configuration value used when comparing RSSI values. The standard for the transceiver to migrate from the current site can be raised by increasing the configuration in **Level Margin**. By adjusting the configuration in **Level Margin**, the transceiver can be migrated to an adequately good site.



- **Vote Now** is only supported in a Trunking 2.5 system and DMR Tier III Trunking system.

Comprehensive Hunt

In **Comprehensive Hunt**, the transceiver executes the acquisition test in order for all frequencies used in the network among frequencies configured in **Trunked Channel Plan** to acquire a frequency to be used as a control channel, if the transceiver cannot acquire a control channel according to the normal control channel acquisition procedure.

If the transceiver fails the acquisition test for all candidate control channels, the transceiver restarts the search from the Resuming a Control Channel Sequence.

This function is only supported in a DMR Tier III Trunking system.

Note

- Since the Comprehensive Hunt Sequence attempts the acquisition for all candidate control channels, it may take an overly long time to acquire the control channel.

Configuration using KPG-D3/ D3N

- Configuring **Trunked Channel Plan** ( [See](#) Radio Configuration > System Properties > Channel Plan > DMR Trunked Channel Plan)
- Configuring **Lowest Frequency Number** ( [See](#) Radio Configuration > System Properties > Trunking Network > DMR-based Trunking > General > System)
- Configuring **Highest Frequency Number** ( [See](#) Radio Configuration > System Properties > Trunking Network > DMR-based Trunking > General > System)
- Configuring **Normal Hunt Control Channel** ( [See](#) Radio Configuration > System Properties > Trunking Network > DMR-based Trunking > Hunt > Normal Hunt)
- Configuring **Preferential Hunt Control Channel** ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Hunt Options)
- Configuring **Wakeup Message Resend Timer** ( [See](#) Radio Configuration> System Properties> Trunking Network> DMR-based Trunking> Hunt> Hunt Options> Wakeup Message Resend Timer)
- Configuring **Vote Now** to be enabled or disabled ( [See](#) Radio Configuration> System Properties> Trunking Network> DMR-based Trunking> Hunt> Hunt Options> Vote Now)
- Configuring **Vote Now Priority** ( [See](#) Radio Configuration> System Properties> Trunking Network> DMR-based Trunking> Hunt> Hunt Options> Vote Now)
- Configuring **Background Hunt** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Trunking Network > DMR-based Trunking > Hunt > Hunt Option)
- Configuring **Level Margin** ( [See](#) Radio Configuration > System Properties > Trunking Network > DMR-based Trunking > Hunt > Hunt Option)
- Configuring **Search Interval Time** ( [See](#) Radio Configuration > System Properties > Trunking Network > DMR-based Trunking > Hunt > Hunt Option > Background Hunt)
- Configuring **Comprehensive Hunt** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Trunking Network > DMR-based Trunking > Hunt > Hunt Option)

Passive Scan

Passive Scan is the function for the transceiver to scan the channels in the current site while the control channel is paused in Hibernating Station Mode. By scanning the channels in the current site, the transceiver can immediately find the control channel even if the control channel of the repeater migrates.

When the transceiver receives a pause notification from the control channel, the transceiver executes Passive Scan during the time of Inactivity Timer included in the notification. Also, the transceiver completes Passive Scan when the pause is finished and the transceiver finds the active control channel.

If no control channel is found after Inactivity Timer has elapsed, the transceiver determines that the control channel has been lost, finishes Passive Scan, and migrates to the Control Channel Hunt behavior.

The status of the control channel and transceiver when Passive Scan is executed is as follows:

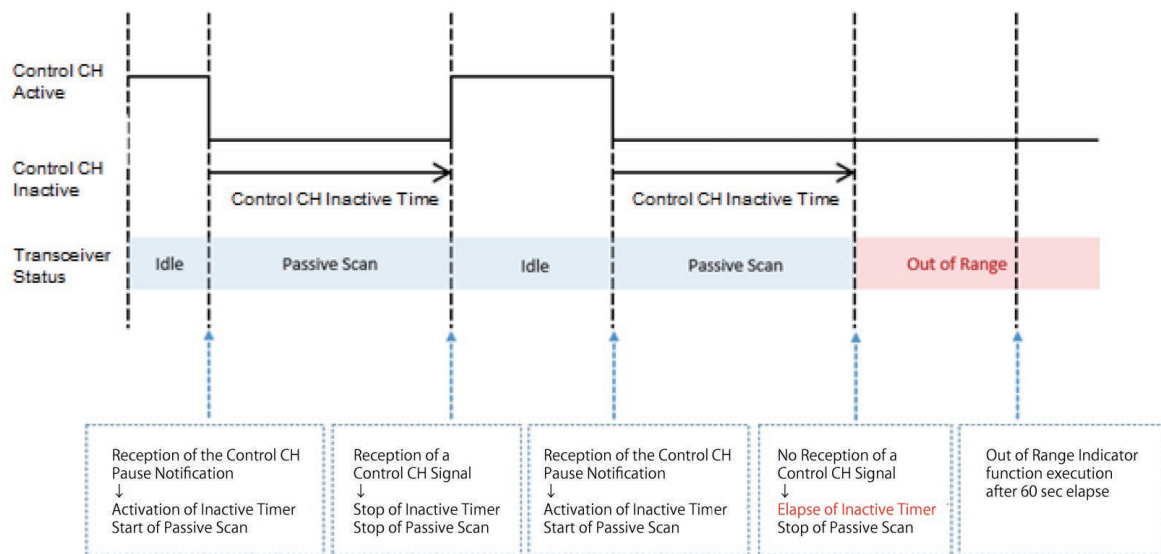


Figure 3-9 Status of the Control Channel and Transceiver in Passive Scan

Note

- During Passive Scan, if no response is received from the system when a Wakeup Message is sent to the control channel to initiate voice communication or data communication, the transceiver enters the Out of Range state and finishes Passive Scan.
- The following automatic transmission is not executed during Passive Scan:
 - Auto GPS Report
 - GPS Distance Change
- If the rotation of the control channel occurs due to downlink interference of the system, etc. during Passive Scan, the transceiver whose Inactivity Timer expires is not able to acquire the original control channel. Therefore, the transceiver enters the Active Hunt state and sends a Wakeup Message. In this case, the traffic channel, not the control channel, receives the Wakeup Message and responds to the transceiver as to which channel is the control channel. The transceiver can acquire the control channel even if the rotation of the control channel occurs while the repeater is behaving intermittently.
- Passive Scan is only supported in a Trunking 2.5 system.

System Search Policy

System Search Policy is a policy used by the transceiver to search the system.

Using this function, the transceiver can be configured to start roaming easily in order for a user to select the system having good signal strength. The transceiver can also be configured not to start roaming in order to keep using the system in use as much as possible around the system critical point.

Table 3-18 System Search Policy

System Search Policy	Description
Normal	This is normal configuration considering both roaming and coverage. This configuration is used for normal communications.
Roaming Preferential	This configuration gives higher priority for roaming to maintain communication quality and allows the transceiver to start the system search easily. This configuration is used to install many multiple sites having relatively small communication area.
Site Preferential	This configuration prioritizes the coverage of the current site, and the transceiver is less likely to start a system. This configuration is used when the transceiver is operated with a single site, or the transceiver is used to widen the operation area of the transceiver by installing a small number of sites having wide coverage.

Note

- In a Trunking 2.5 system and S-Trunking system, the transceiver determines **System Search Policy** only while the transceiver is receiving the output signal from the repeater.
- For the signal strength level while the transceiver acquires a control channel, Roaming Preferential is the strongest level followed by Normal and Site Preferential.
- For the frequency of the transceiver to migrate from the current site to another site, Roaming Preferential is the highest frequency rate followed by Normal and Site Preferential.

Configuration using KPG-D3/ D3N

Configuring **System Search Policy** ( See Radio Configuration > System Properties > Trunking Network > DMR-based Trunking > Hunt > Hunt Option)

Composite Control Channel

Composite Control Channel is the function for the repeater to behave by temporarily switching from the control channel to the traffic channel.

By the repeater assigning a control channel as a traffic channel temporarily if the channel resources in the site are insufficient, the transceiver can effectively use the channel in the site.

Note

- The following restrictions occur while the repeater is behaving by switching to a traffic channel by using Composite Control Channel:
 - Functions, such as **Late Entry**, which are provided by the repeater on the control channel are not provided for the transceiver.
 - Behaviors which require a control channel from the transceiver to the repeater are not available. For example, refer to the descriptions of "If a random access for a Call Interruption request message fails" in Call Interruption or "If the transceiver does not receive any message from the system: " in the various Calls for the display specifications of when Registration, Call Interruption, Emergency Call, and other various Calls fail to function.
 - The transceiver attempting to migrate to another site by the Hunt behavior or Vote Now assumes that no control channel exists at the destination site and skips the migration to another site. For the Hunt behavior, the Hunt behavior to the next control channel is continued, and for Vote Now, the transceiver remains on the current site without migrating to a new site.

Retaining the Information of the Control Channel Used When the Transceiver Is Turned OFF (Last Control Channel)

Last Control Channel can be used to retain the information for the last-used site if the transceiver is turned OFF while the transceiver is operated in a DMR-based Trunking system.

There are two types of operation for the system. Whether the transceiver starts searching for a control channel from the last-used site or from the preferred channel when the transceiver searches for a control channel can be configured depending on the operation mode of the system.

- **If giving preference to always using the site having good signal strength:**

Since the last-used site normally has high signal strength, it is effective to start searching for a control channel from the last-used site.

- **If giving preference to always using the preconfigured site:**

The transceiver may register at a site having poor signal strength every time. To avoid this problem, it is effective to always start searching for a preferred channel.

If this function is enabled, the information for the last-used site is retained even if the transceiver is turned OFF. When the transceiver is turned ON again, the transceiver starts searching for a control channel from a control channel in the retained site.

If this function is disabled, the information for the last-used site is not retained after the transceiver is turned OFF. When the transceiver is turned ON again, the transceiver starts searching for a control channel from the control channel configured as a Preferential Hunt Control Channel. Preferential Hunt Control Channel is the channel having the highest priority when searching for a control channel.

Configuration using KPG-D3/ D3N

Configuring **Last Control Channel** to be enabled or disabled ( See Radio Configuration > System Properties > Trunking Network > DMR-based Trunking > Hunt > Hunt Option)

Out of Range Indicator

Out of Range Indicator is the function to notify a user that no available control channel has been found after searching for a control channel.

If **Out of Range Indicator** is enabled, “Out of Range” appears on the display when no available control channel has been found even if 60 sec elapse after entering the Out of Service state.



Out of Range Tone

Out of Range Tone is the tone to notify a user that the transceiver cannot acquire a control channel.

The transceiver emits an Out of Range Tone (1 beep) when no available control channel has been found even if 60 sec elapse after entering the Out of Service state. The transceiver behaves as follows according to the configuration in **Out of Range Tone**:

Table 3-19 Out of Range Tone

Configuration	Description
Off	An Out of Range Tone (1 beep) does not sound from the transceiver.
One-shot	The transceiver emits an Out of Range Tone (1 beep) only once when no available control channel has been found even if 60 sec elapse after entering the Out of Service state. After that, an Out of Range Tone (1 beep) does not sound from the transceiver even if an available control channel has still not been found.
Cycle	An Out of Range Tone (1 beep) sounds from the transceiver at 30-sec intervals while no available control channel has been found.

In-service Tone

In-service Tone is the tone to notify the user that the transceiver has acquired an available control channel.

If **In-service Tone** is enabled, the transceiver emits an In-service Tone (3 beeps) when an available control channel has been acquired after the transceiver has emitted an Out of Range Tone (1 beep) when it continuously fails to acquire a control channel.

Note

- If **Out of Range Indicator** is disabled in a DMR Tier III Trunking system, “Search” does not appear while searching for a control channel.

Configuration using KPG-D3/ D3N

- Configuring **Out of Range Indicator** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Hunt Options > Out of Range)
- Configuring **Out of Range Tone** ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Hunt Options > Out of Range)
- Configuring **In-service Tone** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Hunt Options > Out of Range)

3.3 Configuring the Length of Time to Retain the In Service State (Beacon Interval Time)

In **Beacon Interval Time**, the length of time for the transceiver to retain the In Service state (the state where the transceiver is determined as within the system service area) is configured even if the output signal from the repeater disappears.

This function is only supported in an S-Trunking system.

The transceiver displays the “” icon for the duration configured in **Beacon Interval Time** after the output signal from the repeater disappears.

The status of the “” icon is the strength of the output signal last received from the repeater.

After a valid control channel is acquired, the transceiver can retain the In Service state during **Beacon Interval Time** when the output signal from the repeater disappears because of intermittent repeater behavior.

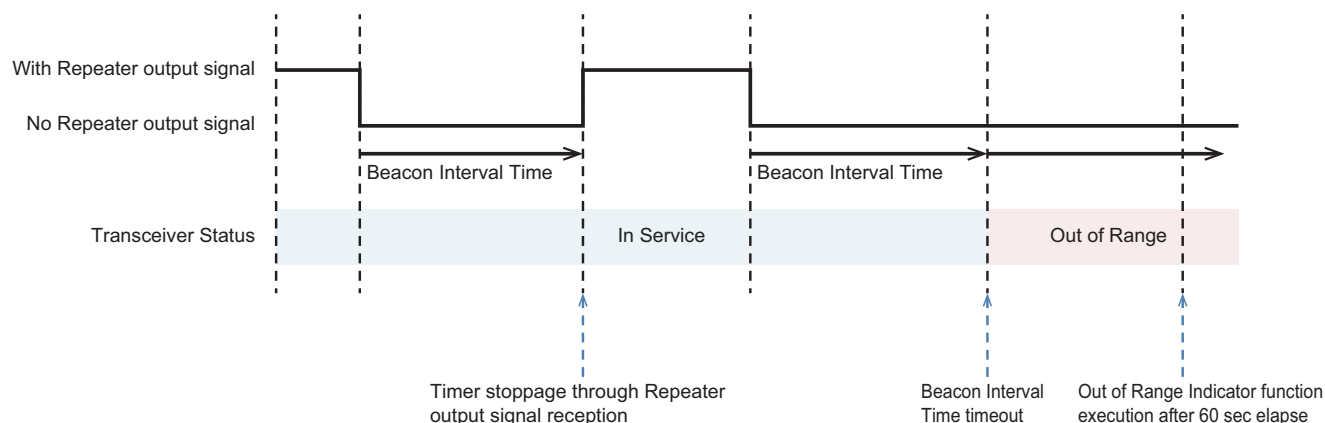


Figure 3-10 Beacon Interval Time

Configuration using KPG-D3/ D3N

Configuring **Beacon Interval Time** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Hunt Options > Out of Range)

3.4 Registration in a DMR-based Trunking System

Registration is a function that enables registration with the system the location data of the transceiver at the time the transceiver searches for or acquires a control channel, for instance by turning the transceiver ON. By registering the location of the transceiver, the system can recognize which site the transceiver belongs to and specifies the site where the communication can be established. Therefore, in the case of Individual Call, a request for an incoming call can immediately be placed with a site where the called transceiver resides; hence, the system can effectively be operated.

Group Subscription is a function that enables the transceiver to register with the system groups to be used. By registering groups, the system can recognize in which site the transceiver waiting for a Group Call resides. Therefore, in the case that a Group Call is made in a multi-site system, the system can limit the registered sites as coverage for the call; hence, the system can effectively handle a Group Call.

De-registration is a function that enables clearing from the system of the transceiver registration information, for instance by turning the transceiver OFF. This function can be used on the system side to recognize a transceiver that does not reside in the site.

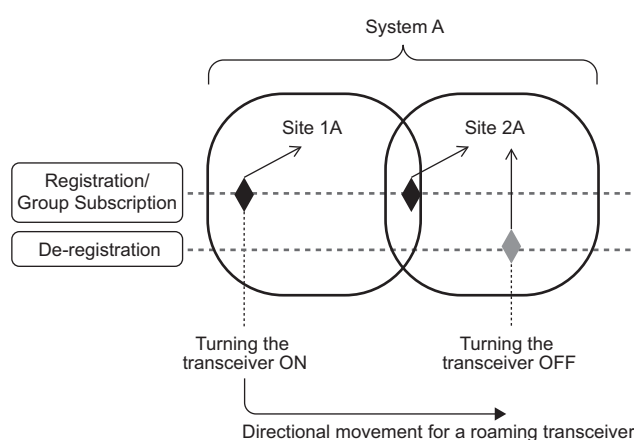


Figure 3-11 Registration/ Group Subscription/ De-registration

Registration specifications are different for a Trunking 2.5 system/ DMR Tier III Trunking system and an S-Trunking system. Therefore, Registration does not succeed if the transceiver is configured with a Trunking format which is different from that of the system.

Table 3-20 Registration Specifications

Trunking Format	Description
Trunking 2.5/ DMR Tier III Trunking	The transceiver executes Registration according to the standards of the DMR Standard ETSI TS 102 361-4 V1.9.2.
S-Trunking	The transceiver executes Registration by using a message of proprietary specifications based on the DMR Standard ETSI TS 102 361-4.

Registering the Own Unit ID in a System (Registration)

The transceiver can register its own Unit ID in the system.

Conditions for the transceiver to begin Registration

The transceiver begins Registration under the following conditions.

- **When the transceiver is turned ON**
The transceiver begins Registration upon acquisition of a control channel after the transceiver is turned ON.
- **If roaming to different sites**
The transceiver begins Registration when the transceiver roams to different sites.
- **If changed to a DMR-based Trunking system**
The transceiver will begin Registration when a control channel is acquired after a system other than a DMR-based Trunking system is changed to a DMR-based Trunking system by a user operating the transceiver.
- **If changed to a different DMR-based Trunking system**
The transceiver will begin Registration when a control channel is acquired after a DMR-based Trunking system is changed to a different DMR-based Trunking system by a user operating the transceiver.
- **If Registration is requested from a system (Mass Registration)**
The transceiver will begin Registration if a Broadcast message requesting Registration is received from a system and the transceiver is a Registration request target.
- **If a call is requested without location registration information in a system**
If the transceiver makes a call request without the location registration information of the mobile station in a system, the transceiver begins Registration after indicating that the call request failed.
- **When Registration Timer elapses**
The transceiver executes Registration when Registration Timer elapses.

Transceiver's behavior for Registration

The following is the transceiver's behavior during Registration.

- If the location of the own transceiver is successfully registered, the transceiver will remain on the acquired control channel. Otherwise, the transceiver attempts to acquire another control channel again.
- If the transceiver receives the response message indicating failure in Registration from the system when the transceiver begins Registration, the transceiver retains the information (a maximum of 8 messages) and then the transceiver will attempt to acquire a control channel again. Since the information is not cleared even if the zone is changed and it is retained until the transceiver is turned OFF, the transceiver will not begin Registration if the acquired control channel has the same Site No. as the Site No. that was previously determined as a Registration failure. Also, if the transceiver does not receive any response from the system when the transceiver begins Registration or if a timer for Random Access expires, the transceiver will attempt to acquire a new control channel again. In this case, incompleteness of Registration prevents the transceiver from being used in the system. Upon acquisition of a new control channel, the transceiver begins Registration according to the conditions.
- If the transceiver receives the response message indicating failure in Registration from the system at one site and then acquires a control channel of another site, the transceiver executes Registration even if the site where the transceiver acquired the control channel has the same **Location Area ID** as the site where the transceiver received the response message indicating failure in Registration.
- The transceiver cannot initiate a call until location registration is completed, because Registration is a mandatory condition to communicate using a system. However, in a system that does not require location registration, the transceiver can initiate a call even if location registration is not completed. This depends on the system configuration.
- If the transceiver information registered in the system has already been cleared when the transceiver initiates a call, the transceiver begins Registration and then terminates the call upon receipt of a response message from the system indicating non-registration.
- If **IP Packet Data Services** is enabled, the IP address of the transceiver is notified to a system during the execution of Registration (IP Connection Advice). Even if a message of IP connection failure (IP_Connection_failed) is received from a system for a Registration request or an IP address notification to a system, the transceiver determines Registration as successful and remains on the current control channel.

Note

- When the transceiver executes Registration, additional information may be notified to the system depending on the functions.
If the following functions are used at the same time, because the additional information cannot be notified by a single Registration, Registration is executed twice.
 - Group Subscription and Battery Saver
 - Group Subscription and IP Packet Data Service
 - Group Subscription and Battery Saver and IP Packet Data Service *1
- *1 Battery Saver and IP Packet Data Service are notified together by a single Registration.

Registration Timer

In **Registration Timer**, the maximum length of wait time until Registration is executed is configured to maintain the validity of the Unit ID by executing Registration again before the Unit ID expiration date in the system expires.

When the Unit ID expiration date expires, the transceiver executes Registration again to maintain the validity of the Unit ID.

Registration Timer starts or restarts in the following cases:

- If the system sends back a REG_accepted, IP_Connection_failed, or Reg_Subscription/ Attachment service message, **Registration Timer** starts or restarts.
- If the transceiver receives a response from the system to the request to start the transceiver, **Registration Timer** restarts.
- If the transceiver sends back for a response from the system to the request to start the system, **Registration Timer** restarts.
- If the transceiver executes De-Registration, **Registration Timer** stops.

Note

- In addition to the timer duration (0.5 h - 168 h), the configuration of **Registration Timer** also has “Off” to stop the timer.
- Even if **Registration Timer** expires while the transceiver is unable to execute Registration, such as when some services are running, for example, while a Group Call is being received, or when the transceiver is outside of the communication area, the service is not immediately interrupted. Registration is executed after the transceiver is ready for Registration, for example, after the service is terminated.
- In Hibernating Station Mode of a Trunking 2.5 system, if **Registration Timer** expires while the control channel is paused, the transceiver sends the Wakeup Message to the system to execute the Registration behavior.
- **Registration Timer** is only supported in a Trunking 2.5 system and DMR Tier III Trunking system.

Configuration using KPG-D3/ D3N

Configuring **Registration Timer** ( Radio Configuration> System Properties> Systems> DMR-based Trunking> Other Options)

Registering the Group ID Used by the Own Transceiver in a System (Group Subscription)

The transceiver can register the Group ID used by itself in the system.

The following are the conditions for the transceiver to execute Group Subscription and the transceiver's behavior. The transceiver behavior varies depending on whether **Group Subscription** is enabled or disabled.

Table 3-21 Conditions to Execute Group Subscription and the Transceiver's Behavior

Conditions	Group Subscription	
	Enabled	Disabled
When the transceiver begins Registration, such as a case when the transceiver is turned ON or when the transceiver roams to a different site	The transceiver requests Registration to the system by the Registration request message with the Group ID included, and executes group registration to the system.	The transceiver requests Registration to the system without including the Group ID in the Registration request message.
When changing to another group without group registration by a user operating the transceiver	The transceiver requests Registration to the system by the Registration request message with the Group ID included, and executes group registration to the system. The transceiver requests Registration to the system 2 sec after changing the Group ID by a user operating the transceiver.	The transceiver does not request Registration to the system.

Note

- If the Group ID is All Group ID, the transceiver does not execute group registration even if Group Subscription is enabled.
- If the transceiver transmits with a Group ID different from the registered Group ID, the transceiver does not request Registration to the system.

Behavior when group registration fails

If group registration fails although Registration is successful, the transceiver remains on the acquired control channel without registering the group. If **Group Subscription Invalid Indicator Tone** is enabled, a Group Subscription Invalid Indicator Tone (2 beeps) sounds from the transceiver at 30-sec intervals. Also, if **Group Subscription Invalid Indicator** is enabled, "Invalid Group" is displayed on the display of the transceiver.



In a group which failed to be registered, the transceiver cannot transmit, including Talkback transmission. Reception is available in a group which failed to be registered.

Configuration using KPG-D3/ D3N

- Configuring **Group Subscription** to be enabled or disabled ( See Radio Configuration > System Properties > Trunking Network > DMR-based Trunking > General > System)
- Configuring **Group Subscription Invalid Indicator** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Hunt Options)
- Configuring **Group Subscription Invalid Indicator Tone** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Hunt Options)

Clearing the Registration Information from a System (De-registration)

The transceiver can clear from the system the information about the transceiver location registration.

Conditions for the transceiver to clear the transceiver location registration information from the system

The transceiver clears from the system the information about the transceiver location registration under the following conditions.

- **If the transceiver is turned OFF**
The transceiver will be turned OFF after clearing from the system the information about the location registration. If Power-off Status Message is configured, the transceiver will clear from the system the information about location registration after sending the Power-off Status Message. In Portable, if the transceiver is turned OFF by a user removing the battery pack, the transceiver will not clear from the system the information about the location registration.
- **If changed to a system other than a DMR-based Trunking system**
The transceiver will migrate to the changed Zone-channel after clearing from the system the information about location registration.
- **If changed to a different DMR-based Trunking system**
The transceiver will migrate to the changed channel after clearing from the system the information about location registration.
- **If whether the system with the location registered after Registration is executed can be determined as DMR Tier III if Trunking 2.5 is configured for the transceiver**
The transceiver will execute Control Channel Hunt after clearing from the system the information about location registration.

Transceiver's behavior if clearing the information about location registration from the system

If the transceiver receives from the system a response message (indicating permission, rejection or failure), if the transceiver does not receive any response from the system, or if the timer for random access expires, the transceiver will refresh the information about the site from where the information of the location registration has cleared.

Authentication Function of a System and Transceiver (Authentication)

Authentication is the function to execute authentication between the transceiver and a DMR-based Trunking system for the system to accept only an authenticated transceiver and exclude an invalid transceiver.

Also, the transceiver can authenticate a system to prevent the transceiver from responding to a Stun, Revive or Kill request from an invalid system.

Authentication by Registration

The system authenticates for the transceiver mainly during the execution of Registration. The system requests authentication to the transceiver, the transceiver responds to the authentication request, and the system determines whether the transceiver is valid or not.

Authentication upon receipt of the Stun/ Revive/ Kill request

If Authentication for Stun/Revive is enabled, the transceiver executes an authentication request if Stun or Revive is received from the system. If the transceiver receives a Kill request from the system, the transceiver executes an authentication request to the system regardless of the configuration in Authentication for Stun/Revive.

The system responds to the authentication request, and the transceiver determines whether the system is valid or not. If the system is determined as an invalid system in the authentication results, the transceiver does not accept the Stun, Revive or Kill request.

About the authentication key

A 128-bit **Authentication Key** is required for authentication between the transceiver and the system. **Authentication Key** can be configured using KPG-D3/ D3N.

Authentication will be unsuccessful if the same authentication key as the authentication key configured in **Authentication Key** is not registered for the system.



- If the authentication by Registration fails, the transceiver enters the hunt state.

Configuration using KPG-D3/ D3N

- Configuring **Authentication Key** (See Radio Configuration > System Properties > Systems > DMR-based Trunking > General > System Options)
- Configuring **Authentication for Stun/Revive** to be enabled or disabled (See Radio Configuration > System Properties > Systems > DMR-based Trunking > General > System Options)

3.5 Using IP Bearer Service

IP Bearer Service is the function to make data communication which complies with ETSI TS 102 361-3 by using UDP/IP or TCP/IP.

The transceiver can use IP Bearer Service when the configuration in **IP Packet Data Services** is enabled.

IP Bearer Service is used to communicate the OTAP data of a Trunking 2.5 system and DMR Tier III Trunking system. (Refer to Common Function Part [Writing Configuration Data Using Wireless Communication \(OTAP\)](#).)

The following functions can be used in IP Bearer Service:

- ICMP Echo
- IP Based Packet Data

Note

- If the transceiver fails in the notification of an IP address by using IP Connection Advice, IP Bearer Service cannot be used. (Refer to [Transceiver's behavior for Registration](#).)
- To use IP Bearer Service, **DMR Air Interface IP Address** needs to be configured by using KPG-D3/ D3N.
- UDP/IP is used for the communication of OTAP data in a Trunking 2.5 system and DMR Tier III Trunking system. For this reason, the IP Bearer Service function of a DMR Tier III Trunking system only supports UDP/IP.
- The Encryption function of OTAP communication using IP Bearer Service only supports the DES format. The bit scramble format, AES format, and ARC4 (Enhanced Encryption) format are not supported.
- If the timing of GPS data automatic transmission comes while the transceiver is sending data by using IP Bearer Service, the automatic transmission of GPS data does not occur and the GPS data to be transmitted is discarded.
- To use IP Bearer Service, 576 bytes or greater needs to be configured in Maximum Transmission Unit (MTU) for a network.

Configuration using KPG-D3/ D3N

- Configuring **IP Packet Data Services** to be enabled or disabled ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Packet Data)
- Configuring **DMR Air Interface IP Address** ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Packet Data)

Confirming Whether the Transceiver Is in Operation (ICMP Echo)

ICMP Echo is the function to confirm from a system whether the transceiver is in operation.

By sending an ICMP Echo Reply when the transceiver receives an ICMP Echo Request from a system, whether the transceiver is in operation can be confirmed.

Transceiver behavior

1 Receives from a system an ICMP Echo request message on a control channel.

“Receive Data” appears on the display.



2 Migrates to a traffic channel, and receives the ICMP Echo Request data.

When the reception of ICMP Echo Request data ends, an ACK is sent to a system.



- If the configuration in **Busy LED** is enabled, the LED lights green on the traffic channel.
- If the configuration in TX LED is enabled, the LED lights red during ACK transmission.
- The “” icon disappears during ACK transmission.



(During ACK transmission)

3 Sends the ICMP Echo Reply data.

“Send Data” appears on the display.



When an ACK of ICMP Echo Reply data is received from a system, “Complete” appears on the display for 1 sec. When the transmission of ICMP Echo Reply data ends, the transceiver returns from a traffic channel to a control channel.



(1 sec)

IP Based Packet Data

IP Based Packet Data is the function for the transceiver to receive IP based Packet data specified by ETSI TS 102 361-1. If the configuration in **IP Packet Data Services** is enabled, the transceiver can receive the data which is sent from a system by making the configured own IP address (**DMR Air Interface IP Address**) the destination. Also, data transmission from the transceiver is not supported, except the transmission behavior that occurs during the reception of data sent from a system.

By using the IP Based Packet Data function, the transceiver can receive OTAP data.

Configuration using KPG-D3/ D3N

Configuring **IP Packet Data Services** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Packet Data)

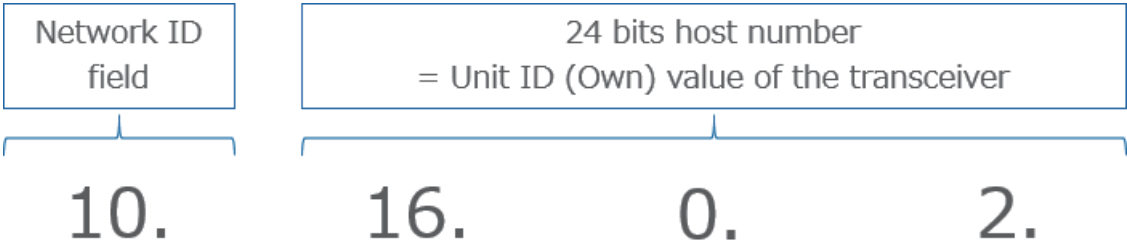
DMR IP Addressing

DMR IP Addressing is the function to configure an individual IP address regulated in ETSI TS 102 361-3 for the transceiver. Among the address formats for DLL derived IP addressing, only Class A (DLL (Data Link Layer) individual address) is supported for the NX-3000 series transceiver.

In DMR IP Addressing, an individual IP address (**DMR Air Interface IP Address**) can be configured for each transceiver by using KPG-D3/ D3N.

In **DMR Air Interface IP Address**, only the first octet, which is at the beginning of an IP address, is configured. For the second octet, third octet, and fourth octet, the values calculated from Unit ID (Own) configured for the transceiver are automatically configured.

Example: The IP address if the Network ID field = 0d10 = 0x0A, Unit ID (Own) = 0d1048578 = 0x100002



Pressing the **Menu** button places the transceiver in Menu Mode, and then selecting “IP Address” causes the transceiver to enter IP Address Mode and display the IP address. (Refer to Common Function Part [Using Menu Mode.](#))



Note

- The display of an IP address is only supported in a Trunking 2.5 system and DMR Tier III Trunking system.

Configuration using KPG-D3/ D3N

- Configuring **IP Packet Data Services** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Packet Data)
- Configuring **DMR Air Interface IP Address** ([See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Packet Data)

3.6 Using DMR ID to Initiate a Selective Call

An individual call and group call are available by using DMR IDs. In addition, a message can be sent to a specified target ID in various types of message communications.

Available Calls

The following various types of calls can be used in a DMR-based Trunking system. For transceiver operations and behaviors, refer to the instructions of each call type.

- Individual Call
- Group Call
- Broadcast Group Call
- Telephone Call
- Status Call
- Short Data Call
- Long Data Call

Transition for Each Mode

If a user wishes to send or receive an Individual Call, Group Call, Status Message, or Short Message, the user must operate the transceiver after selecting the desired mode. Refer to [“Transition for Each Mode”](#) for transition for each mode.

3.7 Making an Individual Call

Individual Call can be used to initiate a call to a target transceiver individually to establish voice calls.

By specifying a Unit ID, the transceiver can initiate a call to the transceiver having the Unit ID.

An Individual Call has 2 behaviors: FOACSU (Full Off Air Call Set-Up) and OACSU (Off Air Call Set-Up).

FOACSU:

By retaining a call until the receiving transceiver responds, the transceiver can start communications after a traffic channel is assigned upon the response of the receiving transceiver.

(If the target transceiver does not exist, the unnecessary assignment of a traffic channel can be avoided.)

OACSU:

A traffic channel is assigned to the transceiver without the response of the target transceiver, and the transceiver can start communications.

Initiating an Individual Call

An Individual Call can be started by one of the following methods.

● Individual Call Mode

In Individual Call Mode, an Individual Call is initiated by selecting a Unit ID configured in the Individual ID List or directly entering a Unit ID. (Refer to [Individual ID List](#).)

Pressing the **Individual** button, **Individual + Status** button, or **Individual + Short Message** button places the transceiver in Individual Call Mode.

The transceiver also enters Individual Call Mode by selecting “Individual”, “Individual + Status”, or “Individual + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

If “Individual”, “Individual + Status”, or “Individual + Short Message” is configured in **Keypad Operation**, pressing the **[0]** button to **[9]** button on the keypad also places the transceiver in Individual Call Mode. The transceiver enters Unit ID Shortcut Entry Mode or will be on hold as the first digit of the Unit ID is entered. (Refer to Common Function Part [Keypad Operation](#).)

● Selcall on PTT

The transceiver initiates an Individual Call when the **PTT** switch is pressed on a channel where “Individual Call” is configured in Selcall on PTT. The Unit ID of the target transceiver can be configured by selecting one Unit ID from the Individual ID List by using KPG-D3/ D3N.

● Dialing Mode (DMR Tier III Trunking system, S-Trunking system only)

In Dialing Mode, an Individual Call is initiated by directly entering an Individual ID and pressing the **PTT** switch. By pressing the **Dialing** button, or by pressing the **Menu** button to enter Menu Mode and then selecting “Dialing”, the transceiver enters Dialing Mode.

● Redial Mode (DMR Tier III Trunking system, S-Trunking system only)

In Redial Mode, an Individual Call is initiated by selecting an Individual ID and pressing the **PTT** switch. By pressing the **Redial** button, or by pressing the **Menu** button to enter Menu Mode and then selecting “Redial”, the transceiver enters Redial Mode.

● Talkback

After an Individual Call is received, pressing the **PTT** switch while the Unit ID Name or Unit ID of the transmitting transceiver is displayed enables the transceiver to respond (Talkback) to the transmitting transceiver of the Individual Call.

● Call button

Pressing one of the **Call 1** to the **Call 6** buttons sends a message requesting an Individual Call to the system for the Unit ID allocated to the button pressed.

For mobile, if any of ports from “Call 1” through “Call 6” assigned as AUX Input ports becomes active, a message requesting Individual Call will be sent to the system for the Unit ID corresponding to the activated port.

● Stack Mode

Selecting the receive history in Stack Mode and pressing the **PTT** switch initiates an Individual Call. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

● Response to incoming calls

When the transceiver receives an Individual Call, the transceiver can respond to the transmitting transceiver by pressing the **PTT** switch while “Incoming” appears on the main display, or upon the receipt of a PC command from the communication port.

For Mobile, when **Off-hook Connect** is enabled, the transceiver can respond to the transmitting transceiver even by placing the microphone in the off-hook state.

● PC command

The transceiver starts an Individual Call upon the receipt of a PC command from the communication port. To use a PC command, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common Function Part [Available Functions for COM Port](#).)

Operating the transceiver

1 Start an Individual Call by one of the above methods.

A message requesting an Individual Call is sent to a system.

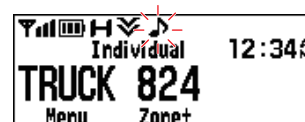


If the receiving transceiver is within the communications range, “Holding” appears on the display waiting for a response from the receiving transceiver.



2 Receive from the system a message for traffic channel assignment.

The “” icon blinks, and the transceiver enters a state allowing transmission of an Individual Call.



3 Press the **PTT** switch.

The Individual Call is initiated.

Even after the **PTT** switch is released to end the transmission, the link between the transceiver and the traffic channel is maintained.

Transceiver behavior during transmitting

The following displays appear depending on the response message from the system after initiating various calls in a DMR-based Trunking system:

Table 3-22 Transceiver Behavior During Transmitting

Status	Transceiver behavior
If no traffic channel is available in the system and if the transceiver receives a response message indicating the queue state from the system:	For Individual Call, Group Call, Broadcast Group Call, and Telephone Call: The Call Queue Tone (2 beeps) sounds from the transceiver, and “Queued” appears on the display. After that, the transceiver will enter the standby state. For Status Call, Short Data Call (46 bytes or less), and GPS data transmission: The Call Fail Tone (2 beeps) sounds from the transceiver, and “Fail” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends. For Short Data Call (47 bytes or more) and Long Data Call: The transceiver enters the standby state while “Send Data” remains displayed.
If the transceiver receives a response message from the system indicating a busy state of the receiving transceiver:	The Busy Tone 2 (3 beeps) sounds from the transceiver, and “Busy” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a response message from the system, indicating that no traffic channel is available:	The System Busy Tone (3 beeps) sounds from the transceiver and “System Busy” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a response message from the system indicating no response from the receiving transceiver:	The No Reply Tone (4 beeps) sounds from the transceiver, and “No Reply” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a message from the system notifying that the receiving transceiver rejected response:	The Call Deny Tone (3 beeps) sounds from the transceiver, and “Call Deny” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a message from the system, such as a service invalid message:	The Call Invalid Tone (4 beeps) sounds from the transceiver, and “Invalid” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver does not receive any message from the system:	The Call Fail Tone (2 beeps) sounds from the transceiver, and “Fail” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends. Note If a random access and Unsolicited Radio Check from the system are performed at the same time, the transceiver stops the random access because the transceiver prioritizes a response behavior to Unsolicited Radio Check. Even if the transceiver stops the random access, the transceiver performs the behavior of “If the transceiver does not receive any message from the system”.

Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If **Optional Signaling LED** is enabled, the LED flashes yellow. (Refer to [Optional Signaling LED](#).)
- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call requesting an Individual Call is initiated. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment after the call requesting an Individual Call is initiated. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for transmissions with Individual Call.
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- Press the **Clear** button to terminate the Individual Call. While the transceiver is on standby to receive a response from the receiving transceiver, canceling the call is possible by pressing the **Clear** button.
- If **Disconnect Indication Tone** is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver when an Individual Call is completed.
- For Mobile, if **On-hook Disconnect** is enabled, an Individual Call terminates by placing the microphone in the on-hook state.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port ( See Radio Configuration > Global Options > External Device > AUX)
- Configuring **Selcall on PTT** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Personalities > Individually > General > Selcall on PTT)
- Configuring the Unit IDs corresponding to the **Call 1 to Call 6** buttons or ports ( See Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call)

Receiving an Individual Call

The transceiver can receive an Individual Call if the received Unit ID matches the Unit ID (Own) preconfigured for the transceiver.

To receive an Individual Call, the transceiver must receive from the system a message requesting reception of an Individual Call, and send a response message to the system. The transceivers can initiate the communication after receiving the message for traffic channel assignment from the system.

Operating the transceiver

The transceiver's behavior varies depending on the configuration for **FOACSU**.

● If FOACSU is enabled

1 Receive from the system a message requesting reception of an Individual Call.

The “” icon blinks, and the ID Name of the transmitting transceiver and “Incoming” appear.



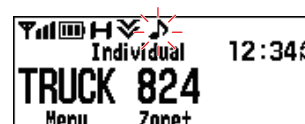
2 Press the **PTT** switch or the **Call Response** button.

The “” icon blinks and a response message is sent to the system.



3 Receive from the system a message for traffic channel assignment.

The transceiver enters a state allowing communication. By pressing the **PTT** switch, the transmitting transceiver can be called.



Note

- If a response to the received Individual Call is not sent and the status below is initiated, “Missed Call” appears on the display.
 - When a certain period of time (T_AnswerCall) elapses without the transceiver responding to an incoming call
 - When the transceiver receives a cancellation message from the system
- When an Individual Call is received from an opponent having the **ID Mode** configured as “Receive Only” with the Individual ID List, pressing the **PTT** switch causes the transceiver to generate Warning Tone A (continuous beep) and does not allow response. Even in this case, pressing the **Call Response** button still allows the transceiver to respond to the received Individual Call.
- For Mobile, if **Off-hook Connect** is enabled, the received Individual Call can be answered by placing the microphone in the off-hook state.
- If the **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when the transceiver starts sending a response message. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)/ Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\).](#))
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for transmissions with Individual Call.
- Reception can be canceled by pressing the **Clear** button while the transceiver is in the state in Step 1.
- Pressing the **Clear** button allows terminating the Individual Call. For Mobile, if **On-hook Disconnect** is enabled, an Individual Call terminates by placing the microphone in the on-hook state.
- If **Disconnect Indication Tone** is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver when an Individual Call is completed.
- The transceiver automatically sends a response message for the following cases:
 - If **On-hook Disconnect** is enabled and the microphone is on-hook for Mobile
 - If **Suppress Emergency Call** is enabled and the transceiver receives an Individual Call of Emergency
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [About the transceiver behavior when receiving an Individual Call.](#))
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [About the transceiver behavior when receiving an Individual Call.](#))

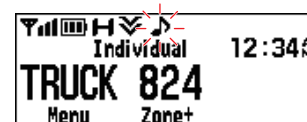
● If FOACSU is disabled

1 Receive from the system a message requesting reception of an Individual Call.

A response message is automatically sent to the system.

**2** Receive from the system a message for traffic channel assignment.

The “” icon blinks and the transceiver enters a state allowing communication. By pressing the **PTT** switch, the transmitting transceiver can be called.



 Note

- Pressing the **Clear** button allows terminating the Individual Call. For Mobile, if **On-hook Disconnect** is enabled, an Individual Call terminates by placing the microphone in the on-hook state.
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [About the transceiver behavior when receiving an Individual Call.](#))
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [About the transceiver behavior when receiving an Individual Call.](#))

About the transceiver behavior when receiving an Individual Call● **Alert Tone****If FOACSU is enabled:**

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration for **Alert Tone (Individual Call Incoming)** of the corresponding Unit ID.

However, if “Common” is configured in **Alert Tone (Individual Call Incoming)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Alert Tone (Individual Call Incoming)** common to DMR-based Trunking.

If FOACSU is disabled:

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration for **Alert Tone (Individual)** of the corresponding Unit ID.

However, if “Common” is configured in **Alert Tone (Individual)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Alert Tone (Individual Call)** common in DMR-based Trunking.

● **Selective Call Alert LED****If FOACSU is enabled:**

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration for **Alert LED Color (Individual Call Incoming)** of the corresponding Unit ID.

However, if “Common” is configured in **Alert LED Color (Individual Call Incoming)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration in **Alert LED Color (Individual Call Incoming)** common to DMR-based Trunking.

If FOACSU is disabled:

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration for **Alert LED Color (Individual)** of the corresponding Unit ID.

However, if “Common” is configured in **Alert LED Color (Individual)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration in **Alert LED Color (Individual Call)** common in DMR-based Trunking.

● **Optional Signaling LED**

If **Optional Signaling LED** is enabled, the LED flashes yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

Also, if the buttons on the transceiver are pressed while the LED flashes according to the configuration of **Selective Call Alert LED**, and if the matching state of the Optional Signaling continues, the LED flashes yellow.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking)
- Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking)
- Configuring **Alert Tone (Individual)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID/Status List > ID/Status List > DMR Individual ID > DMR Individual ID List)
- Configuring **Alert LED Color (Individual)** (Individual ID List) ( [See](#) Radio Configuration > System Properties > ID/Status List > ID/Status List > DMR Individual ID > DMR Individual ID List)
- Configuring **Alert Tone (Individual Call)/ Alert Tone (Individual Call Incoming)** common to DMR-based Trunking ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking > Individual Call)
- Configuring **Alert LED Color (Individual Call)/ Alert LED Color (Individual Call Incoming)** common to DMR-based Trunking ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking > Individual Call)

Individual ID List

If making Individual Calls, the desired Unit IDs need to be preconfigured in the transceiver using KPG-D3/ D3N prior to use of the transceiver. A maximum of 1,500 Unit IDs can be configured for Individual ID List.

If **Fleet Dialing Plan** is enabled in a DMR Tier III Trunking system or S-Trunking system, ID can be configured even divided into the Prefix-Fleet-IN format.

Table 3-23 Individual ID List

Configuration	Description
ID	A Unit ID can be configured in the range between 000001 and FFFCDF (hexadecimal), or between 1 and 16776415 (decimal).
Prefix	A Prefix number can be configured in the range between 328 and 806.  Note To configure a Prefix number, Fleet Dialing Plan needs to be enabled in a DMR Tier III Trunking system or S-Trunking system.
Fleet	A Fleet number can be configured in the range between 20 and 89.  Note To configure a Fleet number, Fleet Dialing Plan needs to be enabled in a DMR Tier III Trunking system or S-Trunking system.
IN	If the Fleet is between 20 and 41, an Individual number can be configured in the range between 200 and 899. If the Fleet is between 42 and 89, an Individual number can be configured in the range between 200 and 549.  Note To configure an Individual number, Fleet Dialing Plan needs to be enabled in a DMR Tier III Trunking system or S-Trunking system.
ID Name	The caller's ID Name is configured. A maximum of 14 characters can be configured for the ID Name. If the ID Name of the transmitting transceiver is configured in the Individual ID List, the ID Name of the transmitting transceiver appears when the transceiver receives a call. If the transceiver receives the Unit ID Name by the Over-the-Air Alias function when the transceiver receives a call, the received Unit ID Name appears. If the transceiver cannot receive the Unit ID Name, the stored Unit ID Name appears if the Unit ID Name is stored for the Unit ID stored in the transceiver. If the Unit ID Name is not stored in the transceiver, the Unit ID Name configured in the Individual ID List appears if the Unit ID Name for the received Unit ID is configured in the Individual ID List. The Unit ID number appears if the above conditions are not satisfied.
Type	The permission or inhibition of transmission of the receiving party can be configured. An ID for which "RX Only" is configured for Type does not appear on the ID selection display in Individual Call Mode, and a user cannot select the ID in Individual Call Mode. If the transceiver receives a call from an ID for which "RX Only" is configured in Type, the caller's ID Name appears. In this case, a user cannot initiate a call to the party even if the user attempts to respond by pressing the PTT switch.
Alert Tone	Individual: The type of tone sounding from the transceiver can be configured for an Individual Call from the Unit IDs configured in the Individual ID List. Individual Call Incoming: An Alert Tone of when the transceiver receives an Individual Call (FOACSU behavior) can be configured for each Unit ID.

Configuration	Description
Alert LED Color	Individual: The color of flashing LED can be configured for an Individual Call from the Unit IDs configured in the Individual ID List. Individual Call Incoming: The Alert LED Color of when the transceiver receives an Individual Call (FOACSU behavior) can be configured for each Unit ID.  Note To use Alert LED Color, Selective Call Alert LED needs to be enabled.

Configuration using KPG-D3/ D3N

Configuring the **Individual ID List** ( **See** Radio Configuration > System Properties > ID/Status List > ID/Status List > DMR Individual ID > DMR Individual ID List)

Restricting IDs for Which the Transceiver Can Initiate a Call (Encodable Unit ID Range)

Encodable Unit ID Range is the Unit ID range used to initiate a call.

A Unit ID with which a user is allowed to initiate a call can be restricted using KPG-D3/ D3N. A user can initiate a call to a Unit ID configured in the Individual ID List even if it is outside the range of **Encodable Unit ID Range**.

The transceiver for which **Encodable Unit ID Range** is not configured can initiate a call to all transceivers.

The transceiver unmutes the speaker and emits received audio when the transceiver receives the Unit ID satisfying the receiving conditions. In this case, the Unit ID of the transmitting transceiver appears on the receiving transceiver. If the Unit ID of the transmitting transceiver is in the range of the **Encodable Unit ID Range** or has been registered in the Individual ID List, the receiving transceiver can respond to the transmitting transceiver by pressing the **PTT** switch. If the Unit ID of the transmitting transceiver is outside the range of the **Encodable Unit ID Range** and also has not been registered in the Individual ID List, the receiving transceiver cannot respond to the transmitting transceiver.

Configuration using KPG-D3/ D3N

Configuring **Encodable Unit ID Range** ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > TX Options)

Sending the Received Unit ID from the Communication Port (Unit ID Serial Output)

Unit ID Serial Output can be used to send the received Unit ID from the transceiver's communication port.

With the **Unit ID Serial Output** enabled, the dispatcher can monitor and control in real time transceivers that are transmitting. Also, the Unit ID sent from the communication port can also be used for management of the call log.

Note

- The transceiver will send the Unit ID from the communication port only when Color Code and Slot Selection match the Color Code and Slot Selection configured in the transceiver.
- When the transceiver receives a call via Selective Call, Unit ID is sent from the communication port regardless of the configuration in **Unit ID Serial Output**.
- To use **Unit ID Serial Output**, "Data", "Data + GPS Data Output", or "Data + Location Data Output" needs to be assigned to the communication port of the transceiver.
- Even if **Fleet Dialing Plan** is enabled in a DMR Tier III Trunking system or S-Trunking system, a DMR ID in the range between 1 and 16776415 is used for a Unit ID and Group ID in the data to be sent.
- When the transceiver receives a Group Call from a telephone, U16776896 (0xFFFE0) is output if the call is PSTN, and U16776897 (0xFFFE1) is output if the call is PABX.

Configuration using KPG-D3/ D3N

Configuring **Unit ID Serial Output** ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options > Serial Output)

Notifying the User with a Tone That a Call Request Has Been Initiated (Call Request Tone)/ Notifying the User with a Tone That a Call Request Is in Progress (Call Processing Tone)

Call Request Tone is the function to sound a Call Request Tone (1 beep) from the transceiver when a call request for an Individual Call or Group Call is initiated by pressing the **PTT** switch in a DMR-based Trunking system.

Also, **Call Processing Tone** is the function to sound a Call Processing Tone (2 beeps) from the transceiver while the **PTT** switch is pressed and held after a call request for an Individual Call or Group Call is initiated by pressing the **PTT** switch in a DMR-based Trunking system.

Depending on the system condition, it may take few seconds to determine the call request upon the initiation of a call request using Individual Call or Group Call. Use of this function notifies a user by emitting a tone from the transceiver of the condition from when the transceiver initiates a call request using Individual Call or Group Call until the call request is determined.

When the transceiver initiates an Individual Call or Group Call using this function, the transceiver behaves as follows.

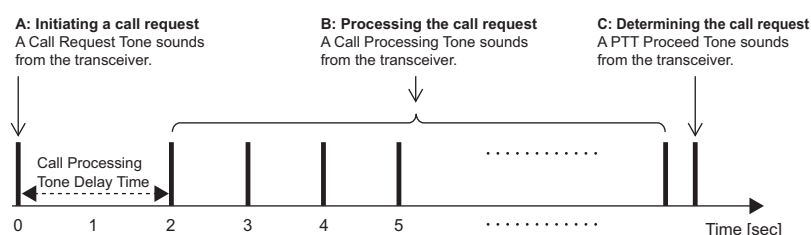


Figure 3-12 Call Request Tone/ Call Processing Tone

- A:** A Call Request Tone (1 beep) sounds from the transceiver when a call request is initiated by pressing the **PTT** switch.
- B:** A Call Processing Tone (2 beeps) sounds from the transceiver while the **PTT** switch is pressed and held after initiating a call request by pressing the **PTT** switch. The length of time from when a call request is initiated by pressing the **PTT** switch until the Call Processing Tone (2 beeps) sounds from the transceiver can be configured in **Call Processing Tone Delay Time**.
- C:** If **PTT Proceed Tone** is enabled, a PTT Proceed Tone (3 beeps) sounds from the transceiver when a call request is determined. The user can initiate the communication after the call request has been established. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)

Configuration using KPG-D3/ D3N

- Configuring **Call Request Tone** to be enabled or disabled (See Radio Configuration > Protocol Options > DMR > Alert Tone/LED > Trunking)
- Configuring **Call Processing Tone** to be enabled or disabled (See Radio Configuration > Protocol Options > DMR > Alert Tone/LED > Trunking)
- Configuring **Call Processing Tone Delay Time** (See Radio Configuration > Protocol Options > DMR > Alert Tone/LED > Trunking)

Preventing the Automatic Assignment of a Traffic Channel (FOACSU)

FOACSU (Full Off Air Call Set-Up) is the function to prevent a traffic channel from being assigned until the receiving transceiver responds by using Individual Call.

If this function is enabled, the transceiver retains an Individual Call until the receiving transceiver responds. A traffic channel is assigned to the transceiver with the response of the receiving transceiver, and the transceiver can start communications.

If this function is disabled, a traffic channel is automatically assigned to the transceiver without the response of the receiving transceiver, and the transceiver can start communications.



- To activate **FOACSU**, the activation of **FOACSU** also needs to be configured in the system.

Behavior of when the transceiver receives an Individual Call of Emergency

If **Suppress Emergency Call** is enabled, **FOACSU** is not activated when the transceiver receives an Individual Call of Emergency even if **FOACSU** is enabled. Using this function, a traffic channel is automatically assigned to the transceiver even without the response of the receiving transceiver, and the transceiver can start communications.

Configuration using KPG-D3/ D3N

- Configuring **FOACSU** to be enabled or disabled (**See** Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > RX Options > FOACSU)
- Configuring **Suppress Emergency Call** to be enabled or disabled (**See** Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > RX Options > FOACSU)

3.8 Making a Group Call

Group Call is the function to establish 2-way group voice communications by initiating a call to a group.

The transceiver can initiate a call to the transceivers having the same Group ID by specifying the Group ID. The transceiver can also initiate a call to all transceivers by specifying the All Group ID (\$FFFFFF) for which "ALL" is configured.

If the transceiver receives the All Group ID (\$FFFFFF (ALLMSID)/ \$FFFFFD (ALLMSIDL)/ \$FFFFFE (ALLMSIDZ)), the transceiver treats the reception as the reception of an All Group Call, and unmutes the speaker. However, if the **PTT** switch is pressed after the reception of an All Group Call, the transceiver does not reply to the transmitting transceiver by an All Group Call.

Initiating a Group Call

Group Call can be started by one of the following methods.

- **Selecting a channel**

When a channel is selected and the **PTT** switch is pressed, the transceiver starts a Group Call using Group ID configured for the channel.

If "Transmit/Receive" is configured in **ID Mode** of the selected channel, the transceiver can call or wait for a call on the channel. If "Receive Only" is configured in **ID Mode**, the transceiver can wait for a call on the channel but not make a call.

- **Selcall on PTT**

The transceiver initiates a Group Call when the **PTT** switch is pressed on a channel where "Group Call" is configured for **Selcall on PTT**. The Group ID of the target transceiver can be configured by selecting one Group ID from the Group ID List by using KPG-D3/ D3N.

- **PC command**

The transceiver starts a Group Call upon the receipt of a PC command from the communication port. To use a PC command, "Data", "Data + GPS Data Output", or "Data + Location Data Output" needs to be assigned to a communication port 0 to 1 or the Bluetooth of the transceiver. (Refer to Common Function Part [Available Functions for COM Port.](#))

- **Dialing Mode (DMR Tier III Trunking system, S-Trunking system only)**

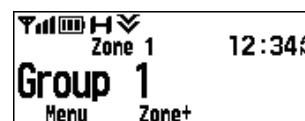
In Dialing Mode, a Group Call is initiated by directly entering a Group ID and pressing the **PTT** switch. By pressing the **Dialing** button, or by pressing the **Menu** button to enter Menu Mode and then selecting "Dialing", the transceiver enters Dialing Mode.

- **Redial Mode (DMR Tier III Trunking system, S-Trunking system only)**

In Redial Mode, a Group Call is initiated by selecting a Group ID and pressing the **PTT** switch. By pressing the **Redial** button, or by pressing the **Menu** button to enter Menu Mode and then selecting "Redial", the transceiver enters Redial Mode.

Operating the transceiver

1 Select a channel configured with a Group ID for making a Group Call.



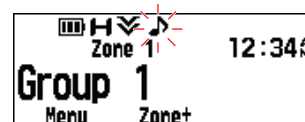
2 Press the **PTT** switch.

A message requesting a Group Call is sent to the system.



3 Receive from the system a message for traffic channel assignment.

The “” icon blinks and the transceiver enters a state allowing communication.



4 Press the **PTT** switch.

The Group Call is initiated.

Even after the **PTT** switch is released to end the transmission, the link between the transceiver and the traffic channel is maintained.

Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If **Optional Signaling LED** is enabled, the LED flashes yellow. (Refer to [Optional Signaling LED](#).)
- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when the **PTT** switch is pressed to initiate a call request. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver while the **PTT** switch is pressed and held after a call request is initiated by pressing the **PTT** switch. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for transmissions with Group Call.
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- The transceiver starts a Group Call only by a user pressing the **PTT** switch if the transceiver transmits on a channel with “Group Call” configured for **Selcall on PTT**. In this case, a Group ID does not need to be selected by using the transceiver.
- For details on the information displayed on the display during transmission, refer to “[Transceiver behavior during transmitting](#)”.
- Pressing the **Clear** button allows terminating the Group Call. For Mobile, if **On-hook Disconnect** is enabled, a Group Call terminates by placing the microphone in the on-hook state.
- If **Disconnect Indication Tone** is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver when a Group Call is completed.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Selcall on PTT** ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Personalities > Individually > General > Selcall on PTT)

Receiving a Group Call

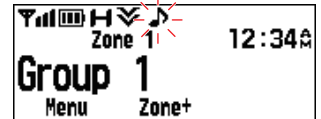
If the received Group ID matches the Group ID configured for the transceiver, the transceiver can receive the Group Call.

Operating the transceiver

1 The transceiver receives a Group Call.

The “” icon blinks and a received Group ID appears.

Any of the received Group ID, the Unit ID of the transmitting transceiver, or both appears according to the configuration in **Group Call Display Type**. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)



2 Press the PTT switch.

The transceiver can respond to the received Group ID. When a button other than the **PTT** switch is pressed, the configured function will be activated.

Note

- If **Busy LED** is enabled, the LED lights green regardless of whether reception is enabled or disabled on a traffic channel. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound from the transceiver according to the configuration in **Alert Tone** that has been configured in the Personality or zone. However, if “Common” is configured in **Alert Tone**, the Alert Tone sounds from the transceiver according to the configuration in **Alert Tone (Conference Group Call)** common in DMR-based Trunking.
- If **Selective Call Alert LED** is enabled, the LED flashes when receiving according to the configuration for **Alert LED Color** that has been configured in the Personality or zone. However, if “Common” is configured in **Alert LED Color**, the LED flashes according to the configuration in **Alert LED Color (Conference Group Call)** common in DMR-based Trunking.
- When the transceiver receives a Group Call from a telephone, if Alert Tone is configured to sound, an Alert Tone will sound from the transceiver according to the configuration in **Alert Tone (Telephone Group Call)**. Also, if **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes according to the configuration in **Alert LED Color (Telephone Group Call)**.
- If **Optional Signaling LED** is enabled, the LED flashes yellow. (Refer to [Optional Signaling LED](#).)
- If **Group ID Scan** is enabled, the transceiver is on standby to receive a Group Call from all Group IDs configured in the Group ID List. (Refer to [Group ID Scan](#).)
- The transceiver can record the receipt of a Group Call. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)
- The transceiver can send the ID of the transmitting transceiver from the communication port on the transceiver when receiving a Group Call.
- When the transceiver receives a Group Call from a telephone, the Encryption function is disabled, and the transceiver communicates without encryption on a traffic channel.
- If the transceiver receives a Group Call from a telephone, the PTT Hold Inhibit function functions with the function always enabled regardless of the FPU settings.
- If the transceiver receives a Group Call from a telephone, **Auto Reset Timer** functions as “0 sec” regardless of the FPU settings.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking)
- Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking)
- Configuring **Alert Tone/ Alert LED Color** (Individually) ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Personalities > Individually > General)
- Configuring **Alert Tone (Conference Group Call)/ Alert Tone (Telephone Group Call)** common to DMR-based Trunking ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/LED > Trunking)
- Configuring **Alert LED Color (Conference Group Call)/ Alert LED Color (Telephone Group Call)** common to DMR-based Trunking ( [See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/LED > Trunking)

Group ID List

In a DMR-based Trunking system, the Group ID List is used only in Group ID Scan. (Refer to [Group ID Scan](#).)

If **Fleet Dialing Plan** is enabled in a DMR Tier III Trunking system or S-Trunking system, ID can be configured even divided into the Prefix-Fleet-GN format. A maximum of 1,500 Group IDs can be configured in the Group ID List.

Table 3-24 Group ID List

Configuration	Description
ID	A Group ID can be configured in the range between 000001 and FFFCDF (hexadecimal), between 1 and 16776415 (decimal), or “ALL”. “ALL” allows initiation of a call to all groups.  Note • For All Group ID (ALL), the ID for sending and receiving is fixed to 0xFFFFFFFF.
Prefix	A Prefix number can be configured in the range between 328 and 806.  Note • To configure a Prefix number, Fleet Dialing Plan needs to be enabled in a DMR Tier III Trunking system or S-Trunking system.
Fleet	A Fleet number can be configured in the range between 20 and 89.  Note • To configure a Fleet number, Fleet Dialing Plan needs to be enabled in a DMR Tier III Trunking system or S-Trunking system.
GN	A Group number can be configured in the range between 900 and 999.  Note • To configure a Group number, Fleet Dialing Plan needs to be enabled in a DMR Tier III Trunking system or S-Trunking system.
ID Name	The caller's ID Name is configured. A maximum of 14 characters can be configured for the ID Name. If the ID Name of the group is configured in the Group ID List, the ID Name appears when the transceiver receives a call. If the ID Name is not configured in the Group ID List, the Group ID List number appears.

Configuration	Description
Type	The permission or inhibition of transmission of the receiving party can be configured. If the transceiver receives a call from an ID for which “RX Only” is configured in Type , the caller’s ID Name appears. In this case, a user cannot initiate a call to the party even if the user attempts to respond by pressing the PTT switch.
Alert Tone	The tone type sounding from the transceiver can be configured for a Group Call from the Group IDs registered in the Group ID List.
Alert LED Color	The color of flashing LED can be configured for a Group Call from the Group IDs registered in the Group ID List.  Note To use Alert LED Color, Selective Call Alert LED needs to be enabled.

Configuration using KPG-D3/ D3N

Configuring **Group ID List** ( **See** Radio Configuration > System Properties > ID/ Status List > ID/ Status List > DMR Group ID > DMR Group ID List)

Display When the Transceiver Receives a Group Call (Group Call Display Type)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Group Call Display Type is the function to display the received information on the display when the transceiver receives a Group Call.

Table 3-25 Group Call Display Type

Configuration	Description
Group ID	The Group ID of the received Group Call appears. If the ID Name is not configured in the Group ID List, the Group ID List number appears.
Calling Transceiver ID	The Unit ID of the transmitting transceiver appears. If the ID Name is stored in the Unit ID stored in the stack memory of the transceiver, the stored ID Name appears. If the ID Name is not stored in the Unit ID stored in the stack memory of the transceiver, and if the ID Name of the received Unit ID is configured in the Unit ID List, the ID Name in the Unit ID List appears. The Unit ID List number appears if the above conditions are not satisfied. If the transceiver receives the Unit ID Name, the received Unit ID Name appears after 500 ms elapses upon the appearance of the Unit ID.
Calling Transceiver ID/ Group ID	The Group ID of the received Group Call and the Unit ID of the transmitting transceiver appear for 2 sec alternately.

Note

- If the transceiver receives Status Message or Short Message in Group Call, the Unit ID of the transmitting transceiver and the received message appear regardless of the configuration in **Group Call Display Type**.

Configuration using KPG-D3/ D3N

Configuring **Group Call Display Type** ( **See** Radio Configuration > Protocol Options > DMR > General > RX Options)

Group ID Scan

Group ID Scan is the function to standby to receive multiple Group Calls in a DMR-based Trunking system.

If this function is enabled, the transceiver is on standby to receive a Group Call from a Group ID configured for the channel and all Group IDs configured in the Group ID List.

If this function is disabled, the transceiver is on standby to receive only a Group Call from a Group ID configured for the channel.

Group ID Scan cannot be used at the same time as Single Scan.



- **Group ID Scan** can also be used for communication of data such as Status Message, Short Message, and GPS data.

Configuration using KPG-D3/ D3N

Configuring **Group ID Scan** to be enabled or disabled (Individually) (See Radio Configuration > System Properties > Systems > DMR-based Trunking > Personalities > Individually > General)

Preventing the Functions Working with Group Call Reception from Activating (Call Alert Inhibit (Group Calls Only))

Call Alert Inhibit (Group Calls only) is the function that disables the Alert Tone, Selective Call Alert LED, Horn Alert, Vibrator, and Caller ID Stack functions when the transceiver receives a Group Call.

Use of this function prevents specific functions from activating as follows even if these functions are enabled or configured to be enabled when the transceiver receives a Group Call.

- **Alert Tone**

Alert Tones do not sound from the transceiver even if the transceiver receives a Group Call.

- Alert Tone (Zone Information)
- Conference Group Call (Alert Tone) (Trunking)
- Broadcast Group Call (Alert Tone) (Trunking)

- **Selective Call Alert LED**

A Selective Call Alert LED does not blink even if the transceiver receives a Group Call.

- **Horn Alert (Mobile only)**

The headlight of the vehicle connected to Horn Alert does not light up and the horn is not sounded even when a Group Call is received.

- **Vibrator (Portable only)**

The Vibrator does not function even if the transceiver receives a Group Call.

- **Caller ID Stack**

The Caller ID will not be stored in the transceiver stack memory even if the transceiver receives a Group Call.



- This function can be used even with the Broadcast Group Call.

Configuration using KPG-D3/ D3N

Configuring **Call Alert Inhibit** to be enabled or disabled (See Radio Configuration > Protocol Options > DMR > General > RX Options)

Preventing Reception of a Group Call While the Transceiver Is Receiving an Individual Call (Ignore Group Call during Individual Call)

Ignore Group Call during Individual Call is the function that prevents receipt of a Group Call if receiving an Individual Call.

This function is used to prioritize the receipt of Individual Calls.

If this function is enabled, the transceiver cannot receive a Group Call (including data communications) while receiving an Individual Call and the **Auto Reset Timer** is counting down.

Note

- Even if this function is enabled, the following Group Calls can be received.
 - A Group Call using All Group ID
 - A Group Call for Emergency
 - This function can be used even with the Broadcast Group Call.

Configuration using KPG-D3/ D3N

Configuring **Ignore Group Call during Individual Call** to be enabled or disabled ( See Radio Configuration > Protocol Options > DMR > General > RX Options)

PTT Hold Inhibit

PTT Hold Inhibit can be used to prevent the transmission behavior if transmission is disabled on a traffic channel when the transceiver starts transmitting using Group Call in a DMR-based Trunking system.

While a transceiver transmits a Group Call, another transceiver receiving this Group Call cannot transmit a Group Call. If this function is enabled, the transceiver can notify the user that transmission is disabled even if the **PTT** switch is pressed to transmit when the transceiver is receiving a Group Call while another transceiver is transmitting using Group Call.

Using this function prevent the transceivers maintaining transmission from initiating transmission simultaneously when transmission becomes possible; therefore, the collision of calls can be avoided.

Table 3-26 PTT Hold Inhibit

Configuration	Description
Enabled	If transmission is inhibited on a traffic channel when the transceiver initiates a transmission using Group Call in a DMR-based Trunking system, the transmission behavior is not maintained and the transmission ends immediately. While pressing the PTT switch, the Warning Tone A (continuous beep) sounds from the transceiver and transmission cannot be initiated.
Disabled	If transmission is inhibited on a traffic channel when the transceiver initiates a transmission using Group Call in a DMR-based Trunking system, the transmission behavior is maintained until transmission is available. While pressing the PTT switch, the transmission behavior is maintained. Pressing and holding the PTT switch, transmission will initiate if transmission becomes possible.

Note

- The transmission behavior is maintained regardless of the PTT Hold Inhibit configuration while the transceiver is in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **PTT Hold Inhibit** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > TX Options)

Initiating Another Call While Receiving a Group Call

The following operations are available while the transceiver is receiving a Group Call on the traffic channel:

- **Transmission of Individual Call from Individual Call Mode**

Selecting an Individual ID from the Individual ID List and pressing the **PTT** switch after entering Individual Call Mode initiates an Individual Call. (Refer to [Initiating an Individual Call](#).)

- **Status Message transmission from Status Mode**

Selecting a status from the Status List and pressing the **Menu** () button, **[*]** button, or **PTT** switch after entering Status Mode sends a Status Message. (Refer to [Sending and Receiving a Status Message \(Status Call\)](#).)

- **Short Message transmission from Short Message Mode**

A Short Message is entered after entering Short Message Mode. Pressing the **PTT** switch or the **Menu** () button sends a Short Message. (Refer to [Sending and Receiving a Short Message \(Short Data Call\)](#).)

- **Telephone Call transmission from Autodial Mode**

Pressing the **PTT** switch or the **Menu** () button after entering Autodial Mode and then selecting a telephone number from the Autodial List sends a Telephone Call. (Refer to [Initiating a Telephone Call](#).)

- **Remote Control message transmission from Remote Control Mode**

The message to be sent is selected from the options menu after entering Remote Control Mode. Pressing the **Menu** () button, **[*]** button, or **PTT** switch sends the Remote Control message. (Refer to [Remote Operation by Radio Communication \(Remote Control\)](#).)

- **Individual Call transmission from Stack Mode**

Selecting the receive history in Stack Mode and pressing the **PTT** switch initiates an Individual Call. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

- **GPS data transmission**

GPS data can be sent manually by a user pressing the **Send the GPS Data** button. Also, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the GPS data can also be sent by selecting “Send GPS Data”. (Refer to [Sending GPS Data](#), Common Function Part [Using Menu Mode](#).)

- **Call transmission by using a Call button**

Pressing one of the **Call 1** to **Call 6** buttons sends the request message preconfigured in the transceiver for the following Call to the system. (Refer to [Initiating an Individual Call](#), [Sending and Receiving a Status Message \(Status Call\)](#), and [Initiating a Telephone Call](#).)

- Individual Call
- Status Data Call
- Telephone Call

- **Transmission from Dialing Mode**

The transceiver can make various calls by entering a dialing code in Dialing Mode. By pressing the **Dialing** button, or by pressing the **Menu** button to enter Menu Mode and then selecting “Dialing”, the transceiver enters Dialing Mode. (Refer to [Executing Various Communications by Using the Dialing Function](#).)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

3.9 Making an Informative Group Call (Broadcast Group Call)

Broadcast Group Call can be used to engage in one-way informative group voice calls by initiating a call to a group.

The transceiver can initiate a call to the transceivers having the same Group ID by specifying the Group ID. The transceiver can also initiate a call to all transceivers by specifying the Group ID for which "ALL" is configured.

Initiating a Broadcast Call

Broadcast Group Call can be started by one of the following methods:

- **Broadcast button**

Broadcast Call information is added to a Group Call and sent by the transceiver initiating a Group Call while Broadcast Group Call is enabled.

Pressing the **Broadcast** button toggles the Broadcast Group Call between enabled and disabled.

If the **Menu** button is pressed to enter Menu Mode and then "Broadcast" is selected, Broadcast Group Call can also be toggled between enabled and disabled. (Refer to Common Function Part [Using Menu Mode.](#))

- **PC command**

The transceiver starts a Broadcast Group Call upon the receipt of a PC command from the communication port. To use a PC command, "Data", "Data + GPS Data Output", or "Data + Location Data Output" needs to be assigned to the communication port of the transceiver. (Refer to Common Function Part [Available Functions for COM Port.](#))

- **Dialing Mode (DMR Tier III Trunking system, S-Trunking system only)**

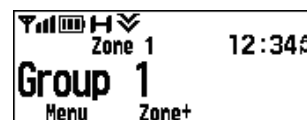
In Dialing Mode, a Broadcast Group Call is initiated by directly entering a Broadcast code and pressing the **PTT** switch. By pressing the **Dialing** button, or by pressing the **Menu** button to enter Menu Mode and then selecting "Dialing", the transceiver enters Dialing Mode.

- **Redial Mode (DMR Tier III Trunking system, S-Trunking system only)**

In Redial Mode, a Broadcast Group Call is initiated by entering a Broadcast code and pressing the **PTT** switch. By pressing the **Redial** button, or by pressing the **Menu** button to enter Menu Mode and then selecting "Redial", the transceiver enters Redial Mode.

Operating the transceiver

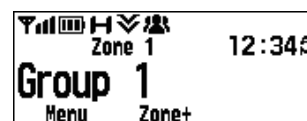
1 Select a channel configured with a Group ID for making a Broadcast Group Call.



2 Press the **Broadcast** button.

Broadcast Group Call is enabled after a Button Beep A (1 beep) sounds from the transceiver and the "👤" icon appears.

The following operations are identical even if Broadcast Group Call is enabled by pressing the **Menu** button.



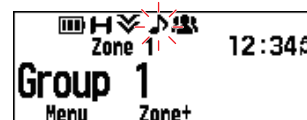
3 Press the **PTT** switch.

A message requesting a Broadcast Group Call is sent to a system.



4 Receive from the system a message for traffic channel assignment.

The “” icon blinks and the transceiver enters a state allowing communication.



5 Press the **PTT** switch.

The Broadcast Group Call is initiated.

Even after the **PTT** switch is released to end the transmission, the link between the transceiver and the traffic channel is maintained.

Pressing the **Broadcast** button after the transmission causes Broadcast Group Call to be disabled.

Note

- If **Optional Signaling LED** is enabled, the LED flashes yellow. (Refer to [Optional Signaling LED](#).)
- The transceiver cannot transmit the Broadcast Group Call by specifying the All Group ID.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Receiving a Broadcast Group Call

If the received Group ID matches the Group ID configured for the transceiver, the transceiver can receive the Broadcast Group Call.

Note

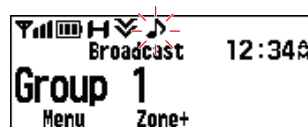
- The transceiver can receive the Broadcast Group Call initiated using the Group ID for which “ALL” is configured even if no Group ID is configured for the transceiver.

Operating the transceiver

Press the **Broadcast** button.

The “” icon blinks, and then “Broadcast” and a received Group ID appear.

Any of the received Group ID, the Unit ID of the transmitting transceiver, or both appears according to the configuration in Group Call Display Type. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)



Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when the transceiver is receiving, an Alert Tone will sound from the transceiver according to the configuration in **Alert Tone (Broadcast Group Call)**.
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving according to the configuration in **Alert LED Color (Broadcast Group Call)**.
- If **Optional Signaling LED** is enabled, the LED flashes yellow. (Refer to [Optional Signaling LED](#).)
- A user cannot reply to the received Group ID. Pressing the **PTT** switch causes “Receive Only” to appear on the transceiver display.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > General > Alert Tone/ LED)
- Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DMR > General > Alert Tone/ LED)
- Configuring **Alert Tone (Broadcast Group Call)** ( [See](#) Radio Configuration > Protocol Options > DMR > General > Alert Tone/ LED > Trunking > Broadcast Group Call)
- Configuring **Alert LED Color (Broadcast Group Call)** ( [See](#) Radio Configuration > Protocol Options > DMR > General > Alert Tone/ LED > Trunking > Broadcast Group Call)

3.10 Common Functions for Data Communications

The following functions are used in common for data communications such as Status Call and Short Data Call:

- Number of Retries
- Maximum ACK Wait Time

Number of Retries

If the transceiver does not receive the acknowledgment after the transceiver sends data and the time configured for **Maximum ACK Wait Time** elapses, the transceiver resends data. **Number of Retries** is the number of times for the transceiver to resend data. A smaller number can be configured if there is good communicating conditions, and a larger number can be configured if there are inferior communicating conditions.

Configuration using KPG-D3/ D3N

Configuring **Number of Retries** ( See) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Data Communications)

Maximum ACK Wait Time

Maximum ACK Wait Time is the length of time that the transceiver stands by to receive the acknowledgment after the transceiver sends data. If the transceiver does not receive the acknowledgment within the time configured for **Maximum ACK Wait Time**, the transceiver resends data.

Note

- A Long Data Message transmits data divided over multiple times. The receiving transceiver stands by to receive the next data for the time configured for **Maximum ACK Wait Time** after receiving the previous data. The transceiver exits Long Data Message Receive Mode if the transceiver does not receive any data during the period.

Configuration using KPG-D3/ D3N

Configuring **Maximum ACK Wait Time** ( See) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Data Communications)

3.11 Sending and Receiving a Status Message (Status Call)

Refer to “[Sending and Receiving a Status Message \(Status Call\)](#)” in 2 DMR CONVENTIONAL SYSTEM.

3.12 Sending and Receiving a Short Message (Short Data Call)

Refer to “[Sending and Receiving a Short Message \(Short Data Call\)](#)” in 2 DMR CONVENTIONAL SYSTEM.

3.13 Sending and Receiving a Long Message (Long Data Call)

Refer to “[Sending and Receiving a Long Message \(Long Data Call\)](#)” in 2 DMR CONVENTIONAL SYSTEM.

3.14 Communicating with a Telephone (Telephone Call)

Telephone Call is the function to initiate voice communications using a telephone by connecting to a telephone line such as PSTN and PABX.

A call can be initiated from the transceiver to a telephone, and from a telephone to the transceiver.

Initiating a Telephone Call

A Telephone Call can be initiated by one of the following methods:

● Autodial Mode

In Autodial Mode, a Telephone Call is initiated by selecting a DTMF code configured in the Autodial List, or directly entering a DTMF code and pressing the **PTT** switch.

To make a Telephone Call from Autodial Mode, "01" needs to be added to the beginning of the DTMF code for a PSTN telephone line, and "02" needs to be added to the beginning of the DTMF code for a PABX telephone line.

Pressing the **Autodial** button places the transceiver in Autodial Mode.

The transceiver can also be placed in Autodial Mode by executing "Autodial" after placing the transceiver in Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode.](#))

Or, if "Autodial" is configured in **Keypad Operation**, pressing a button on the keypad causes the transceiver to enter Autodial Mode. The transceiver will be on hold as the first digit of the DTMF code is entered. A Telephone Call is initiated by entering a DTMF code and pressing the **PTT** switch.

● Call button

A Telephone Call can be initiated by pressing one of the **Call 1** to **Call 6** buttons. A DTMF code of the target transceiver can be configured for the **Call 1** to **Call 6** buttons by selecting one DTMF code from the Autodial List by using KPG-D3/ D3N.

● Selcall on PTT

The transceiver initiates a Telephone Call when the **PTT** switch is pressed on a channel where "Telephone Call" is configured in **Selcall on PTT**. A DTMF code of the target transceiver can be configured by selecting one DTMF code from the Autodial List by using KPG-D3/ D3N.

● Dialing Mode (DMR Tier III Trunking system, S-Trunking system only)

In Dialing Mode, a PABX Call or PSTN Call is initiated by directly entering the code of the PABX Call or PSTN Call and pressing the **PTT** switch. By pressing the **Dialing** button, or by pressing the **Menu** button to enter Menu Mode and then selecting "Dialing", the transceiver enters Dialing Mode.

● Redial Mode (DMR Tier III Trunking system, S-Trunking system only)

In Redial Mode, a PABX Call or PSTN Call is initiated by selecting the code of the PABX Call or PSTN Call and pressing the **PTT** switch. By pressing the **Redial** button, or by pressing the **Menu** button to enter Menu Mode and then selecting "Redial", the transceiver enters Redial Mode.

● Response to incoming calls

When the transceiver receives a Telephone Call, the transceiver can respond to the transmitting telephone by pressing the **PTT** switch, or the **Call Response** button while "PABX" or "PSTN" appears on the main display.

For Mobile, when **Off-hook Connect** is enabled, the transceiver can respond to the transmitting telephone by placing the microphone in the off-hook state.

The following describes how to initiate a Telephone Call in Autodial Mode if **Store and Send** is disabled.



Note

- When the transceiver receives a Telephone Call, the Encryption function is disabled, and the transceiver communicates without encryption on a traffic channel.
- If the transceiver receives a Telephone Call, **Auto Reset Timer** functions as "0 sec" regardless of the FPU settings.

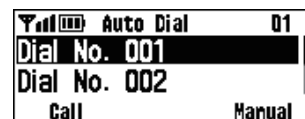
Operating the transceiver

● Initiating a Telephone Call by selecting a DTMF code from the Autodial List

1 Press the **Autodial** button.

The transceiver enters Autodial Mode and then the Autodial List selection display appears.

The following operations are identical when the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.

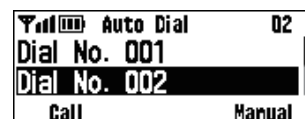


Note

- If **Store and Send** is enabled, the DTMF code entry display will appear. Pressing the **Back** ([↵]) button causes the transceiver to switch to the selection screen for the Autodial List.

2 Press the [▲] or [▼] button to select the DTMF code to be sent from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **PTT** switch or the **Menu** ([□]) button.

The transceiver initiates the Telephone Call.

“Telephone” and “Calling” appear.



4 Receive from the system a message for traffic channel assignment.

The “🔊” icon blinks, and then “PABX” or “PSTN” appears and the audio of the traffic channel sounds.



5 Press the **PTT** switch.

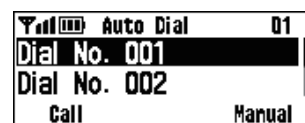
A user can start conversations.

● Initiating a Telephone Call by directly entering a DTMF code

1 Press the **Autodial** button.

The transceiver enters Autodial Mode and then the Autodial List selection display appears.

The following operations are identical when the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.

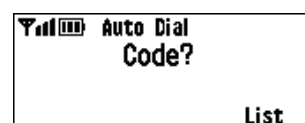


Note

- If **Store & Send** is enabled, the DTMF code entry display will appear.

2 Press the **Back** () button or **[#]** button.

The DTMF code entry display appears.



3 Enters a DTMF code.

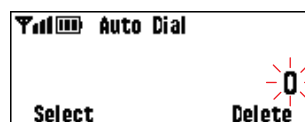
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

● Using the keypad

Press a button on the keypad to enter a DTMF code.

● Using the PF buttons

Enter a DTMF code by pressing the **[▲]** button or **[▼]** button and confirm the entered DTMF code by pressing the **Menu** () button.



Note

- To enter the DTMF “A” code, press and hold the **[*]** button and then press the **[2]** button.
- To enter the DTMF “B” code, press and hold the **[*]** button and then press the **[5]** button.
- To enter the DTMF “C” code, press and hold the **[*]** button and then press the **[8]** button.
- To enter the DTMF “D” code, press and hold the **[*]** button and then press the **[0]** button.
- To enter the DTMF “*” code, press the **[*]** button and then press the **[*]** button.
- To enter the DTMF “#” code, press the **[*]** button and then press the **[#]** button.
- If “Direct Entry” is configured in *** and # Buttons**, pressing the **[*]** button or **[#]** button directly enters the “*” or “#” tone. In this case, the above operations are unavailable.

4 Press the **PTT** switch or the **Menu** ([]) button.

The transceiver initiates the Telephone Call.
“Telephone” and “Calling” appear.



5 Receive from the system a message for traffic channel assignment.

The “” icon blinks, and then “PABX” or “PSTN” appears and the audio of the traffic channel sounds.



6 Press the **PTT** switch.

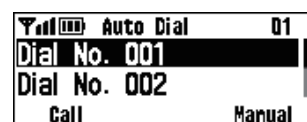
A user can start conversations.

● Redialing

1 Press the **Autodial** button.

The transceiver enters Autodial Mode and then the Autodial List selection display appears.

The following operations are identical when the transceiver enters **Autodial Mode** by a user pressing the **Menu** button or using the keypad.

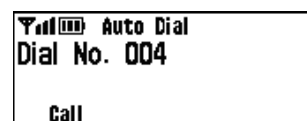


Note

- If **Store and Send** is enabled, the DTMF code entry display will appear.
Pressing the **Back** ([]) button causes the transceiver to switch to the selection screen for the Autodial List.

2 Press the [] button and then press the [] button.

The name or DTMF code of the target transceiver of the last transmission appears.



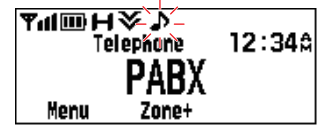
3 Press the **PTT** switch or the **Menu** ([]) button.

The transceiver initiates the Telephone Call.
“Telephone” and “Calling” appear.



4 Receive from the system a message for traffic channel assignment.

The “🔊” icon blinks, and then “PABX” or “PSTN” appears and the audio of the traffic channel sounds.



5 Press the **PTT** switch.

A user can start conversations.

Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Optional Signaling LED](#).)
- If **Optional Signaling LED** is enabled, the LED flashes yellow. (Refer to [Optional Signaling LED](#).)
- If **Call Request Tone** is enabled, a **Call Request Tone** sounds from the transceiver when the **PTT** switch is pressed to initiate a call request. Also, if Call Processing Tone is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment after the call requesting a Telephone Call is initiated. (Refer to [Notifying the User with a Tone That a Call Request Has Been Initiated \(Call Request Tone\)](#)/ [Notifying the User with a Tone That a Call Request Is in Progress \(Call Processing Tone\)](#).)
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for communications.
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)
- Pressing the **Clear** button allows terminating the Telephone Call. For Mobile, if the **Mic On-hook Disconnect** is enabled, a Telephone Call terminates by placing the microphone in the on-hook state.
- If **Disconnect Indication Tone** is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver when the communication ends.
- For details on the information displayed on the display during transmission, refer to “[Transceiver behavior during transmitting](#)”.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Selcall on PTT** ([See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Personalities > Individually > General > Selcall on PTT)
- Configuring the DTMF codes corresponding to the **Call 1** to **Call 6** buttons or ports ([See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call)

Receiving a Telephone Call

The transceiver can receive a Telephone Call from a telephone.

Operating the transceiver

1 Receive a Telephone Call.

The “📞” icon blinks, and then “Telephone” and “PABX” or “PSTN” appear.



2 Press the **PTT** switch or the **Call Response** button.

The transceiver responds to the transmitting telephone.



- For Mobile, when **Off-hook Connect** is enabled, the transceiver can respond to the transmitting telephone by placing the microphone in the off-hook state.



3 Receive from the system a message for traffic channel assignment.

Audio sounds on the traffic channel.



4 Press the **PTT** switch.

A user can start conversations.



- An Alert Tone sounds from the transceiver according to the configuration in **Alert Tone (Telephone Individual Call)** when the transceiver receives a Telephone Call by Individual Call.
- If **Telephone Call Alert LED** is enabled, the LED flashes according to the configuration in **Alert LED Color (Telephone Individual Call)**.
- If **Optional Signaling LED** is enabled, the LED flashes yellow. (Refer to [Optional Signaling LED](#).)

Configuration using KPG-D3/ D3N

- Configuring **Alert Tone (Telephone Individual Call)** ([See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking > Telephone Individual Call)
- Configuring **Telephone Call Alert LED** to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/LED)
- Configuring **Alert LED Color (Telephone Individual Call)** ([See](#) Radio Configuration > Protocol Options > DMR > Alert Tone/ LED > Trunking > Telephone Individual Call)

3.15 Executing Various Communications by Using the Dialing Function

Dialing is the function to execute various communications by using a dialing code corresponding to the standard.

If the Dialing function is used, the Dialing standards described in ETSI TS 102 361-4 Annex E are followed. Also, in this case, for Unit IDs and Group IDs, the ID system converted according to this standard is used.

Configurations for Using the Dialing Function

To use the Dialing function, the following configurations need to be configured:

- **Fleet Dialing Plan**

Whether to use the Dialing function by the transceiver is configured.

- **Various configurations for Dialing Codes**

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

A communication for which the operation is allowed in Dialing Mode is configured.

Fleet Dialing Plan

Whether to use the Dialing function by the transceiver can be configured.

The transceiver behavior varies as follows depending on the configuration in **Fleet Dialing Plan** of a DMR Tier III Trunking system and S-Trunking system:

Table 3-27 Fleet Dialing Plan

Fleet Dialing Plan	Description
Enabled	The Dialing function can be used by the transceiver. For a Unit ID and Group ID, the format converted from a DMR ID 1 to 16776415 and divided into Number Prefix (NP), Fleet Individual Number (FIN), and Individual Number (IN)/ Group Number (GN) is used.
Disabled	The Dialing function cannot be used by the transceiver. For a Unit ID and Group ID, a DMR ID 1 to 16776415 is used.

Various configurations for Dialing Codes

A communication for which the transmission is allowed in Dialing Mode is configured. In Dialing Mode, the various types of communications can be initiated. With this configuration, the transmission can be restricted by the types of communications. With the following configurations, the transmission will be permitted or will not be permitted by the types of communications in Dialing Mode.

Table 3-28 Various configurations for Dialing Codes

Configuration	Description
PABX Call	Configures whether to permit the transmission of a PABX Call in Dialing Mode.
PSTN Call	Configures whether to permit the transmission of a PSTN Call in Dialing Mode.
All Call	Configures whether to permit the transmission of an All Call in Dialing Mode.
Priority Call	Configures whether to permit the transmission of a Priority Call in Dialing Mode.
Emergency Call	Configures whether to permit the transmission of an Emergency Call in Dialing Mode.
Broadcast Call	Configures whether to permit the transmission of a Broadcast Call in Dialing Mode.
Status Call	Configures whether to permit the transmission of a Status Call in Dialing Mode.
Short Data Call	Configures whether to permit the transmission of a Short Data Call in Dialing Mode.
Interfleet Individual Call	Configures whether to permit the transmission of an Individual Call to a Prefix other than the own Number Prefix (NP) in Dialing Mode. To permit an Interprefix Individual Call, an Interfleet Individual Call needs to be permitted.
Interfleet Group Call	Configures whether to permit the transmission of a Group Call to a Fleet other than the own Fleet Group Number (FGN) in Dialing Mode.
Interprefix Individual Call	Configures whether to permit the transmission of an Individual Call to a Prefix other than the own Number Prefix (NP) in Dialing Mode. To permit an Interprefix Individual Call, an Interfleet Individual Call needs to be permitted.
Interprefix Group Call	Configures whether to permit the transmission of a Group Call to a Prefix other than the own Number Prefix (NP) in Dialing Mode. To permit an Interprefix Group Call, an Interfleet Group Call needs to be permitted.
Range of Individual Numbers	Configures in the own Fleet Individual Number (FIN) the upper limit of the target Individual Number (IN) for which the transmission of an Individual Call is permitted in Dialing Mode.
Range of Group Numbers	Configures in the own Fleet Group Number (FGN) the upper limit of the target Group Number (GN) for which the transmission of a Group Call is permitted in Dialing Mode.

Note

- The configuration for Dialing Codes does not influence the receiving behavior of the transceiver.

Available Dialing Codes

The following are the dialing codes available in Dialing Mode and the configuration conditions required for communications:

Table 3-29 Available Dialing Codes List

Communication Type	Priority	Dialing Code	Dialing Code Configuration Conditions
Individual Call Destination n = 3 digits (IN)	Normal	nnn	Within the range in Range of Individual Numbers
	High Priority	*8*nnn	- Within the range in Range of Individual Numbers - Permitting a Priority Call
	Emergency	*9*nnn	- Within the range in Range of Individual Numbers - Permitting an Emergency Call
Interfleet Individual Call Destination n = 5 digits (FIN+IN)	Normal	nnnnn	Permitting an Interfleet Individual Call
	High Priority	*8*nnnnn	- Permitting an Interfleet Individual Call - Permitting a Priority Call
	Emergency	*9*nnnnn	- Permitting an Interfleet Individual Call - Permitting an Emergency Call
Interprefix Individual Call Destination n = 8 digits (NP+FIN+IN)	Normal	nnnnnnnn	- Permitting an Interfleet Individual Call - Permitting an Interprefix Individual Call
	High Priority	*8*nnnnnnnn	- Permitting an Interfleet Individual Call - Permitting an Interprefix Individual Call - Permitting a Priority Call
	Emergency	*9*nnnnnnnn	- Permitting an Interfleet Individual Call - Permitting an Interprefix Individual Call - Permitting an Emergency Call
Group Call Destination n = 3 digits (GN)	Normal	nnn	Within the range in Range of Group Numbers
	High Priority	*8*nnn	- Within the range in Range of Group Numbers - Permitting a Priority Call
	Emergency	*9*nnn	- Within the range in Range of Group Numbers - Permitting an Emergency Call
Interfleet Group Call Destination n = 5 digits (FGN+GN)	Normal	nnnnn	Permitting an Interfleet Group Call
	High Priority	*8*nnnnn	- Permitting an Interfleet Group Call - Permitting a Priority Call
	Emergency	*9*nnnnn	- Permitting an Interfleet Group Call - Permitting an Emergency Call
Interprefix Group Call Destination n = 8 digits (NP+FGN+GN)	Normal	nnnnnnnn	- Permitting an Interfleet Group Call - Permitting an Interprefix Group Call
	High Priority	*8*nnnnnnnn	- Permitting an Interfleet Group Call - Permitting an Interprefix Group Call - Permitting a Priority Call
	Emergency	*9*nnnnnnnn	- Permitting an Interfleet Group Call - Permitting an Interprefix Group Call - Permitting an Emergency Call

3.15 Executing Various Communications by Using the Dialing Function

Communication Type	Priority	Dialing Code	Dialing Code Configuration Conditions
Broadcast Group Call Destination n = 3 digits (GN)	Normal	*11*nnn	• Within the range in Range of Group Numbers • Permitting a Broadcast Call
	High Priority	*11*8*nnn *8*11*nnn	• Within the range in Range of Group Numbers • Permitting a Broadcast Call • Permitting a Priority Call
	Emergency	*11*9*nnn *9*11*nnn	• Within the range in Range of Group Numbers • Permitting a Broadcast Call • Permitting an Emergency Call
Interfleet Broadcast Group Call Destination n = 5 digits (FGN+GN)	Normal	*11*nnnnnn	• Permitting an Interfleet Group Call • Permitting a Broadcast Call
	High Priority	*11*8*nnnnnn *8*11*nnnnnn	• Permitting an Interfleet Group Call • Permitting a Broadcast Call • Permitting a Priority Call
	Emergency	*11*9*nnnnnn *9*11*nnnnnn	• Permitting an Interfleet Group Call • Permitting a Broadcast Call • Permitting an Emergency Call
Interprefix Broadcast Group Call Destination n = 8 digits (NP+FGN+GN)	Normal	*11*nnnnnnnn	• Permitting an Interfleet Group Call • Permitting an Interprefix Group Call • Permitting a Broadcast Call
	High Priority	*11*8*nnnnnnnn *8*11*nnnnnnnn	• Permitting an Interprefix Group Call • Permitting an Interfleet Group Call • Permitting a Broadcast Call • Permitting a Priority Call
	Emergency	*11*9*nnnnnnnn *9*11*nnnnnnnn	• Permitting an Interfleet Group Call • Permitting an Interprefix Group Call • Permitting a Broadcast Call • Permitting an Emergency Call
All Group Call	Normal	*1987	• Permitting an All Call
	High Priority	*1981	• Permitting an All Call • Permitting a Priority Call
	Emergency	*1982	• Permitting an All Call • Permitting an Emergency Call
PSTN Call Destination n = 1 digit to 32 digits	Normal	01n...	• Permitting a PSTN Call
	High Priority	*8*01n...	• Permitting a PSTN Call • Permitting a Priority Call
	Emergency	*9*01n...	• Permitting a PSTN Call • Permitting an Emergency Call
PABX Call Destination n = 1 digit to 32 digits	Normal	02n...	• Permitting a PABX Call
	High Priority	*8*02n...	• Permitting a PABX Call • Permitting a Priority Call
	Emergency	*9*02n...	• Permitting a PABX Call • Permitting an Emergency Call

3.15 Executing Various Communications by Using the Dialing Function

Communication Type	Priority	Dialing Code	Dialing Code Configuration Conditions
Individual Status Call Destination n = 3 digits (IN) Status number s = 00 to 99	-	*0ss*nnn	- Within the range in Range of Individual Numbers - Permitting a Status Call
Interfleet Individual Status Call Destination n = 5 digits (FIN+IN) Status number s = 00 to 99	-	*0ss*nnnnn	- Permitting an Interfleet Individual Call - Permitting a Status Call
Interprefix Individual Status Call Destination n = 8 digits (NP+FIN+IN) Status number s = 00 to 99	-	*0ss*nnnnnnnn	- Permitting an Interfleet Individual Call - Permitting an Interprefix Individual Call - Permitting a Status Call
Group Status Call Destination n = 3 digits (GN) Status number s = 00 to 99	-	*0ss*nnn	- Within the range in Range of Group Numbers - Permitting a Status Call
Interfleet Group Status Call Destination n = 5 digits (FGN+GN) Status number s = 00 to 99	-	*0ss*nnnnn	- Permitting an Interfleet Group Call - Permitting a Status Call
Interprefix Group Status Call Destination n = 8 digits (NP+FGN+GN) Status number s = 00 to 99	-	*0ss*nnnnnnnn	- Permitting an Interfleet Group Call - Permitting an Interprefix Group Call - Permitting a Status Call
Individual Short Data Call Destination n = 3 digits (IN) Short Message d = 1 digit to 489 digits	-	*2*nnn*ddd...	- Within the range in Range of Individual Numbers - Permitting a Short Data Call
Interfleet Individual Short Data Call Destination n = 5 digits (FIN+IN) Short Message d = 1 digit to 489 digits	-	*2*nnnnn*ddd...	- Permitting an Interfleet Individual Call - Permitting a Short Data Call
Interprefix Individual Short Data Call Destination n = 8 digits (NP+FIN+IN) Short Message d = 1 digit to 489 digits	-	*2*nnnnnnnn*ddd...	- Permitting an Interfleet Individual Call - Permitting an Interprefix Individual Call - Permitting a Short Data Call
Group Short Data Call Destination n = 3 digits (GN) Short Message d = 1 digit to 365 digits	-	*2*nnn*ddd...	- Within the range in Range of Group Numbers - Permitting a Short Data Call
Interfleet Group Short Data Call Destination n = 5 digits (FGN+GN) Short Message d = 1 digit to 365 digits	-	*2*nnnnn*ddd...	- Permitting an Interfleet Group Call - Permitting a Short Data Call
Interprefix Group Short Data Call Destination n = 8 digits (NP+FGN+GN) Short Message d = 1 digit to 365 digits	-	*2*nnnnnnnn*ddd...	- Permitting an Interfleet Group Call - Permitting an Interprefix Group Call - Permitting a Short Data Call

 Note

- A communication whose priority is High Priority will be a Priority Call. A Priority Call is controlled by the system, and a traffic channel can be assigned preferentially. However, the receiving transceiver is not notified that the call is a Priority Call.
- A communication whose priority is Emergency will be an Emergency Call. The receiving transceiver is notified that the call is an Emergency Call, and the transceiver notifies a user that the call is an Emergency Call according to the configuration of the transceiver. Also, an Emergency Call is controlled by the system, and a traffic channel can be assigned preferentially.

Initiating a Communication in Dialing Mode

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

The various communications can be initiated by entering a dialing code in Dialing Mode.

One of the following methods can place the transceiver in Dialing Mode:

● Dialing button

Pressing the **Dialing** button places the transceiver in Dialing Mode.

● Menu button

Pressing the **Menu** button places the transceiver in Menu Mode, and then the transceiver enters Dialing Mode by selecting “Dialing”.

● Keypad Operation

If “Dialing” is configured in **Keypad Operation**, pressing the [0] button to [9] button, [*] button, or [#] button on the transceiver keypad causes the transceiver to enter Dialing Mode. The transceiver will be on hold as the first digit of the dialing code is entered.

Operating the transceiver

1 Press the **Dialing** button.

The transceiver enters Dialing Mode.

The following operations are identical even if the transceiver enters Dialing Mode by pressing the **Menu** button or with keypad entry.



2 Enter a dialing code.

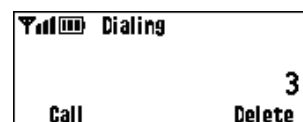
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

● Using the keypad

A dialing code can be entered by pressing the [0] button to [9] button.

● Using the PF buttons

Enter a dialing code by pressing the [▲] button or [▼] button and confirm the entered dialing code by pressing the **Menu** ([□]) button or [*] button.



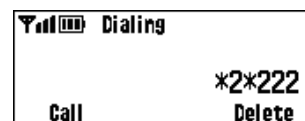
- If “Direct Entry” is configured in *** and # Buttons (DMR Dialing)**, pressing the [*] button or [#] button directly enters “*” or “#”.

3 Press the **PTT** switch, **Menu** ([□]) button, or [#] button.

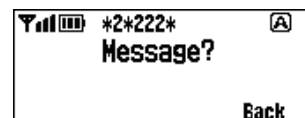
The various communications can be initiated according to the entered dialing code.

● If sending a Short Message:

- 1 In Dialing Mode, enter the destination (*2*destination*) after the dialing code which specifies a Short Data Call.

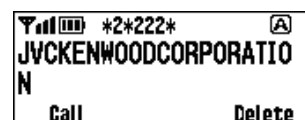


The Short Message entry screen appears.



- 2 Enter a Short Message.

For a Group call, a maximum of 365 characters can be entered, and for an Individual Call, a maximum of 489 characters can be entered. Refer to Common Function Part “[Entering or Deleting Characters](#)” for entry method.

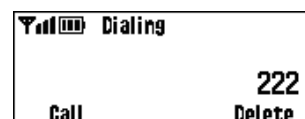


- 3 Press the **PTT** switch, **Menu** ([) button, or **[#]** button.

The transceiver sends the Short Data Call to the entered destination.

● If sending an Individual Call:

- 1 In Dialing Mode, enter a 3-digit Individual Number.



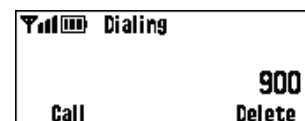
- 2 Press the **PTT** switch, **Menu** ([) button, or **[#]** button.

The Individual Call is initiated.



- If sending a Group Call:

- 1 In Dialing Mode, enter a 3-digit Group Number.



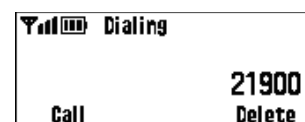
- 2 Press the **PTT** switch, **Menu** ([**□**]) button, or [**#**] button.

The transceiver initiates a Group Call.



- If sending an Interfleet Group Call:

- 1 In Dialing Mode, enter a 2-digit Fleet and a 3-digit Group Number.



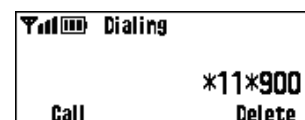
- 2 Press the **PTT** switch, **Menu** ([**□**]) button, or [**#**] button.

The transceiver sends the Group Call to the entered destination.



- If sending a Broadcast Group Call:

- 1 Enter the destination Group Number after the Control Code which specifies Broadcast.



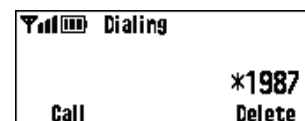
- 2 Press the **PTT** switch, **Menu** ([**□**]) button, or [**#**] button.

The transceiver sends the Interfleet Group Call to the entered destination.



● If sending an All Call:

- 1 Enter the Control Code which specifies an All Call.



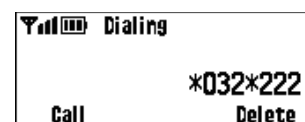
- 2 Press the **PTT** switch, **Menu** ([**□**]) button, or [**#**] button.

The transceiver sends the All Call.



● If sending a Status Call:

- 1 Enter the destination after the Control Code which specifies a Status Call.



- 2 Press the **PTT** switch, **Menu** ([**□**]) button, or [**#**] button.

The transceiver sends the Status Call to the entered destination.



Note

- If an invalid dialing code is entered, and then the **PTT** switch, **Menu** ([**□**]), or [**#**] button is pressed, an Invalid Dialing Entry Tone (1 beep) sounds from the transceiver, "Invalid Entry" appears on the display, and the dialing code entry screen is restored.

Initiating a Communication in Redial Mode

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

A dialing code entered in the past can be sent again by selecting the code from the dialing history list.

In Redial Mode, a code can be sent by selecting the code from the dialing history list with the latest 3 records.

One of the following methods can place the transceiver in Redial Mode:

● Redial button

Pressing the **Redial** button places the transceiver in Redial Mode.

● Menu button

Pressing the **Menu** button places the transceiver in Menu Mode, and then the transceiver enters Redial Mode by selecting “Redial”.

Note

- Only the available dialing codes can be retained in the dialing history list.
- The dialing history list is retained only while the transceiver is turned on, and the list will be deleted when the transceiver is turned off.
- Broadcast Mode is reset if the transceiver enters Redial Mode.

Operating the transceiver

1 Press the **Redial** button.

The transceiver enters Redial Mode and then the dialing code selection display appears.

The following operations are identical even if the transceiver enters Redial Mode by pressing the **Menu** button.



2 Press the **[▲]** or **[▼]** button and select the dialing code.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **PTT** switch, **Menu** (**[□]**) button, or **[#]** button.

The transmission is started by using the selected dialing code.

Note

- The display during the transmission varies depending on the type of communication.



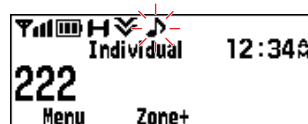
ID Display upon Receipt

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

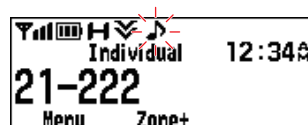
If the transceiver receives a call from the ID registered in the ID List, the ID name or list number appears.

If the transceiver receives a call from the ID which is not registered in the ID List, the ID appears on the display as follows:

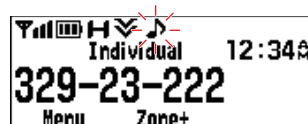
- Only an Individual Number is displayed if the received Prefix and Fleet are identical to the own Prefix and Fleet.



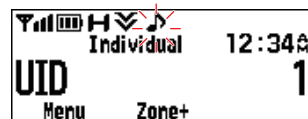
- A Fleet and an Individual Number are displayed if the received Prefix is identical to the own Prefix and the received Fleet is not identical to the own Fleet.



- A Prefix, Fleet, and Individual Number are displayed if the received Prefix and Fleet are not identical to the own Prefix and Fleet.



- A DMR ID 1 to 16776415 is displayed if the received ID is an ID which cannot be converted to the ID system of Dialing.



Note

- The above are the displays when an Individual Call is received; however, the following IDs displays are identical even when the IDs are displayed for the calls:
 - Sender ID display when a Status Call is received
 - Sender ID display when a Short Data Call is received
 - Sender ID display for Caller ID Stack
 - Sender ID display for Status Message Stack
 - Sender ID display for Short Message Stack
 - Sender ID display for Playback Mode

3.16 Locking the Site to Be Used (Site Lock)

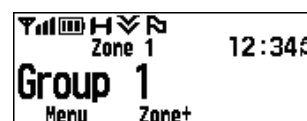
Site Lock can be used to lock the site to be used as the current site and prevent the transceiver from roaming to other sites by a user operating transceiver buttons when the transceiver is used around the border of the site coverage area. If this function is enabled, the transceiver is locked on the current site and cannot roam.

By pressing the **Site Lock** button, or by pressing the **Menu** button to enter Menu Mode and then selecting “Site Lock”, Site Lock can be enabled and disabled.

Operating the transceiver

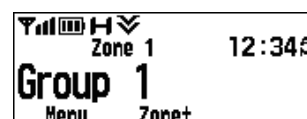
1 Press the **Site Lock** button while Site Lock is disabled.

The “” icon appears, and the site number of the current site and the site name appear on the display for 2 sec. In 2 sec, Site Lock is enabled.



2 Press the **Site Lock** button while Site Lock is enabled.

The “” icon disappears and then Site Lock will be disabled.



Note

- Transceiver operation is identical even if “Site Lock” is selected after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode.](#))
- If the Site Lock is enabled, Background Hunt does not function.
- The Site Lock does not become disabled even if the transceiver cannot receive signals from a control channel while the Site Lock is enabled.
- The Site Lock can be enabled for the current site only if the transceiver has acquired a control channel.
- If the Site Lock is enabled, Vote Now does not function.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

3.17 Matching a Channel of the Transceiver to a Channel of the System (Control Channel Switching)

Control Channel Switching is the behavior to change the control channel acquired by the transceiver according to the control channel of the system in accordance with the change of the control channel of the system.

By varying the control channels in the site (without locking them to a specific repeater), the operation of the transmission line of the repeater can be reduced. In addition, by distributing the operating load of the repeater as a system, it has the advantage of reducing the frequency of system maintenance and increasing the reliability of the system.

When the transceiver is in the idle state on the control channel, the transceiver receives the information (C_MOVE) sent from the system and confirms the information in C_MOVE. If the transceiver determines that the control channel on the system has switched from the C_MOVE information, the transceiver performs a new control channel acquisition process. For a Trunking 2.5 system, if the transceiver on the traffic channel is notified from the system that the control channel has switched, the transceiver performs a new control channel acquisition process after the call ends.

Also, for a Trunking 2.5 system, because the control channel is changed within the site, Registration of when a new control channel is acquired is not executed.

3.18 Restricting the Communication Time on a Traffic Channel (Traffic Timer)

Traffic Timer is the function to restrict the time for the transceiver to communicate by the occupation of a traffic channel. In a DMR-based Trunking system, **Traffic Time** corresponding to each type of communication (normal voice communication, voice communication by Emergency Call, voice communication by a telephone connected to PSTN/ PABX, data communication) is available. If the time configured in **Traffic Time** elapses, the transceiver terminates a call and reverts to the control channel.

Table 3-30 Traffic Timer

Traffic Timer	Description
Traffic Time (Non-emergency)	The maximum length of time for the transceiver to communicate by the occupation of a traffic channel during normal voice communication can be configured.
Traffic Time (Emergency)	The maximum length of time for the transceiver to communicate by the occupation of a traffic channel during voice communication by Emergency Call can be configured.
Traffic Time (Line)	The maximum length of time for the transceiver to communicate by the occupation of a traffic channel during voice communication by a telephone connected to PSTN/ PABX can be configured.
Traffic Time (Packet)	The maximum length of time for the transceiver to communicate by the occupation of a traffic channel during data communication can be configured.

Note

- The system may notify the transceiver of the four types of **Traffic Time** by using the Broadcast message. If the transceiver receives the notification from the system, the transceiver behaves according to the time specified by the system. However, even if the transceiver receives the notification from the system, if the specified value is "0", the transceiver behaves according to the time in **Traffic Time** configured using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

- Configuring **Traffic Time (Non-emergency)** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Traffic Timers > Traffic Time)
- Configuring **Traffic Time (Emergency)** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Traffic Timers > Traffic Time)
- Configuring **Traffic Time (Line)** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Traffic Timers > Traffic Time)
- Configuring **Traffic Time (Packet)** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Traffic Timers > Traffic Time)

3.19 Communicating on a Zone-channel in DMR Conventional while Outside the Communication Area (Alternate Zone-Channel)

Alternate Zone-Channel is the function to automatically migrate to a Zone-channel in DMR Conventional to communicate when the DMR Tier III Trunking system is detected to be outside the communication area for a certain period of time.

The transceiver periodically searches for a control channel in a DMR Tier III Trunking system after migrating to a Zone-channel in DMR Conventional. If a control channel is found, the transceiver restores the previous Zone-channel in the DMR Tier III Trunking system.

When a DMR Tier III Trunking system becomes unavailable for any reason, the transceiver can communicate on an alternative Zone-channel.

This function is only supported in a DMR Tier III Trunking system. For a Trunking 2.5 system and S-Trunking system, because **Alternate Zone-Channel** cannot be used, the transceiver becomes unable to communicate if the transceiver is outside of the communication area.

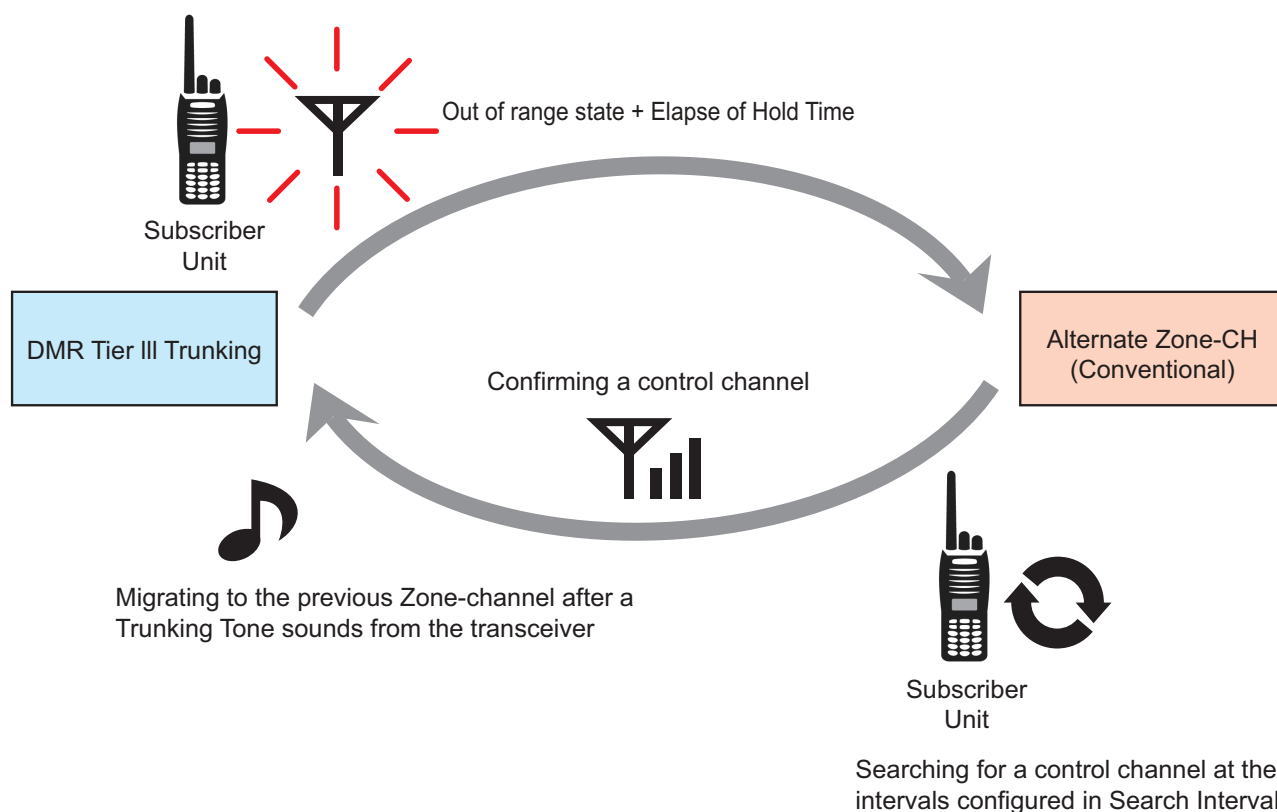


Figure 3-13 Image of the Channel Migration in a DMR Tier III Trunking System

Transceiver behavior

If the transceiver becomes outside the communication area in a DMR Tier III Trunking system, and the time configured in **Hold Time** elapses, the transceiver automatically migrates to the Zone-channel configured in **Alternate Zone-Channel**. In this case, "Failsoft" appears on the display.



In the Zone-channel (Alternate Zone-Channel) where the transceiver migrates to, a control channel in a DMR Tier III Trunking system is searched at the intervals configured in **Search Interval**.



If a control channel is found, a Trunking Tone (2 beeps) sounds from the transceiver, and the transceiver restores the previous Zone-channel in the DMR Tier III Trunking system.

 Note

- **Hold Time** and **Search Interval Time** are extended by the following operations:
 - Button operation
 - **PTT** switch operation
 - AUX Input
 - PC Command
- Even if **Alternate Zone-Channel** is configured in a DMR Tier III Trunking system, the transceiver does not migrate to an Alternate Zone-Channel under the following conditions:
 - While the transceiver is in Emergency Mode
 - While Public Address functions
 - While the transceiver is in Lone Worker Mode
 - While the transceiver is in Function Mode
 - When the transceiver temporarily migrates from a Zone-channel by the **Direct Channel**, **Home Channel**, or **Channel Select** function
- On an Alternate Zone-Channel, the transceiver does not search for a control channel in a DMR Tier III Trunking system under the following conditions:
 - While the transceiver is transmitting
 - While receiving (Audio Unmute)
 - During data communications
 - While the transceiver is in Emergency Mode
 - While Public Address functions
 - While the transceiver is in Lone Worker Mode
 - While the transceiver is in Function Mode
- If the condition that a control channel in a DMR Tier III Trunking system cannot be searched is satisfied when **Search Interval Time** elapses, **Search Interval Time** restarts.
- If a Zone-channel is changed by user operation while the transceiver is on an Alternate Zone-Channel, the state where the transceiver is on an Alternate Zone-Channel is cleared.
- If the transceiver is turned off and then turned on again on an Alternate Zone-Channel, the transceiver restores the previous Zone-channel in a DMR Tier III Trunking system.
- If Emergency is executed while the transceiver is on an Alternate Zone-Channel, the transceiver behaves according to the configuration of Emergency for the Alternate Zone-Channel. Also, the state where the transceiver is on an Alternate Zone-Channel is cleared.

Configuration using KPG-D3/ D3N

- Configuring **Alternate Zone-Channel** ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Hunt Options > Out of Range > Alternate Zone-Channel)
- Configuring **Hold Time** ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Hunt Options > Out of Range)
- Configuring **Search Interval Time** ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Hunt Options > Out of Range)

3.20 Prioritizing Own Voice Communications by Terminating Other Voice Communications (Call Interruption)

Call Interruption is the function to prioritize own communications even when the traffic channel is being used for other communications.

A Call Interruption request is executed to the system if the **Call Interruption** is operated while the transceiver is receiving audio on a traffic channel. When a Call Interruption request is accepted in a system, a Call Interruption command is transmitted to the transceiver transmitting audio. The transceiver which receives the Call Interruption request command ends voice transmission.

To request Call Interruption, press the **Call Interruption** button while the transceiver is receiving audio on a traffic channel. If “Interrupt CALL” is configured in **Response while Reception**, a Call Interruption request is executed by pressing the **PTT** switch while the transceiver is receiving audio on a traffic channel.

The following are the 2 types of Call Interruption commands transmitted from a system:

Table 3-31 Call Interruption Commands

Command	Description
Request Command	The transceiver which received a request command stops voice transmission if the configuration in Decode (Call Interruption) is enabled.
Forced Command	The transceiver which received a forced command forcibly stops voice transmission regardless of the configuration in Decode (Call Interruption).

Note

- In a DMR-based Trunking system, unlike in a DMR Conventional system, **Call Interruption** functions even in the following cases:
 - If the received audio is encrypted
 - If **Over-the-Air Alias** is configured
 - If “One-shot” or “Interval” is configured in **Report (GPS Report with Voice)**
- Call Interruption** is restricted by the type of call received on a traffic channel regardless of whether the received audio is encrypted, and regardless of whether the call is an Emergency Call. Basically, Call Interruption cannot be executed for a call for which Talkback cannot be activated.
- Whether a Call Interruption request is accepted in a system is determined by the system specifications.
- If the transceiver receives a Group Call from a telephone, the transceiver does not execute the Call Interruption behavior.
- The display behavior of Call Interruption is not executed because the display specifications of Emergency Mode occur for the transceiver while in Emergency Mode.
- A Call Interruption request message can also be transmitted by receiving a PC command from the communication port. To use a PC command, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to a communication port 0 to 2 or the Bluetooth of the transceiver. (Refer to Common Function Part [Available Functions for COM Port.](#))
- During an All Call, the transceiver does not stop transmission even if a Call Interruption command is received, regardless of the type of Call Interruption command.

Sending a Call Interruption Request Message

To send a Call Interruption request message by operating the **Call Interruption** button, **Encode (Call Interruption)** of the channel used needs to be enabled.

To send a Call Interruption request message by operating the **PTT** switch, **Encode (Call Interruption)** of the channel used is enabled, and “Interrupt Call” needs to be configured in **Response while Reception**.

Operating the transceiver

● Sending by using the Call Interruption button

1 Press the **Call Interruption** button during audio reception on a traffic channel.

A Button Beep A (1 beep) sounds from the transceiver, and “Interrupt” appears on the display. The transceiver migrates to a control channel and sends a Call Interruption request message to the system.

Note

- A Call Interruption request message is sent to the system even when the **Call Interruption** button is pressed during reception of the encrypted audio.
- If the **Clear** button is pressed while “Interrupt” appears by pressing the **Call Interruption** button, the “Interrupt” display is cleared, and the transceiver reverts to the previous receive mode. However, the Call Interruption request accepted by the system cannot be canceled.



2 Sending the Call Interruption request message is completed.

When the Call Interruption request message is accepted by the system and the transceiver receives an ACK from the system, the transceiver migrates to the previous traffic channel.

When the voice transmission by the other transceiver stops and the voice transmission by the own transceiver becomes available, a Transaction Confirmed Tone (2 beeps) sounds from the transceiver, and “Complete” appears on the display for 1 sec. After that, pressing the **PTT** switch transmits the communication.



● Transmission using the PTT switch

1 Press the **PTT** switch during audio reception on a traffic channel.

“Interrupt” appears on the transceiver display. The transceiver migrates to a control channel and sends a Call Interruption request message to the system.



Note

- If “Follow PTT Hold Inhibit” is configured in **Response while Reception**, the Call Interruption behavior does not occur because the transceiver behaves according to the configuration in **PTT Hold Inhibit**.
- A Call Interruption request message is sent to the system even when the **PTT** switch is pressed during reception of the encrypted audio.
- If the **PTT** switch is released while “Interrupt” appears by pressing the **PTT** switch, the “Interrupt” display is cleared, and the transceiver reverts to the previous receive mode.

2 Sending the Call Interruption request message is completed.

When the Call Interruption request message is accepted by the system and the transceiver receives an ACK from the system, the transceiver migrates to the previous traffic channel.

When the voice transmission by the other transceiver stops and the voice transmission by the own transceiver becomes available, “Complete” appears on the display for 1 sec. After that, if the **PTT** switch remains pressed, a Transaction Confirmed Tone (2 beeps) does not sound and the communication transmission starts.



Note

- If the following occurs after the Call Interruption request message is sent to the system, a Call Fail Tone (2 beeps) sounds and “Fail” appears on the display:
 - If a random access for a Call Interruption request message fails
 - If a NACK is received from the system
 - If **Call Interruption Wait Time** expires before the voice transmission becomes available even though an ACK has been received from the system

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver (See Radio Configuration > Global Options > Button Assignment)
- Configuring **Encode (Call Interruption)** to be enabled or disabled (See Radio Configuration > System Properties > Systems > DMR-based Trunking > Personalities > Table > Personality Table > General > Call Interruption)
- Configuring **Response while Reception** (Table) (See Radio Configuration > System Properties > Systems > DMR-based Trunking > Personalities > Table > Personality Table)
- Configuring **Response while Reception** (Individually) (See Radio Configuration > System Properties > Systems > DMR-based Trunking > Personalities > Individually > General)
- Configuring **Call Interruption Wait Time** (See Radio Configuration > Zone/Channel > RX/TX Options > TX Options)

Receiving a Call Interruption Request Command

The transceiver which received a request command ends voice transmission if the configuration in **Decode (Call Interruption)** is enabled.



Transceiver behavior

If **Decode (Call Interruption)** is enabled, the transceiver ends voice transmission and “Interrupted” appears on the display upon receipt of a Call Interruption request command from the system during voice transmission on a traffic channel.

While the **PTT** switch is pressed, a Warning Tone A sounds to prompt a user to release the **PTT** switch.

If **Decode (Call Interruption)** is disabled, the transceiver continues voice communication even if the transceiver receives a Call Interruption request command from the system.

Receiving a Call Interruption Forced Command

The transceiver which received a forced command forcibly ends voice transmission regardless of the configuration in **Decode (Call Interruption)**.



Transceiver behavior

The transceiver ends voice transmission and “Interrupted” appears on the display upon receipt of a Call Interruption forced command from the system during voice transmission on a traffic channel.

While the **PTT** switch is pressed, a Warning Tone A sounds to prompt a user to release the **PTT** switch.

Configuration using KPG-D3/ D3N

Configuring **Decode (Call Interruption)** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > Personalities > Table > Personality Table > General > Call Interruption)

3.21 Notifying the Status of Communications with Other Sites (Network Failure Indicator)

Network Failure Indicator is the function that notifies by the display and the tone the transceiver of the state that the network control function with other sites becomes unavailable due to a failure even if the system is functioning normally as a site.

In a multi-site system, a message indicating the Network Failure status is notified from the system to the transceiver when the system cannot connect to another site, and a message indicating the return from the Network Failure status (normal status) is notified from the system to the transceiver when the system can connect to another site.

When these messages are received, the transceiver behaves as follows:

Transceiver behavior

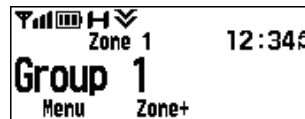
● If the connection to another site becomes unavailable

When a broadcast message indicating the Network Failure status is received, “Network Fail” appears on the display and a Network Failure Tone A sounds at 5-sec intervals.



● If the connection to another site becomes available

When a broadcast message indicating a return from the Network Failure status is received, the “Network Fail” display is reset and a Network Failure Tone B sounds.



Note

- To display “Network Fail” when a broadcast message indicating the Network Failure status is received, the configuration of “Display” in **Network Failure Indicator** needs to be enabled.
- To emit “Network Failure Tone A” and “Network Failure Tone B” when a broadcast message indicating the Network Failure status is received, the configuration of “Tone” in **Network Failure Indicator** needs to be enabled.
- If the system is in a state of Network Failure, the transmit and receive function cannot be used in the roaming site.
- Even after the transceiver receives a broadcast message indicating the Network Failure status, the Background Hunt behavior is performed (for a DMR Tier III Trunking system and S-Trunking system).
- When the transceiver receives a Vote Now notification, and if the Network Failure status is displayed in the information included in the Vote Now notification to indicate whether to be in a Network Failure status, the transceiver does not migrate to the adjacent site and remains on the current site (for a Trunking 2.5 system and DMR Tier III Trunking system).
- Pressing any button stops a Network Failure Tone A.

Configuration using KPG-D3/ D3N

- Configuring **Display** to be enabled or disabled (See Radio Configuration> System Properties> Trunking Network> DMR-based Trunking> Hunt> Hunt Options> Network Failure Indicator)
- Configuring **Tone** to be enabled or disabled (See Radio Configuration> System Properties> Trunking Network> DMR-based Trunking> Hunt> Hunt Options> Network Failure Indicator)

3.22 Sending GPS Data

Global Positioning System (GPS) is the system to acquire the current location information of the own transceiver by receiving signals from the Global Positioning System satellites orbiting the earth.

The transceiver of the mobile station can send the acquired own location information (GPS data) to the base station. The base station can send received GPS data to the PC as serial commands.

A GPS receiver unit compatible with the NMEA-0183 standard is required for the communication port of the mobile station transceiver to send GPS data. The transceiver has a built-in GPS receiver unit. The optional GPS receiver unit also can be connected with the transceiver.

Note

- To use the built-in GPS receiver unit, **Built-in GPS Receiver/Bluetooth** must be enabled when configuring data by using KPG-D3/ D3N. In this case, the configuration for the communication port is not required.
- To use the optional GPS receiver unit, "GPS" must be assigned to the communication port to which the GPS receiver unit is connected. For Portable, a GPS microphone (KMC-47GPS/ KMC-47GPSD) is usable. For Mobile, an optional third-party GPS receiver unit is usable.

Transmission Method of GPS Data

The following are the methods to send GPS data:

- **Automatic GPS data transmission**
 - [Sending GPS Data Automatically at Certain Intervals \(GPS Report Mode\)](#)
 - [Sending GPS Data According to the Request from the Base Station \(GPS Report Mode\)](#)
- **Manual GPS data transmission**
 - [Sending GPS Data Manually by Using a Button \(Send the GPS Data\)](#)
- **GPS data transmission linked with a Status Call**
 - [Sending GPS Data Together With Status Call \(GPS Combination\)](#)
- **GPS data transmission linked with an Emergency Call**
 - [Sending GPS Data Together With Emergency Call \(GPS Combination\)](#)
- **GPS data transmission during voice communications**
 - [Sending GPS Data during Voice Communications \(GPS Report with Voice\)](#)
- **GPS data transmission linked with travel distance**
 - [Sending GPS Data Based On Travel Distance \(GPS Distance Change\)](#)

ID of the Target Transceiver (ID (GPS > Base Station))

ID (GPS > Base Station) is the ID of the target transceiver used for sending GPS data.

By using KPG-D3/ D3N, either Unit ID or Group ID can be configured as **ID (GPS > Base Station)**.

If **Fleet Dialing Plan** is enabled in a DMR Tier III Trunking system or S-Trunking system, **ID (GPS > Base Station)** can be configured even in the Prefix-Fleet-IN/GN format. The ID of the base station which is responsible for operation and administration of system is normally configured.

Table 3-32 ID (GPS > Base Station)

Configuration	Description
ID Type (GPS > Base Station)	The ID type (Group ID or Unit ID) of the target transceiver when the transceiver sends GPS data can be configured.
ID (GPS > Base Station)	The ID of the target transceiver when the transceiver sends GPS data can be configured. ID (GPS > Base Station) can be configured in the range between 1 and 16776415 (decimal).
Prefix-Fleet-IN/GN	The ID of the target transceiver when the transceiver sends GPS data by using Fleet Dialing can be configured. The ID consists of Prefix, Fleet, and IN (Individual Number)/ GN (Group Number). • Prefix A Prefix number can be configured in the range between 328 and 806. • Fleet A Fleet number can be configured in the range between 20 and 89. • IN (Individual Number)/ GN (Group Number) If “Unit ID” is configured in ID Type: If the Fleet is between 20 and 41, an Individual number can be configured in the range between 200 and 899. If the Fleet is between 42 and 89, an Individual number can be configured in the range between 200 and 549. If “Group ID” is configured in ID Type: A Group number can be configured in the range between 900 and 999.

Note

- If **ID (GPS > Base Station)** is not configured, GPS data is sent to the **Base ID** to which data such as a Status Message and Short Message is to be sent. (Refer to [Base ID](#).)

Configuration using KPG-D3/ D3N

Configuring **ID Type (GPS > Base Station)** and **ID (GPS > Base Station)** ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS > Base Station)

Sending GPS Data Automatically at Certain Intervals (GPS Report Mode)

GPS data can be sent automatically at the intervals configured in **GPS Report Interval Time**.

This function is used for controlling or monitoring vehicles on a time basis by periodically sending location information to the base station.

To use this function, "Auto" must be configured for **GPS Report Mode** by using KPG-D3/ D3N.

Note

- In a DMR-based Trunking system, the GPS data transmission by "Auto" of **GPS Report Mode** and the GPS data transmission by the Location Information Protocol (LIP) behave exclusively.

The transceiver executes the GPS data transmission behavior by "Auto" of **GPS Report Mode** when the transceiver is turned on. After that, if the transceiver receives the GPS data transmission request by the Location Information Protocol (LIP), the transceiver stops the GPS data transmission behavior by "Auto". When the GPS data transmission behavior stops, the transceiver restarts the GPS data transmission behavior by "Auto" if the transceiver migrates to a site with a different Site ID or if a channel is changed to a channel of another system.

- The transceiver sends the GPS data upon receipt of the GPS data transmission request from the base station even if "Auto" is configured for **GPS Report Mode**.

If the transceiver is under the following conditions, the automatic transmission of GPS data at certain intervals will be canceled.

- While the transceiver is transmitting
- While the transceiver is in busy state
- While the transceiver unmutes the speaker
- While the **Public Address** function is used (Mobile only)
- When **Transmit Frequency** is not configured
- While transmission is disabled by the **Time-out Timer**
- While the transceiver is sending or receiving the DMR data
- Transceiver Password Mode
- Emergency Mode
- Out of Range
- While the transceiver is waiting for a response by the reception of an Individual Call (FOACSU) (while "Incoming" appears)
- During Passive Scan
- If the **PTT** switch is pressed during the automatic transmission of GPS data, the GPS data transmission stops, and voice transmission starts.
- GPS data is not encrypted during encrypted communication.
- Even if non-positioning data is received from the GPS receiver unit, GPS data is sent.

Configuration using KPG-D3/ D3N

Configuring **GPS Report Mode** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS)

Sending GPS Data According to the Request from the Base Station (GPS Report Mode)

GPS Report Mode allows the transceiver to automatically send GPS data when a GPS data transmission request is received from the base station.

This function is used when the base station controls the timing to require GPS data. This function is also used to avoid a data collision if there are many transceivers.

To use this function, "Poll" must be configured for **GPS Report Mode** by using KPG-D3/ D3N.

The GPS data transmission by "Poll" of **GPS Report Mode** includes the following polling:

● Location Information Protocol (LIP)

The reception of the GPS data transmission request and the GPS data transmission are performed using the Location Information Protocol (LIP) of the Unified Single Block Data Polling Service (USBD).

Communication by the Location Information Protocol (LIP) is performed in one of the slots of the repeater including the control channel.

● NMEA format

When the transceiver receives a transmission request of GPS data, the GPS data is sent using the NMEA format.

Communication in the NMEA format is performed in a slot of the control channel.

Note

- The transceiver sends the GPS data upon receipt of the GPS data transmission request from the base station even if "Auto" is configured for **GPS Report Mode**.
- GPS data is sent to the ID that sent the data transmission request.
- GPS data is not encrypted during encrypted communication.
- Even if non-positioning data is received from the GPS receiver unit, GPS data is sent.

Configuration using KPG-D3/ D3N

Configuring **GPS Report Mode** ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS > Base Station)

Sending GPS Data Manually by Using a Button (Send the GPS Data)

GPS data can be sent manually by a user pressing the **Send the GPS Data** button. Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the GPS data can be sent manually by selecting the "Send GPS Data". (Refer to Common Function Part [Using Menu Mode](#).)

Note

- GPS data is not encrypted during encrypted communication.
- Even if non-positioning data is received from the GPS receiver unit, GPS data is sent.
- If the **PTT** switch is pressed during the transmission of GPS data by **Send the GPS Data**, the GPS data transmission stops, and voice transmission starts.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( **See** Radio Configuration > Global Options > Button Assignment)

Sending GPS Data Together With Status Call (GPS Combination)

The transceiver can send GPS data by adding the GPS data to a Status Message using DMR.

To use this function, **Status** for **GPS Combination** must be enabled by using KPG-D3/ D3N. The range of status numbers (**Combination Status Range**) to which GPS data can be added can be configured.

Note

- The GPS data added to a Status Message is sent to the ID configured for **Base ID (GPS)** or **Base ID**.
- GPS data is not encrypted during encrypted communication.
- Even if non-positioning data is received from the GPS receiver unit, GPS data is sent.
- If the **PTT** switch is pressed during the transmission of GPS data by **GPS Combination**, the GPS data transmission stops, and voice transmission starts.

Configuration using KPG-D3/ D3N

- Configuring **GPS Combination (Status)** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS > GPS Combination)
- Configuring **Combination Status Range** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS > GPS Combination)

Sending GPS Data Together With Emergency Call (GPS Combination)

The transceiver can transmit by adding the GPS data when sending an Emergency Status or audio data.

To use this function, **Emergency Status** for **GPS Combination** must be enabled by using KPG-D3/ D3N.

In Emergency Mode, the GPS data is sent to the ID configured in **Base ID (GPS)** or **Base ID**.

If **Emergency Alarm (DMR)** or **Emergency Status (DMR)** is configured, GPS data is sent after the **Emergency Alarm (DMR)** or **Emergency Status (DMR)** is sent.

GPS data is sent regardless of the configuration in **Emergency Alarm (DMR)** or **Emergency Status (DMR)**.

Note

- Emergency Status of **GPS Combination** functions regardless of the configuration in **Emergency Cycle**.
- GPS data is not encrypted during encrypted communication.
- Even if non-positioning data is received from the GPS receiver unit, GPS data is sent.
- If the **PTT** switch is pressed during the transmission of GPS data by **GPS Combination**, the GPS data transmission stops, and voice transmission starts.

Configuration using KPG-D3/ D3N

Configuring **GPS Combination (Emergency Status)** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS > GPS Combination)

Sending GPS Data during Voice Communications (GPS Report with Voice)

The transceiver can multiplex GPS data on audio data and send the data during voice communications.

When starting audio data transmission or while sending audio data, the transceiver multiplexes GPS data on the audio data and sends the data at regular time intervals.

The behavior for multiplexing GPS data varies as follows depending on the configuration in **Report (GPS Report with Voice)**:

Table 3-33 Behavior for Multiplexing GPS Data

Report	Description
Off	GPS data is not multiplexed during audio data transmission.
One-shot	GPS data is multiplexed at the start of audio data transmission.
Interval	GPS data is multiplexed at the start of or during audio data transmission according to the cycle that is calculated based on the value configured in Interval (GPS Report with Voice) . The cycle for multiplexing GPS data can be calculated using the formula below. GPS data multiplex cycle [sec] = Interval (GPS Report with Voice) configuration value x 3.6 sec

Note

- During audio data transmission, GPS data is sent according to the configuration in **Interval (GPS Report with Voice)**, regardless of **Portable/Ignition On (GPS Report Interval Time)** and **Ignition Off (GPS Report Interval Time)**.
- According to the DMR specifications, GPS data that is transmitted contains only the coordinates and Position Error information (Unknown), and GPS data is transmitted to the same destination as the audio data even if **GPS Base ID**, **Base ID Type** or **Base ID** is configured.
- During serial output of the location information, the Unit ID value inside Map Header KW 1/ KW 2/ KW 3 (\$PKNDS, \$PKNID, \$PKNSH) will be complemented using the Unit ID of the sender of the audio data.
- If data is received while voice communication is in progress, the LCD display, LED and Alert Tone will function according to the configurations during a voice call.
- GPS data is not encrypted during encrypted communication.
- If there exists unsent GPS data at the timing of GPS data transmission when GPS data is not received from the GPS receiver unit or when **Built-in GPS Receiver/Bluetooth** is disabled, the latest GPS data will be transmitted. If there exists only sent GPS data at the timing of GPS data transmission, GPS data will not be transmitted.
- GPS data is not transmitted when GPS data with no positioning information is received from the GPS receiver unit.

Configuration using KPG-D3/ D3N

- Configuring **Report (GPS Report with Voice)** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS > GPS Report with Voice)
- Configuring **Interval (GPS Report with Voice)** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS > GPS Report with Voice)

Sending GPS Data Based On Travel Distance (GPS Distance Change)

GPS Distance Change allows the transceiver to send GPS data when the distance between the location of the previous GPS data transmission and the current location exceeds the value configured in Distance.

The transceiver calculates the distance between the position where the GPS data was sent and the current position at regular time intervals (3 sec) after the transceiver automatically or manually sent GPS data. The GPS data is sent if the calculated distance exceeds the value configured for **Distance**. If no GPS data is sent after the transceiver is turned ON, the transceiver regards the location information first received from the GPS unit as the previous transmission position and calculates the distance to the current position. The distance is calculated from the latitudinal and longitudinal values.

Note

- GPS data is not encrypted during encrypted communication.
- GPS data is not transmitted when GPS data with no positioning information is received from the GPS receiver unit.
- If the **PTT** switch is pressed during the transmission of GPS data by **GPS Distance Change**, the GPS data transmission stops, and voice transmission starts.
- In a system that supports Indoor Location, **GPS Distance Change** does not function if one of the following conditions is satisfied:
 - When a beacon signal (whether RF System or Bluetooth System is configured in **Send Location via** does not matter) is received
 - During GPS Delay Time

Configuration using KPG-D3/ D3N

- Configuring **GPS Distance Change** to be enabled or disabled ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS)
- Configuring **Distance** ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS)

Sending GPS Data Preferentially While Receiving a Group Call (GPS Report Priority over Group Call)

GPS Report Priority over Group Call is the function that gives higher priority to sending GPS data, and stops receipt of a Group Call at the timing of automatic GPS data transmission while the transceiver is receiving a Group Call.

This function is used to avoid restricting automatic GPS data transmission by the frequent receipt of Group Calls.

Configuration using KPG-D3/ D3N

Configuring **GPS Report Priority over Group Call** to be enabled or disabled ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS)

3.23 GPS Functions

The following functions are relevant to GPS data transmission:

- GPS Report Interval Time
- GPS Time Mark
- GPS Message Type

GPS Report Interval Time

GPS Report Interval Time allows the configuration of the intervals to send GPS data if “Auto” is configured in **GPS Report Mode**.

GPS Report Interval Time (Portable)

GPS Report Interval Time is the interval to automatically send GPS data for Portable.

GPS Report Interval Time (Ignition On/ Ignition Off) (Mobile only)

GPS Report Interval (Ignition On) is the interval to send the GPS data while the vehicle's engine is running.

GPS Report Interval (Ignition Off) is the interval to send GPS data while the vehicle is parked. Also, if the Ignition Sense function is not used (nothing is entered in the Ignition Sense port), GPS data is sent according to the configuration in **GPS Report Interval (Ignition Off)**. (Refer to Common Function Part [Turning the Transceiver ON or OFF According to the State of the Ignition Sense Port \(Ignition Sense\)](#).)



Note

- **GPS Report Interval Time** is used to configure the trigger cycle to start sending GPS data. The timing at which the receiving transceiver completes receiving GPS data may vary depending on the transmit conditions at the transmitting transceiver.
- GPS data will not be transmitted automatically according to **GPS Report Interval Time (Portable/ Ignition On)** and **GPS Report Interval Time (Ignition Off)** during audio data transmission.

Configuration using KPG-D3/ D3N

Configuring **GPS Report Interval Time** (See Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS > Auto > GPS Report Interval Time)

GPS Time Mark

GPS Time Mark is the offset time from UTC (Coordinated Universal Time) to send GPS data.

This function is useful for avoiding a data collision if there are many transceivers that send GPS data.

Configuring a different timing for each transceiver allows each transceiver to send GPS data with different timing. Using this function can avoid a data collision.

Configuration using KPG-D3/ D3N

Configuring **GPS Time Mark** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS > Auto)

GPS Message Type

GPS Message Type allows the transceiver to change the length of the message to send GPS data.

Table 3-34 GPS Message Type

Configuration	Operation
Full	The message to be sent is the GPS data corresponding to \$GPGGA, \$GPRMC and \$GPGLL.
Short	The message to be sent is the GPS data corresponding to \$GPGLL. When the base station receives this GPS data, a part of the data is sent as blank data even if \$GPGGA and \$GPRMC are configured for PC serial output at Base Station Setting .

Configuration using KPG-D3/ D3N

Configuring **GPS Message Type** ( See Radio Configuration > System Properties > Systems > DMR-based Trunking > GPS)

3.24 Receiving GPS Data

The base station receiving GPS data from the mobile station transceiver can send the GPS data to a PC as serial commands. If a PC installed with a mapping application is connected to the communication port of the base station transceiver, the location information of mobile station transceivers appears on a map on the PC display. This function enables a dispatch control or traffic control system.

Also, if a mobile station transceiver connecting to a GPS receiver unit or having a built-in GPS receiver unit receives location information (GPS data) from a GPS satellite, the current location information of the own transceiver can be displayed on the LCD.

Note

- The GPS data acquired from the GPS satellite can be stored at certain intervals in the internal memory of the transceiver. (Refer to Common Function Part [Storing the GPS Data \(GPS Data Storage\)](#).)
- For a transceiver receiving GPS data from a mobile station transceiver, “Data + GPS Data Output” or “Data + Location Data Output” needs to be assigned to the communication port to which a PC with the mapping application installed is connected. (Refer to Common Function Part [Available Functions for COM Port](#).)

Map Header

Whether to send data to the mapping application when the base station transceiver receives the GPS data from the mobile station transceiver can be configured.

The following are the type of data that can be sent to the mapping application.

Table 3-35 Map Header

Data	Description
\$GPGGA (NMEA)	Upon receipt of the GPS data, the base station transceiver extracts the \$GPGGA data in the NMEA-0183 format from the received GPS data and sends the extracted data from the communication port.
\$GPGLL (NMEA)	Upon receipt of the GPS data, the base station transceiver extracts the \$GPGLL data in the NMEA-0183 format from the received GPS data and sends the extracted data from the communication port.
\$GPRMC (NMEA)	Upon receipt of the GPS data, the base station transceiver extracts the \$GPRMC data in the NMEA-0183 format from the received GPS data and sends the extracted data from the communication port.
\$PKNDS (KW)	Upon receipt of the GPS data, the base station transceiver creates the \$PKNDS data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The \$PKNDS data contains the \$GPRMC data in the NMEA-0183 format, Unit ID, and the status information.
\$PKNID (KW)	Upon receipt of the GPS data, the transceiver at the base station creates the \$PKNID data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The transceiver at the base station extracts only Unit ID and the status information from the received GPS data and sends the extracted data from the communication port of the repeater. This sentence is recommended to be used along with \$GPGGA (NMEA), \$GPGLL (NMEA) or \$GPRMC (NMEA). For example, if \$GPGGA (NMEA) and \$PKNID are used simultaneously, the transceiver at the base station sends from the communication port of the repeater the \$GPGGA data in addition to the Unit ID and the status information extracted from the GPS data.
\$PKNSH (KW)	Upon receipt of the GPS data, the transceiver at the base station creates the \$PKNSH data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The \$PKNSH data contains the \$GPGLL data in the NMEA-0183 format and the Unit ID. In order to send GPS data in Emergency Mode or by pressing the PTT switch, this sentence is used.

Configuration using KPG-D3/ D3N

Configuring **Map Header** ( See Radio Configuration > Global Options > External Device > General > Serial Interface > GPS Base Station Settings)

GPS Position Display

GPS Position Display is the function to display the current location information of the own transceiver on the LCD.

Refer to Common Function Part “[USING THE GPS POSITION DISPLAY FUNCTION](#)” for details about **GPS Position Display**.

3.25 Remote Operation by Radio Communication (Remote Control)

Remote Control is the function to remotely operate using radio communication the control of an individually specified transceiver.

An individually specified transceiver can be controlled by sending various Remote Control messages and by making the transceiver receive the messages.

Remote Control has the following functions:

Table 3-36 Remote Control Functions

Function	Description
Remote Monitor	This is the function to make an individually specified transceiver transmit continuously by making the transceiver receive a Remote Monitor message. (Refer to Monitoring the Situation Around Another Transceiver by Remote Control (Remote Monitor) .)
Radio Check	This is the function to check whether or not an individually specified transceiver is being operated by making the transceiver receive a Radio Check message. (Refer to Checking Whether Another Transceiver Is in Operation (Radio Check) .)

An individually specified transceiver can be controlled by sending various Remote Control messages in Remote Control Mode and by making the transceiver receive the messages.

Pressing the **Remote Control** button places the transceiver in Remote Control Mode. Or, pressing the **Menu** button to enter Menu Mode and then selecting “Remote Control” places the transceiver in Remote Control Mode. (Refer to Common Function Part [Using Menu Mode](#).)

Also, various Remote Control messages can be sent by sending a transmission command of the various Remote Control messages from a PC to the transceiver. In this case, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Sending a Remote Control Message in Remote Control Mode

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Various Remote Control messages can be sent in Remote Control Mode.

Operating the transceiver

● Initiating an Individual Call by list selection

1 Press the **Remote Control** button.

The transceiver enters Remote Control Mode and then the Unit ID selection display will appear.

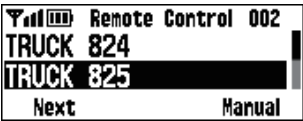
The following operations are identical even if the transceiver enters Remote Control Mode by pressing the **Menu** button.

Note

- If **Fleet Dialing Plan** is enabled in a DMR Tier III Trunking system or S-Trunking system, the transceiver cannot enter Remote Control Mode when an ID is not registered in the Individual ID List.

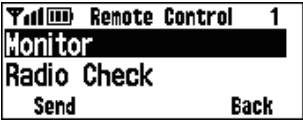
2 Press the [▲] or [▼] button to select a Unit ID from the Individual ID List. Press the Menu ([□]) button.

Refer to Common Function Part “Selecting or Clearing Data from a List” for selection methods.



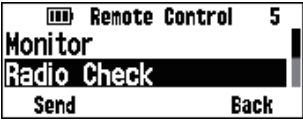
3 Press the Menu ([□]) button, or [*] button.

The selection display of the options menu appears.



4 Press the [▲] or [▼] button to select the Remote Control message to send.

Monitor: A Remote Monitor message is sent.
Radio Check: A Status Polling Service message is sent.



5 Press the PTT switch, Menu ([□]) button, or [*] button.

● For Monitor

An Individual Call with Remote Monitor configured is sent.



If the transceiver receives a message for traffic channel assignment from the system, the “📶” icon blinks, and the Remote transmission (Individual Call) starts from the receiving transceiver.



● For Radio Check

A Status Polling Service message is sent. “Send Data” appears on the display.



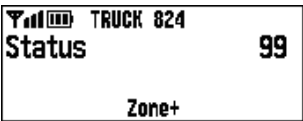
Upon completion of the transmission of a Status Polling Service message, the transceiver waits for a response from the target transceiver.



When the transceiver receives a status from the system, “Complete” appears on the display for 1 sec.



“Status” and the ID Name of the transmitting transceiver appear on the display.



● Sending a Remote Control message by using Manual Dialing

To send a Remote Control message by directly entering a Unit ID, **Manual Dialing** needs to be enabled.

1 Press the **Remote Control** button.

The transceiver enters Remote Control Mode and then the Unit ID selection display will appear. The following operations are identical even if the transceiver enters Remote Control Mode by pressing the **Menu** button.



- If **Fleet Dialing Plan** is enabled in a DMR Tier III Trunking system or S-Trunking system, the transceiver cannot enter Remote Control Mode when an ID is not registered in the Individual ID List.

2 Press the **Function ([O])** button.

The Unit ID entry display appears.



3 Enter a Unit ID.

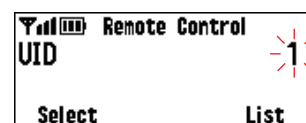
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

- **Using the keypad**

A Unit ID can be entered by pressing the [0] button to [9] button.

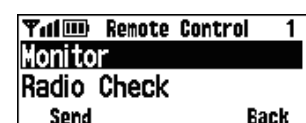
- **Using the PF buttons**

Select a number by pressing the [▲] button or [▼] button and confirm the entered number by pressing the **Menu** ([□]) button or [*] button.



4 Press the **Menu** ([□]) button, or [*] button.

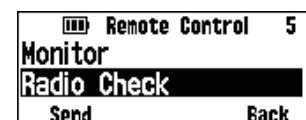
The selection display of the options menu appears.



5 Press the [▲] or [▼] button to select the Remote Control message to send.

Monitor: A Remote Monitor message is sent.

Radio Check: A Status Polling Service message is sent.

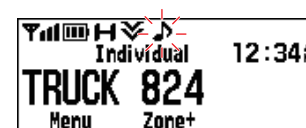


6 Press the **PTT** switch, **Menu** ([□]) button, or [*] button.

- **For Monitor**

An Individual Call with Remote Monitor configured is sent.

If the transceiver receives a message for traffic channel assignment from the system, the “📶” icon blinks, and the Remote transmission (Individual Call) starts from the receiving transceiver.



● For Radio Check

A Status Polling Service message is sent. "Send Data" appears on the display.



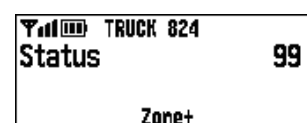
Upon completion of the transmission of a Status Polling Service message, the transceiver waits for a response from the target transceiver.



When the transceiver receives a status from the system, "Complete" appears on the display for 1 sec.



"Status" and the ID Name of the transmitting transceiver appear on the display.



Note

- If the Remote Control Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode by pressing the **Remote Control** button. A selection screen for the Individual ID List appears by pressing the **Function** ([O]) button.
- If no ID is registered in the Individual ID List, the transceiver enters Manual Dialing mode by pressing the **Remote Control** button if **Manual Dialing** is enabled. The transceiver cannot enter Remote Control Mode if **Manual Dialing** is disabled.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver (See Radio Configuration > Global Options > Button Assignment)
- Configuring **Manual Dialing** to be enabled or disabled (See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)

Monitoring the Situation Around Another Transceiver by Remote Control (Remote Monitor)

Remote Monitor is the function to remotely operate using radio communication an individually specified transceiver to transmit continuously.

Use of this function allows the base station to monitor the situation around the transceiver.

If a PC sends the Remote transmission command to the transceiver, the transceiver sends an Individual Call with Remote Monitor configured.

The target of the Individual Call is specified by the Remote transmission command. Also, an Individual Call with Remote Monitor configured can also be sent in Remote Control Mode. (Refer to [Sending a Remote Control Message in Remote Control Mode](#).)

The transceiver which received the Individual Call with Remote Monitor configured unmutes the speaker and initiates a continuous transmission using Individual Call. The duration of the continuous transmission is determined according to the configuration in **Remote Monitor (Timer)** (10 sec to 120 sec) of the transceiver which has received the Individual Call with Remote Monitor enabled.

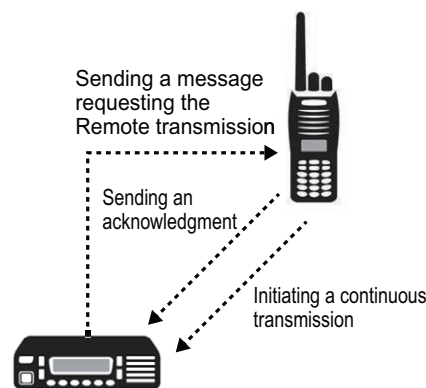


Figure 3-14 Remote Monitor

Remote Monitor has a Normal Mode and a Silence Mode: the former is a mode notifying a user of the transceiver's status of continuous transmission by an indication on the LCD and by lighting the Transmit LED, and the latter is a mode not notifying a user of the transceiver's status of continuous transmission. Which mode is used is determined according to the configuration in **Remote Monitor Display** of the transceiver which has received the Individual Call with Remote Monitor configured.

● If "On" is configured in Remote Monitor Display (Normal Mode)

The transceiver which received the Individual Call with Remote Monitor configured displays "Remote TX" on the display and transmits with the Transmit LED lighting.

● If "Off" is configured in Remote Monitor Display (Silence Mode)

The transceiver which received the Individual Call with Remote Monitor configured transmits without changing the indication of LCD and without lighting the Transmit LED.

Note

- To accept the Individual Call with Remote Monitor configured, **Remote Monitor** of KPG-D3/ D3N needs to be enabled.
- While the transceiver is in the state of continuous transmission by **Remote Monitor**, **Time-out Timer** is disabled. (Refer to [Restricting the Communication Time on a Traffic Channel \(Traffic Timer\)](#).)

Configuration using KPG-D3/ D3N

- Configuring **Remote Monitor** to be enabled or disabled (Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > RX Options > Remote Monitor)
- Configuring **Remote Monitor Timer** (Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > RX Options > Remote Monitor)
- Configuring **Remote Monitor Display** (Radio Configuration > System Properties > Systems > DMR-based Trunking > RX/TX Options > RX Options > Remote Monitor)

Checking Whether Another Transceiver Is in Operation (Radio Check)

Radio Check can be used to check by using radio communication whether an individually specified transceiver is operated in the system.

Radio Check has two types of confirmations: the confirmation from Remote Control Mode and the confirmation by a PC command.

If Radio Check is selected in Remote Control Mode to execute **Radio Check** in Remote Control Mode, a Status Polling Service message which complies with the DMR Standard is sent to the specified Unit ID. By making an individually specified transceiver receive the message, the transceiver can be controlled. (Refer to [Sending a Remote Control Message in Remote Control Mode](#).)

Checking Whether Another Transceiver Is in Operation by Using a PC command (Radio Check)

To use the **Radio Check** function, "Data", "Data + GPS Data Output", or "Data + Location Data Output" needs to be assigned to a communication port 0 to 2 or the Bluetooth of the transceiver. (Refer to Common Function Part [Available Functions for COM Port](#).)

- The transceiver sends a Status Polling Service message which complies with the DMR Standard to the specified Unit ID if a PC sends the Radio Check transmission command (the Status Request Transmission (Digital Ver2) command) to the communication port of the transceiver.
- The transceiver that received a Status Polling Service message sends a Status Message in response. (Refer to [Sending a Status Message](#).)
 - The transceiver sends a status configured in Default Status if a Status Polling Service message is received when a status has never been selected, such as when the transceiver is turned on.
 - If a Status Polling Service message is received when a status is selected in Status Mode, the transceiver sends the selected status.
 - The transceiver sends the last selected status (the backed up status) if the transceiver migrates to normal mode after selecting the status in Status Mode.
 - If the transceiver in the Stun state receives a Status Polling Service message when **Stun Response Status** is not configured, the transceiver sends a status in the same manner as when the transceiver is in the normal state.
- The transceiver behaves in the same manner as when the normal status is received when the status sent back from the transceiver that received a Status Polling Service message is received. (Refer to [Receiving a Status Message](#).)

However, Horn Alert and AUX Output Status Message 1 to AUX Output Status Message 3 do not function even if the status sent from the transceiver is the same status as Horn Alert Status and AUX Output Status Message 1 to AUX Output Status Message 3.

Disabling the Transceiver Capability by Remote Control (Stun/ Kill)

By the transceiver receiving a Remote Control message from the system, the transceiver can be prevented from being used. This function allows a system administrator to remotely disable the transceiver, for instance, if the transceiver is lost.

Also, by the transceiver receiving a Remote Control message from the system, the transceiver which has been disabled by this function can be enabled again.

The following is the transceiver behavior when the transceiver receives a Remote Control message:

Table 3-37 Remote Control

Remote Control Message	Description
Remote Stun	The transceiver is disabled if the transceiver receives the Remote Stun message. Whether to accept a Remote Stun message when the transceiver receives the Remote Stun message can be configured using KPG-D3/ D3N. If the transceiver is configured not to accept a Remote Stun message, the transceiver sends a NACK and does not respond at all even if a Remote Stun message is received. If Authentication for Stun/Revive is enabled, the transceiver executes an authentication request if a Remote Stun message is received from the system. The system responds to the authentication request, and the transceiver determines whether the system is valid or not. If the transceiver determines that the system is valid via authentication, the transceiver sends an acknowledgment for the Remote Stun message and becomes disabled. If the transceiver determines that the system is invalid, the transceiver sends a NACK for the Remote Stun message and does not respond at all. (Refer to Authentication Function of a System and Transceiver (Authentication).)
Remote Revive	If the transceiver is in the Stun state when receiving a Remote Revive message, the Stun state is reset. If the transceiver is configured not to accept a Remote Stun message, the transceiver sends a NACK and does not respond at all even if a Remote Revive message is received. If Authentication for Stun/Revive is enabled, the transceiver executes an authentication request if a Remote Revive message is received from the system. The system responds to the authentication request, and the transceiver determines whether the system is valid or not. If the transceiver determines that the system is valid via authentication, the transceiver sends an acknowledgment for the Remote Revive message and the Stun state is reset. If the transceiver determines that the system is invalid, the transceiver sends a NACK for the Remote Revive message and does not respond at all. (Refer to Authentication Function of a System and Transceiver (Authentication).)
Remote Kill	If the transceiver receives the Remote Kill message, use of the transceiver is prohibited and all operations are disabled. All configuration data of the transceiver is cleared, hence the Kill state is not reset even if the transceiver receives the Remote Revive message. However, the configuration data can be written to the transceiver by using KPG-D3/ D3N. Also, whether to accept a Remote Kill message when the transceiver receives the Remote Kill message can be configured using KPG-D3/ D3N. If the transceiver is configured not to accept a Remote Kill message, the transceiver sends a NACK and does not respond at all even if a Remote Kill message is received. The transceiver executes an authentication request if a Remote Kill message is received from the system. The system responds to the authentication request, and the transceiver determines whether the system is valid or not. If the transceiver determines that the system is valid via authentication, the transceiver sends an acknowledgment to the Remote Kill message, and use of the transceiver is prohibited and all operations are disabled. If the transceiver determines that the system is invalid, the transceiver sends a NACK for the Remote Kill message and does not respond at all. (Refer to Authentication Function of a System and Transceiver (Authentication).)

Configuration using KPG-D3/ D3N

- Configuring **Authentication for Stun/Revive** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > General > System Options)
- Configuring **Remote Stun** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > General > System Options)
- Configuring **Remote Kill** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > General > System Options)

Emergency is the function to be used for the transceiver to transmit and receive for emergency purposes. This function is used for a user to immediately contact the base station in emergency situations.

The transceiver behaves according to the configurations in Emergency Mode when the transceiver is placed in Emergency Mode. The base station transceiver can notice an occurrence of an emergency situation in the transmitting transceiver upon receipt of a call by use of Emergency.

4.1 Placing the Transceiver in Emergency Mode

One of the following operations can place the transceiver in Emergency Mode:

● Emergency button

Pressing and holding the **Emergency** button for longer than the time configured in **Hold Delay** causes the transceiver to enter Emergency Mode.

For Portable, “Emergency” can be assigned to the **AUX** button or the **PF 1** button of the speaker microphone only as the function when the button is held.

For Mobile, “Emergency” can be assigned to the **AUX** button only as the function when the button is held.

Also, “Emergency” can be assigned to the AUX Input port for Mobile. In this case, the transceiver enters Emergency Mode if the AUX Input port to which “Emergency” is assigned goes low level. (Refer to Common Function Part [Available Functions for AUX Input Ports.](#))

● Lone Worker

Using **Lone Worker**, the transceiver can automatically enter Emergency Mode and notify the base station of the emergency status when the transceiver becomes disabled from operating due to an accident.

When the time configured in **Lone Worker Interval** elapses and then the time configured in **Duration of Lone Worker Tone** elapses while the transceiver is in Lone Worker Mode, the transceiver enters Emergency Mode. (Refer to [Placing the Transceiver in Emergency Mode Using the Lone Worker Function.](#))

● Activity Detection

If **Activity Detection** is used, the transceiver automatically enters Emergency Mode and notifies the base station of the emergency status when the transceiver is detected to be in tilted, stationary, or shaking state for a certain period of time due to an accident. **Man-down Detection**, **Stationary Detection**, and **Motion Detection** are the functions available in **Activity Detection**. (Refer to [Placing the Transceiver in Emergency Mode by Using the Activity Detection Function.](#))

● Heart Rate Service/ Automatic Injury Detection Service

The transceiver enters Emergency Mode if the transceiver is connected to a Bluetooth-compatible device which supports **Heart Rate Service** or **Automatic Injury Detection Service** and the transceiver is in any of the following statuses: (Refer to Common Function Part [Activation of Emergency](#), [Notifying of Damage on a Bluetooth-compatible Device to the Transceiver \(Automatic Injury Detection Service\).](#))

- When the status where the heart rate notified from a Bluetooth-compatible device goes higher than Upper Threshold continues while Delay Time is activated
- When the status where the heart rate notified from a Bluetooth-compatible device goes lower than Lower Threshold continues while Delay Time is activated
- When a notification of injury is received from a Bluetooth-compatible device

4.1 Placing the Transceiver in Emergency Mode

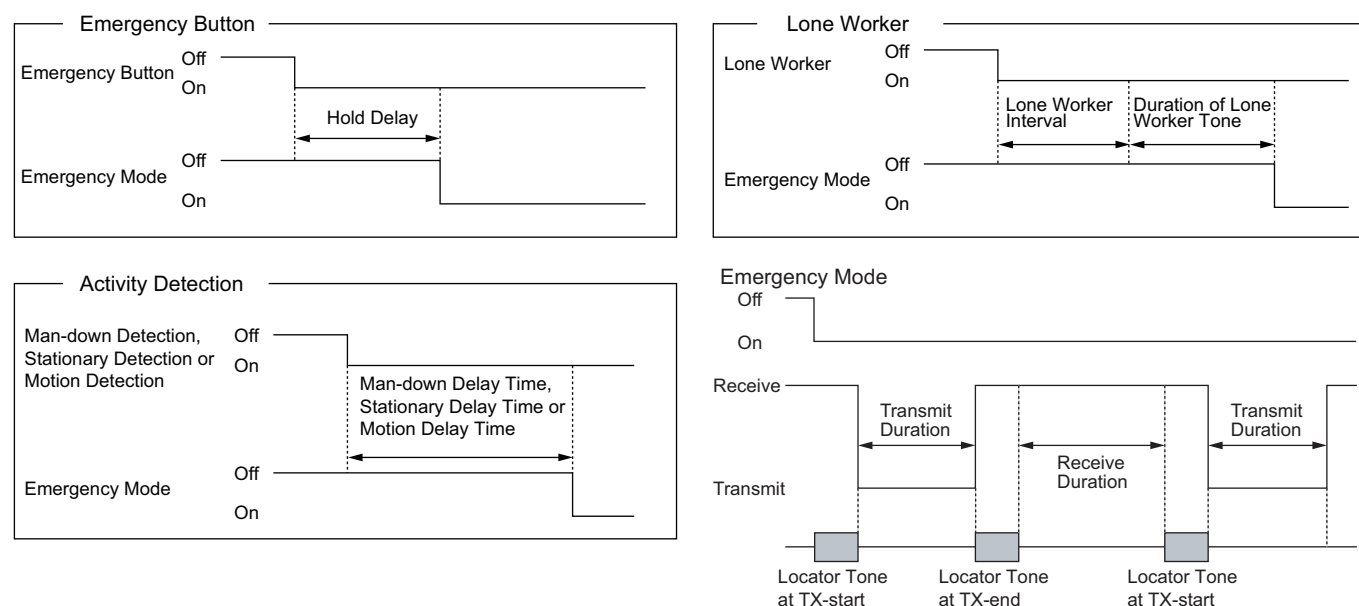


Figure 4-1 Emergency Mode

If Emergency Mode is activated by pressing the **Emergency** button or by the Lone Worker function, Emergency Mode will be exited when the **Emergency** button is pressed longer than the time configured in **Hold Delay** or when the transceiver is turned OFF.

If Emergency Mode is activated by the Activity Detection function, Emergency Mode will be exited when the transceiver is turned off.

However, if **Suspended Power-off** is enabled, the transceiver will not be turned off and remains in Emergency Mode even if the transceiver is operated to be turned off while in Emergency Mode. (Refer to [Suspended Power-off](#).)

Note

- If the transceiver enters Emergency Mode during a scan, Emergency behaves according to the configuration in **Emergency Profile** for the selected channel.
- The **PTT** switch can be used even if the transceiver is in Emergency Mode. The transceiver reverts to automatic receive mode when the transceiver completes transmitting by releasing the **PTT** switch.
- In Emergency Mode, the microphone sensitivity is determined by the configuration in **Emergency Microphone Sense**. (Refer to [Emergency Microphone Sense](#).)
- **Remote Monitor** (DMR-based Trunking) functions even if the transceiver is in Emergency Mode. The transceiver restores automatic receive mode after transmission by **Remote Monitor** completes.
- If the transceiver receives the status configured for **Emergency Termination Status** in Emergency Mode, the transceiver exits Emergency Mode.
- If the transceiver receives the status configured for **Emergency Termination** in Emergency Mode, the transceiver exits Emergency Mode.
- While the transceiver is under the following conditions, the transceiver does not enter Emergency Mode:
 - In the Stun state
 - If the transceiver is in Transceiver Password entry state
 - When "Selected" is configured in **Emergency Channel Type** and the selected channel is an error channel
- The Radio Check command (DMR-based Trunking) can also be received when the transceiver is in Emergency Mode.
- The following functions are disabled while the transceiver is in Emergency Mode:
 - **Lone Worker** button
 - Lone Worker Channel (if "Preset" is configured in **Lone Worker Type**)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Emergency Termination** ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency > Emergency Status)
- ([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency > Emergency Status)

Interrupt Emergency CALL

Interrupt Emergency CALL is the function to execute **Call Interruption** if voice communication (including voice communication not addressed to the own transceiver) is made on a channel used in Emergency Mode when the transceiver enters Emergency Mode.

Call Interruption is the function to enable a transceiver other than the transmitting transceiver to terminate voice communications by sending and receiving the Call Interruption request message. A transceiver receiving the Call Interruption request message on the channel where the transceiver is performing voice communication terminates voice communication. (Refer to [Terminating Voice Communications by a Transceiver Other Than the Transmitting Transceiver \(Call Interruption\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Interrupt Emergency CALL** to be enabled or disabled

- ( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency)
- ( **See**) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency)

Emergency Alarm

Emergency Alarm is the function to send an Emergency Alarm before the transceiver enters Emergency Mode to notify the base station that the transceiver is in an Emergency situation.

Using this function can reliably notify the base station that the transceiver is in an Emergency situation.

● Behavior of the transmitting transceiver

DMR Conventional system:

- The transceiver sends an Emergency Alarm when the **Emergency** button is pressed or when Lone Worker or various Activity Detection functions are activated on a DMR digital channel.
- If the transceiver receives an acknowledgment from the receiving transceiver, the transceiver enters Emergency Mode.
- After sending an Emergency Alarm, if the transceiver receives no acknowledgment until the length of time configured for **Maximum ACK Wait Time** elapses, the transceiver resends the Emergency Alarm. If the transceiver still cannot receive an acknowledgment after sending the Emergency Alarm 5 times, the transceiver enters Emergency Mode.

DMR-based Trunking system:

- The transceiver sends an Emergency Alarm when the **Emergency** button is pressed or when Lone Worker or various Activity Detection functions are activated on a DMR digital channel.
- If the transceiver receives an acknowledgment from the receiving transceiver, the transceiver starts the **Emergency Cycle** behavior.
- If the transceiver cannot receive an acknowledgment, the transceiver resends an Emergency Alarm for the number of times configured in **Number of Retries**. If the transceiver still cannot receive an acknowledgment after resending for the number of times configured in **Number of Retries**, the transceiver starts the **Emergency Cycle** behavior.

● Behavior of the receiving transceiver

DMR Conventional system:

- If the transceiver receives an Emergency Alarm, the transceiver notifies a user of the receipt of the Emergency Alarm according to the configuration for **Emergency Alarm Response**.
- If **Emergency Alarm ACK** is enabled, the transceiver returns an acknowledgment when the transceiver receives an Emergency Alarm.

DMR-based Trunking system:

If the transceiver receives an Emergency Alarm, the transceiver notifies a user of the receipt of the Emergency Alarm according to the configuration for **Emergency Alarm Response**.

Note

- If a zone or channel is changed while the transceiver is in Emergency Mode, the transceiver resends an Emergency Alarm on the channel to which the transceiver has migrated.

About the configuration of Emergency Alarm

For the transceiver to send an Emergency Alarm, the configurations by using KPG-D3/ D3N need to be as follows:

● DMR Conventional system

Emergency Alarm (DMR): Enabled

Emergency ID Type: DMR Group ID

For the receiving transceiver to return an acknowledgment when an Emergency Alarm is received, **Emergency Alarm ACK** needs to be enabled.

● DMR-based Trunking system

Emergency Alarm (DMR): Enabled

Emergency ID (DMR-based Trunking): DMR

Emergency DMR ID Type: Group ID or Unit ID

Emergency Alarm Response

Emergency Alarm Response is the function to enable the transceiver to notify a user of the receipt of an Emergency Alarm when the transceiver receives the Emergency Alarm.

The transceiver behaves as follows according to the configuration using KPG-D3/ D3N.

Table 4-1 Emergency Alarm Response

Configuration	Description
LCD	If an Emergency Alarm is received, the Group ID appears on the display. Also, the Emergency message and the Unit ID of the transmitting transceiver alternately appear. In a DMR-based Trunking system, the display and blinking are not reset even if the Auto Reset Timer elapses. Pressing any button resets the display and blinking. However, when the transceiver receives a voice call, the display for the reception of a voice call has priority.
Alert Tone	The Alert Tone configured for Tone Number sounds from the transceiver when receiving an Emergency Alarm. In a DMR-based Trunking system, the Alert Tone does not stop even if the Auto Reset Timer elapses. Pressing any button stops the Alert Tone. However, when the transceiver receives a voice call, the Alert Tone which sounds for the reception of a voice call and the received voice call output have priority.
Horn Alert (Mobile only)	The Horn Alert port becomes active when receiving an Emergency Alarm. In a DMR-based Trunking system, the behavior of the Horn Alert port does not stop even if the Auto Reset Timer elapses.

Note

- In a DMR-based Trunking system, if LCD is enabled in **Emergency Alarm Response** and Status Message Stack is also enabled, an Emergency Alarm is stacked as a Status Message.

Configuration using KPG-D3/ D3N

- Configuring **Emergency Alarm (DMR)** to be enabled or disabled
 ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency)
 ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency)
 ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Emergency)
- Configuring **Maximum ACK Wait Time**
 ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications)
 ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Data Communications)
 ( [See](#) Radio Configuration > System Properties > Systems > DMR-based Trunking > Other Options > Data Communications)
- Configuring **Emergency Alarm Response**
 ( [See](#) Radio Configuration > Protocol Options > DMR > General > Emergency > Emergency Alarm Response)
- Configuring **Emergency Alarm ACK**
 ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > DMR)
 ( [See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > DMR)

4.2 Configuration Related to Transmission and Reception in Emergency Mode

The transceiver can have a maximum of 8 configurations related to transmission and reception in Emergency Mode as the Emergency Profile. By allocating **Emergency Profile** to each zone or channel, the Emergency behavior of the transceiver can vary depending on the zone or channel.

The functions that can be configured as an **Emergency Profile** are as follows:

- Emergency Channel Type
- Emergency Zone-Channel
- Emergency Mode Type
- LCD Brightness
- Emergency Cycle
- Locator Tone at TX-start
- Transmit Duration
- Locator Tone at TX-end
- Receive Duration
- TX/RX LED in Emergency

The common functions in Emergency Mode are as follows. One configuration from below is available for the transceiver:

- Emergency Display
- Emergency Microphone Sense
- Emergency Text
- Background Tone Transmission
- Emergency Channel Lock
- Suspended Power-off
- Remain Surveillance Mode
- Functions related to Lone Worker
- Functions related to Activity Detection
- Functions related to Bluetooth

Emergency Profile can be configured for each zone or channel. If “Zone Common” is configured in **Emergency Profile** for a channel, the transceiver executes the Emergency behavior by using **Emergency Profile Number** configured for the zone of the channel.

Also, in a DMR Conventional system, **Emergency ID** (DMR Conventional) can be configured for each system. (Refer to [ID Sent When Emergency Mode is Activated](#).)

In a DMR-based Trunking system, **Emergency ID** (DMR-based Trunking) and **Emergency Alarm** can be configured for each system. (Refer to [ID Sent When Emergency Mode is Activated](#), [Emergency Alarm](#).)

Configuration using KPG-D3/ D3N

- Configuring each function of **Emergency Profile** ( [See](#) Radio Configuration > Global Options > Emergency > Profiles)
- Configuring Common Functions for Emergency Mode ( [See](#) Radio Configuration > Global Options > Emergency > General)

4.3 Zone-channel Functioning in Emergency Mode

The channel to be used when the transceiver enters Emergency Mode can be configured.

Emergency Channel Type

Emergency Channel Type is the type of a channel used when the transceiver is placed in Emergency Mode.

Table 4-2 Emergency Channel Type

Configuration	Description
Selected Channel	When the transceiver enters Emergency Mode, the transceiver resets the migration state of channels, such as Home Channel, and then the transceiver executes Emergency on the previously selected channel.
Preset Channel	After entering Emergency Mode, the transceiver migrates to the Zone-channel configured in Emergency Zone-Channel and then executes the Emergency behavior.

The transceiver behaves as below according to the configuration for **Emergency Channel Type**:

● Selected Channel

If a channel in a DMR Conventional system is selected:

The transceiver behaves according to the **Emergency ID Type** (DMR Conventional) configuration.

Table 4-3 Emergency ID Type (DMR Conventional)

Configuration	Description
None	The transceiver transmits only using the Color Code.
DMR Group ID	The transceiver initiates a Group Call using the Group ID configured for Emergency DMR ID .
DMR Unit ID	The transceiver initiates an Individual Call using the Unit ID configured for Emergency DMR ID .

If a channel in a DMR-based Trunking system is selected:

The transceiver behaves according to the **Emergency DMR ID Type** (DMR-based Trunking) configuration.

If “Group ID” is configured for **Emergency DMR ID Type**, the transceiver initiates a Group Call by using the Group ID configured for **Emergency DMR ID**.

If “Unit ID” is configured for **Emergency DMR ID Type**, the transceiver initiates an Individual Call by using the Unit ID configured for **Emergency DMR ID**.

● Preset Channel

If a channel in a **DMR Conventional system** is configured for **Emergency Zone-Channel**:

The transceiver behaves according to the **Emergency ID Type** (DMR Conventional) configuration.

Table 4-4 Emergency ID Type (DMR Conventional)

Configuration	Description
None	The transceiver transmits only using the Color Code.
DMR Group ID	The transceiver initiates a Group Call using the Group ID configured for Emergency DMR ID .
DMR Unit ID	The transceiver initiates an Individual Call using the Unit ID configured for Emergency DMR ID .

If a channel in a **DMR-based Trunking system** is configured for **Emergency Zone-Channel**:

The transceiver behaves according to the **Emergency DMR ID Type** (DMR-based Trunking) configuration.

If “Group ID” is configured for **Emergency DMR ID Type**, the transceiver initiates a Group Call by using the Group ID configured for **Emergency DMR ID**.

If “Unit ID” is configured for **Emergency DMR ID Type**, the transceiver initiates an Individual Call by using the Unit ID configured for **Emergency DMR ID**.

Note

- If the transceiver executes the Emergency behavior on a channel in a DMR-based Trunking system, the transceiver executes the Hunt behavior when the transceiver is outside of the coverage area for the channel, and automatically acquires a control channel available in the system.
- If Preset Channel is configured in **Emergency Channel Type**, and if a channel of a DMR-based Trunking system is configured in **Emergency Zone-Channel**, the transceiver executes the Hunt behavior in the same manner as the normal zone change when **Emergency** is pressed in a zone other than a DMR-based Trunking system, and the transceiver automatically acquires a control channel available in the system.

Configuration using KPG-D3/ D3N

- Configuring **Emergency Channel Type** ( **See** Radio Configuration > Global Options > Emergency > Profiles > Emergency Channel)
- Configuring **ID Type (DMR Conventional)**
 ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency > Emergency ID)
 ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency > Emergency ID)
- Configuring **ID Type (DMR-based Trunking)** ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > DMR > Emergency > Emergency ID)

Emergency Zone-channel

Emergency Zone-channel is the Zone-channel used in Emergency Mode if “Preset Channel” is configured in **Emergency Channel Type**.

Configuration using KPG-D3/ D3N

Configuring **Emergency Zone-channel** ( See Radio Configuration > Global Options > Emergency > Profiles > Emergency Channel > Emergency Zone-Channel)

4.4 Automatically Transmitting and Receiving in Emergency Mode

The number of times for which the transceiver toggles between transmission and reception, or the duration for a single session of automatic transmission or reception for emergency in Emergency Mode can be configured. Also, the microphone sensitivity can be changed and the Background Tone (1 beep) can be multiplexed on the audio to be transmitted in Emergency Mode.

Emergency Cycle

Emergency Cycle is the number of times that the transceiver toggles between transmission and reception for an emergency in Emergency Mode.

Table 4-5 Emergency Cycle

Configuration	Description
1 to 200	The transceiver repeats automatic transmission and automatic reception for the configured number of times, and then the transceiver exits Emergency Mode.
Infinite	The transceiver continues to alternate between automatic transmission and reception until the Emergency button is pressed again or the transceiver is turned OFF.
Off	The transceiver does not automatically transmit and receive in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Cycle** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

Locator Tone at TX-start

Locator Tone at TX-start is the duration to emit an Alert Tone which notifies that the transceiver will start transmission before the transceiver starts automatic transmission in Emergency Mode.

The transceiver automatically repeat transmitting and receiving in Emergency Mode. When the transceiver switches from reception to transmission, an Emergency Locator Tone (2 beeps) sounds from the transceiver for the length of the time configured for **Locator Tone at TX-start**.

When the tone sounds, a user can easily recognize without viewing the transceiver that the transceiver is about to automatically transmit in Emergency Mode. This tone can also be used to locate a user who is in emergency situations.

 Note

- This function is enabled if “Audible” is configured for **Emergency Mode Type**.
- For Portable, when a Bluetooth-compatible speaker or an external speaker is connected, an Emergency Locator Tone (2 beeps) is emitted from the transceiver’s speaker regardless of the configurations of **Bluetooth Speaker** and **External Speaker**. Received audio is emitted according to the configurations of **Bluetooth Speaker** and **External Speaker**. (Refer to Common Function Part [Switching the Speaker to Emit Audio \(Bluetooth Speaker\)](#).)
- For Mobile, where an Emergency Locator Tone (2 beeps) and received audio are emitted from depends on the configuration in External Speaker.

Configuration using KPG-D3/ D3N

Configuring **Locator Tone at TX-start** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

Locator Tone at TX-end

Locator Tone at TX-end is the duration to emit an Alert Tone which notifies that the transceiver has completed an automatic transmission in Emergency Mode, and starts receiving.

The transceiver automatically repeat transmitting and receiving in Emergency Mode. When the transceiver switches from transmission to reception, an Emergency Locator Tone (2 beeps) sounds from the transceiver for the length of the time configured for **Locator Tone at TX-end**.

When the tone sounds, a user can easily recognize without viewing the transceiver that the transceiver ends to automatically transmit in Emergency Mode. This tone can also be used to locate a user who is in emergency situations.

 Note

- This function is enabled if “Audible” is configured for **Emergency Mode Type**.
- For Portable, when a Bluetooth-compatible speaker or an external speaker is connected, an Emergency Locator Tone (2 beeps) is emitted from the transceiver’s speaker regardless of the configurations of **Bluetooth Speaker** and **External Speaker**. Received audio is emitted according to the configurations of **Bluetooth Speaker** and **External Speaker**. (Refer to Common Function Part [Switching the Speaker to Emit Audio \(Bluetooth Speaker\)](#).)
- For Mobile, where an Emergency Locator Tone (2 beeps) and received audio are emitted from depends on the configuration in **External Speaker**.

Configuration using KPG-D3/ D3N

Configuring **Locator Tone at TX-end** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

Transmit Duration

Transmit Duration is the duration of a single automatic transmission cycle in Emergency Mode.

The transceiver switches to automatic reception for emergency when the time configured in **Transmit Duration** elapses after the transceiver starts automatic transmission for emergency.

The transceiver behaves as follows when “0” is configured in **Transmit Duration**:

- **If “None” is configured for Emergency ID:**

The transceiver does not send anything during automatic transmission.

- **If anything other than “None” is configured for Emergency ID:**

The transceiver sends only an Emergency Status during automatic transmission.



Note

- In a DMR-based Trunking system, “None” does not exist as the configuration in **Emergency ID**.
- In a DMR-based Trunking system, the transceiver does not send an Emergency Status during automatic transmission.

Configuration using KPG-D3/ D3N

Configuring **Transmit Duration** (See Radio Configuration > Global Options > Emergency > Profiles > Options)

Receive Duration

Receive Duration is the duration for a single session of automatic reception for emergency in Emergency Mode.

The transceiver switches to automatic transmission for emergency when the time configured in **Receive Duration** elapses after the transceiver starts automatic reception for emergency.

Configuration using KPG-D3/ D3N

Configuring **Receive Duration** (See Radio Configuration > Global Options > Emergency > Profiles > Options)

Emergency Microphone Sense

Emergency Microphone Sense is the function used to adjust the microphone input sensitivity in Emergency Mode.

In **Emergency Microphone Sense**, the microphone sensitivity can be configured within the following range:

6 dB, 4 dB, 2 dB, 0 dB, -2 dB, -4 dB, -6 dB, -8 dB, -10 dB, -12 dB, -14 dB, -16 dB, -18 dB, -20 dB

The appropriate level of microphone sensitivity for normal operation is 0 dB. Based on this level, the parameter of the microphone sensitivity can be configured.



Note

- The microphone sensitivity of the headset connected via Bluetooth also functions according to the configuration in **Emergency Microphone Sense** while the transceiver is in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Microphone Sense** (See Radio Configuration > Global Options > Emergency > General > Common)

Background Tone Transmission

Background Tone Transmission is the function to multiplex a Background Tone (1 beep) on the transmitted audio when the transceiver transmits in Emergency Mode. Background Tone (1 beep) is multiplexed every second while the transceiver is transmitting audio data.

The audio signal is not muted since the Background Tone is transmitted with lower deviation than normal. The receiving transceiver can easily recognize that the transmitting transceiver is in Emergency Mode if the tone is multiplexed while initiating a voice call.



- A Background Tone is not emitted from the speaker of the transmitting transceiver.

Configuration using KPG-D3/ D3N

Configuring **Background Tone Transmission** (See Radio Configuration > Global Options > Emergency > General > Common)

4.5 Indication and Sound in Emergency Mode

Functions related to the tone that sounds from the transceiver when the automatic transmission starts or ends in Emergency Mode, and display and the LED notification in Emergency Mode can be configured.

Locator Tone

An Emergency Locator Tone (2 beeps) sounds from the transceiver before the automatic transmission starts or when the automatic transmission completes in Emergency Mode.

In Emergency Mode, the transceiver repeats an automatic communication only the number of times configured in **Emergency Cycle**. (Refer to [Automatically Transmitting and Receiving in Emergency Mode](#).)

Emergency Display

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Emergency Display is the function to display the channel configured in **Emergency Zone-channel** when in Emergency Mode or to retain the display appearance before the transceiver enters Emergency Mode.

Table 4-6 Emergency Display

Configuration	Description
Selected Channel	The previously selected channel is retained on the display even if the transceiver enters Emergency Mode.
Emergency Channel	A channel configured in Emergency Zone-Channel appears when the transceiver enters Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Display** (See Radio Configuration > Global Options > Emergency > General > Common)

Emergency Text

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Emergency Text is the function to display the text on the transceiver display while in Emergency Mode.

If this function is enabled, the text configured in **Text** appears on the display when the transceiver enters Emergency Mode.

Display example:

Emergency Zone-Channel: Zone 1, Channel 1

Emergency Display: Emergency Channel

Text: "Emergency"



Configuration using KPG-D3/ D3N

- Configuring **Emergency Text** to be enabled or disabled (See Radio Configuration > Global Options > Emergency > General > Common)
- Configuring **Text** (See Radio Configuration > Global Options > Emergency > General > Common)

Emergency Mode Type

Emergency Mode Type is the function to determine whether the received audio or various tones are muted while the transceiver is in Emergency Mode.

Table 4-7 Emergency Mode Type

Configuration	Description
Silent	The transceiver mutes the received audio and various tones while in Emergency Mode.
Audible	The transceiver emits the received audio and various tones in the same manner as in normal mode even while in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Mode Type** (See Radio Configuration > Global Options > Emergency > Profiles > Options)

LCD Brightness (Emergency Mode)

Supported Models: Mobile

In **LCD Brightness** (Emergency Mode), whether the configuration of **LCD Brightness** and the configuration of **LCD Brightness** changed by operating a **PF** button are applied in Emergency Mode can be configured. (Refer to Common Function Part [Changing the Brightness of the Backlight \(LCD Brightness\)](#).)

Table 4-8 LCD Brightness (Emergency Mode)

Configuration	Description
Current	The configuration of LCD Brightness is applied in Emergency Mode as well.
Lowest	The configuration of LCD Brightness is not applied in Emergency Mode. The backlight of the transceiver turns off in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **LCD Brightness** (Emergency Mode) (See Radio Configuration > Global Options > Emergency > Profiles > Options)

TX/RX LED in Emergency

TX/RX LED in Emergency is the function to light the Transmit LED when the transceiver transmits in Emergency Mode and light the Busy LED when the transceiver receives in Emergency Mode.

The transceiver behaves as follows depending on the **TX/RX LED in Emergency** configuration.

- **If the TX/RX LED in Emergency is enabled:**

- While in Emergency Mode, the Transmit LED is on during data transmission, and the Busy LED is on during data receipt.
- For Portable, if “Audible” is configured in **Emergency Mode Type**, the backlight lights while the transceiver is in Emergency Mode.
- The Busy LED lights even though the received audio is not output due to the output of the Locator Tone while the transceiver is on the traffic channel.
- For Portable, if the transceiver enters Emergency Mode while the backlight is lit, the backlight continues to light. However, when “Silent” is configured in **Emergency Mode Type**, the backlight turns off when entering Emergency Mode.
- For Mobile, regardless of the configuration in **TX/RX LED in Emergency** and the configuration in **Emergency Mode Type**, the state of the backlight when the transceiver enters Emergency Mode does not change.

- **If TX/RX LED in Emergency is disabled:**

- While in Emergency Mode, the Transmit LED is off during data transmission, and the Busy LED is off during data receipt.
- For Portable, the backlight does not light while the transceiver is in Emergency Mode.
- For Portable, if the transceiver enters Emergency Mode while the backlight is lit, the backlight turns off.
- For Mobile, regardless of the configuration in **TX/RX LED in Emergency** and the configuration in **Emergency Mode Type**, the state of the backlight when the transceiver enters Emergency Mode does not change.

Configuration using KPG-D3/ D3N

Configuring **TX/RX LED in Emergency** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

Remain Surveillance Mode

Remain Surveillance Mode is the function to continue the Surveillance function as enabled even if the transceiver enters Emergency Mode while the Surveillance function is enabled.

While the Surveillance function is enabled, the transceiver does not emit a tone or light the backlight even when the transceiver functions.

The Surveillance function is used when the change of the transceiver status needs to be kept unnoticed, such as while on a Public Safety operation.

The transceiver behaves as follows according to the configuration in **Remain Surveillance Mode**:

- **If Remain Surveillance Mode is enabled**

Even if the transceiver enters Emergency Mode while the Surveillance function is enabled, the Surveillance function remains enabled, and the transceiver does not emit a tone and the backlight and LED do not light. The Surveillance function remains enabled even if the transceiver exits Emergency Mode.

- **If Remain Surveillance Mode is disabled**

The Surveillance function is disabled if the transceiver enters Emergency Mode while the Surveillance function is enabled. The transceiver behaves according to the configurations in Emergency Mode when the transceiver is placed in Emergency Mode. The Surveillance function remains disabled even if the transceiver exits Emergency Mode.

Note

- While in Emergency Mode, the Surveillance function cannot be toggled between enabled and disabled by operating the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Remain Surveillance Mode** to be enabled or disabled ( See Radio Configuration > Global Options > Emergency > General > Common)

4.6 ID Sent When Emergency Mode is Activated

The Emergency ID can be sent each time the transceiver starts automatic transmission and reception in Emergency Mode.

Emergency ID Type

Emergency ID Type is the type of DMR ID used in Emergency Mode.

Table 4-9 Emergency ID Type

Configuration	Description
None	The transceiver transmits and receives according to the configuration for Color Code of the Zone-channel used for Emergency Mode.
DMR Group ID	The transceiver initiates a Group Call using the Group ID configured for Emergency DMR ID .
DMR Unit ID	The transceiver initiates an Individual Call using the Unit ID configured for Emergency DMR ID .

Note

- In a DMR-based Trunking system, “None” does not exist as the configuration in **Emergency ID**.

Configuration using KPG-D3/ D3N

- Configuring **ID Type (DMR Conventional)** ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency > Emergency ID)
- ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency > Emergency ID)
- Configuring **ID Type (DMR-based Trunking)** ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > DMR > Emergency > Emergency ID)

Emergency DMR ID

Emergency DMR ID is the DMR ID used for transmission and reception in Emergency Mode.

If “DMR Unit ID” is configured for **Emergency ID Type**, the Unit ID used for initiating an Individual Call in Emergency Mode can be configured for each system.

If “DMR Group ID” is configured for **Emergency ID Type**, the Group ID used for initiating a Group Call in Emergency Mode can be configured for each system.

In a DMR-based Trunking system, if **Fleet Dialing Plan** is enabled, an ID can be configured even in the Prefix-Fleet-IN/GN format.

Configuration using KPG-D3/ D3N

Configuring **Emergency DMR ID**

- ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency > Emergency ID)
- ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency > Emergency ID)
- ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > DMR > Emergency > Emergency ID)

Status IDs

The following status IDs that are sent when automatic transmission in Emergency Mode is started can be configured for each factor that activates Emergency Mode (Emergency Button, Lone Worker, Man-down, Stationary, or Motion):

The corresponding fixed text string appears if the received status ID matches the status ID configured in Table 4-10. Refer to Table 2-15 of “[Receiving a Status Message](#)”.

Table 4-10 Status IDs

Configuration	Description
Emergency Call Status	The status ID that is sent when the transceiver enters Emergency Mode by pressing the Emergency button
Lone Worker Status	The status ID that is sent when the transceiver enters Emergency Mode by the Lone Worker function
Man-down Status	The status ID that is sent when the transceiver enters Emergency Mode by the Man-down function
Stationary Status	The status ID that is sent when the transceiver enters Emergency Mode by the Stationary function
Motion Status	The status ID that is sent when the transceiver enters Emergency Mode by the Motion function

For a DMR Conventional system, to send each of the above status IDs when the automatic transmission in Emergency Mode starts, **Emergency Status (DMR)** needs to be enabled.

For a DMR-based Trunking system, each of the above status IDs is sent when the transceiver enters Emergency Mode.

Note

- If the status ID of the corresponding activation factor is not configured and the activation factor places the transceiver in Emergency Mode, the status ID configured in **Emergency Call Status** is sent.
- If **Emergency Status (DMR)** is disabled, a status ID is not sent.
- In a DMR Conventional system, if “None” is configured in **Emergency ID Type**, the status ID will not be sent even when **Emergency Status (DMR)** is enabled.

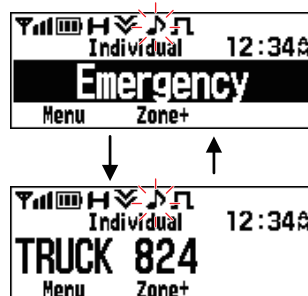
Configuration using KPG-D3/ D3N

- Configuring various status IDs
 - ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency > Emergency Status)
 - ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency > Emergency Status)
- Configuring **Emergency Status (DMR)** to be enabled or disabled
 - ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency)
 - ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency)

4.7 About the Display for Receiving an Emergency Call

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

When an Emergency Call is received by an Individual Call or Group Call, the “🔔” icon blinks, and the transceiver alternately displays “Emergency” for 1 sec and the ID Name of the transmitting transceiver for 2 sec on the display.



If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. Refer to “[Receiving an Individual Call](#)” and “[Receiving a Group Call](#)” for the LED behavior when the transceiver is receiving.

Note

- Refer to “[Receiving a Status Message](#)” for the display when the transceiver receives an Emergency Call after the transceiver receives a status ID.

4.8 Other Functions in Emergency Mode

Emergency Channel Lock and **Suspended Power-off** are other available functions in Emergency Mode.

Emergency Channel Lock

Emergency Channel Lock is the function to disable changing a zone or channel while the transceiver is in Emergency Mode.

If this function is enabled, a zone or channel cannot be changed while the transceiver is in Emergency Mode.

If this function is disabled, a zone or channel can be changed while the transceiver in Emergency Mode is not transmitting.

Configuration using KPG-D3/ D3N

Configuring **Emergency Channel Lock** to be enabled or disabled ( See Radio Configuration > Global Options > Emergency > General > Common)

Suspended Power-off

Suspended Power-off is the function to disable the transceiver to be turned off and retain the transceiver to be in Emergency Mode even if the transceiver is operated to be turned off while in Emergency Mode.

For Mobile, the transceiver behavior varies as below depending on the configuration in **Emergency Mode Type**:

- **If “Silent” is configured in Emergency Mode Type**

The transceiver will not be turned OFF and remains in Emergency Mode even if the **Power** switch is pressed while the transceiver is in Emergency Mode. In this case, the LCD is tuned off and the transceiver appears to be turned OFF. The LED behaves according to the configuration in **TX/RX LED in Emergency** while **Suspended Power-off** is enabled.

- **If “Audible” is configured in Emergency Mode Type:**

The transceiver will not be turned OFF and remains in Emergency Mode even if the **Power** switch is pressed while the transceiver is in Emergency Mode. In this case, the LCD display does not change. The LED behaves according to the configuration in **TX/RX LED in Emergency** while **Suspended Power-off** is enabled.

For Portable, the transceiver will not be turned OFF and remains in Emergency Mode even if the transceiver is operated to be turned OFF while in Emergency Mode. In this case, the LCD display does not change. The LED behaves according to the configuration in **TX/RX LED in Emergency** while **Suspended Power-off** is enabled.

If **Suspended Power-off** is enabled, the transceiver cannot be turned OFF until the transceiver exits Emergency Mode.



- If Emergency Mode is activated by the Activity Detection function or Bluetooth function, **Suspended Power-off** does not function.
- If Emergency Mode is activated by the Lone Worker function, **Suspended Power-off** functions.
- If Emergency is activated by the Activity Detection function or Bluetooth function while **Suspended Power-off** functions, the transceiver switches to Emergency Mode while **Suspended Power-off** continues to function.

Configuration using KPG-D3/ D3N

Configuring **Suspended Power-off** to be enabled or disabled (See Radio Configuration > Global Options > Emergency > General > Common)

4.9 Placing the Transceiver in Emergency Mode Using the Lone Worker Function

Lone Worker is the function that automatically places the transceiver in Emergency Mode if the transceiver is not operated for a certain period of time.

If the transceiver is placed in Lone Worker Mode while the user has a task at a dangerous place, for instance, the transceiver automatically enters Emergency Mode and notifies a base station of the emergency status because a user cannot operate the transceiver due to an accident.

Since the Lone Worker Tone (2 beeps) sounds from the transceiver prior to entering Emergency Mode if the transceiver is in the Lone Worker Mode, the Lone Worker function can also be used to warn a user.

Enabling the Transceiver in Lone Worker Mode/Disabling Lone Worker Mode

The transceiver enters or exits Lone Worker Mode by a user operating the buttons on the transceiver.

Operating the transceiver

● Placing the Transceiver in Lone Worker Mode/ Exiting Lone Worker Mode

1 Do either of the following operations while the transceiver is not in Lone Worker Mode:

- Press the **Lone Worker** button.
- Select a channel where **Lone Worker** is enabled.
- Press the **Menu** button to enter Menu Mode, select “Lone Worker”, and then select “On”.



The “” icon appears, the transceiver enters Lone Worker Mode, and then **Lone Worker Interval** is activated. The Button Beep A (1 beep) sounds from the transceiver when the **Lone Worker** button is pressed.

2 Do either of the following operations while the transceiver is in Lone Worker Mode:

- Press the **Lone Worker** button.
- Select a channel where **Lone Worker** is disabled.
- Press the **Menu** button to enter Menu Mode, select “Lone Worker”, and then select “Off”.



The “” icon disappears and the transceiver exits Lone Worker Mode.

The Button Beep B (2 beeps) sounds from the transceiver when the **Lone Worker** button is pressed.

If no button is pressed after **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in **Lone Worker Interval** elapses. The Lone Worker Tone (2 beeps) sounds for the duration configured in **Duration of Lone Worker Tone**. If no button is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, and if the time configured in **Duration of Lone Worker Tone** elapses, the transceiver enters Emergency Mode.

The transceiver behaves according to the configuration of Emergency after the transceiver enters Emergency Mode.

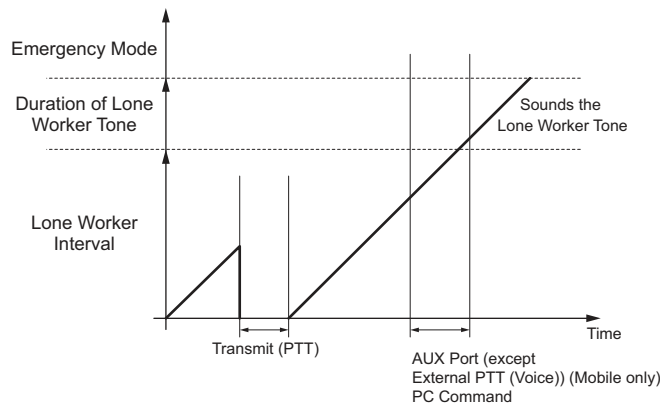


Figure 4-2 Lone Worker Mode

Note

- If “TX/RX Inhibit” is configured in **Lone Worker Type**, Lone Worker cannot be turned On or Off in Menu Mode. (Refer to [Lone Worker Type](#).)
- Lone Worker cannot be activated while the transceiver is in the Stun state or while in Transceiver Password Mode.
- For Mobile, if the AUX Input port to which “Emergency” is assigned becomes active for the time configured in **Emergency Delay Time** while the transceiver is in Lone Worker Mode, the transceiver enters Emergency Mode.
- Lone Worker can be activated even if the Button Lock state is activated while the transceiver is in Lone Worker Mode.
- If the transceiver migrates from Lone Worker Mode to Emergency Mode, the transceiver exits Emergency Mode if the **Emergency** button is pressed for a length of time greater than the length of time configured in **Hold Delay**.
- If a scan initiates while the transceiver is in Lone Worker Mode, the scan initiates with Lone Worker Mode enabled. If the scan starts while the transceiver is in a mode other than Lone Worker mode, the scan starts with Lone Worker Mode disabled.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Lone Worker (DMR Conventional)** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > General > Emergency)
- ([See](#) Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > General > Emergency)

Functions in Lone Worker Mode

The transceiver enters or exits Lone Worker Mode by a user operating the buttons on the transceiver.

The following functions are relevant to Lone Worker Mode.

- Lone Worker Type
- Lone Worker Interval
- Duration of Lone Worker Tone

Lone Worker Type

Lone Worker Type allows you to configure how the transceiver behaves in Lone Worker Mode.

The transceiver behaves as below while in Lone Worker Mode according to the configuration in **Lone Worker Type**:

Table 4-11 Lone Worker Type

Configuration	Description
Normal	Lone Worker Mode can be enabled or disabled by a user pressing the Lone Worker button. A user can transmit and receive using the transceiver in the same manner as normal even if the transceiver enters Lone Worker Mode and while the time configured in Lone Worker Interval is counted. The status of Lone Worker Mode, either enabled or disabled by a user pressing the Lone Worker button, is retained in the transceiver. The status of Lone Worker Mode, either enabled or disabled, is also retained in the transceiver even if the channel is changed or the transceiver is turned ON or OFF.
TX/RX Inhibit	Lone Worker Mode can be enabled or disabled by a user pressing the Lone Worker button. A user cannot transmit or receive using the transceiver while the time configured in Lone Worker Interval is counted after the transceiver enters Lone Worker Mode. Only the following PF buttons can be used while the transceiver is in Lone Worker Mode: • Lone Worker button • Emergency button • Function button • Backlight button • LCD Brightness button • Zeroize button • Battery Status button The status of Lone Worker Mode, either enabled or disabled by a user pressing the Lone Worker button, is retained in the transceiver. The status of Lone Worker Mode, either enabled or disabled, is also retained in the transceiver even if the channel is changed or the transceiver is turned ON or OFF.
Preset	If a channel is selected, Lone Worker Mode is enabled or disabled depending on the configuration in Lone Worker for the selected channel. Also, Lone Worker Mode can be enabled or disabled by a user pressing the Lone Worker button. A user can transmit and receive using the transceiver in the same manner as normal even if the transceiver enters Lone Worker Mode and while the time configured in Lone Worker Interval is counted. The status of Lone Worker Mode, either enabled or disabled by a user pressing the Lone Worker button, is not retained in the transceiver.

Lone Worker Type can be configured using KPG-D3/ D3N depending on the usage of the transceiver. The transceiver behavior varies as below depending on the configuration in **Lone Worker Type**:

Table 4-12 Lone Worker Type

Transceiver Behavior	Configuration in Lone Worker Type		
	Normal	TX/RX Inhibit	Preset
Toggleing Lone Worker Mode between enabled and disabled when a channel is changed	No	No	Yes
Toggleing the Lone Worker Mode between enabled and disabled by a user pressing the Lone Worker button	Yes	Yes	Yes
Retaining the status of Lone Worker Mode, either enabled or disabled, in the transceiver	Yes	Yes	No
Transmitting and receiving by operating the transceiver in the same manner as normal mode	Yes	No	Yes

Yes: Available

No: Unavailable

Configuration using KPG-D3/ D3N

Configuring **Lone Worker Type** ( See Radio Configuration > Global Options > Emergency > General > Lone Worker)

Lone Worker Interval

Lone Worker Interval is the interval time from when the transceiver enters Lone Worker Mode until the Lone Worker Tone (2 beeps) sounds from the transceiver.

If no button is pressed after the transceiver enters Lone Worker Mode and then **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in Lone Worker Interval elapses. For the time configured in **Duration of Lone Worker Tone**, the Lone Worker Tone (2 beeps) sounds from the transceiver.

If any button is pressed before the time configured in **Lone Worker Interval** elapses, **Lone Worker Interval** is reset and then restarts counting down from the beginning. Also, if the **Lone Worker** button is pressed before the time configured in **Lone Worker Interval** elapses, Lone Worker Mode becomes disabled and then the transceiver reverts to the normal mode.

Configuration using KPG-D3/ D3N

Configuring **Lone Worker Interval** ( See Radio Configuration > Global Options > Emergency > General > Lone Worker)

Duration of Lone Worker Tone

Duration of Lone Worker Tone is the length of time that the Lone Worker Tone (2 beeps) sounds from the transceiver.

If no button is pressed after the transceiver enters Lone Worker Mode and then **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in **Lone Worker Interval** elapses. For the time configured in **Duration of Lone Worker Tone**, the Lone Worker Tone (2 beeps) sounds from the transceiver. If no button is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, and if the time configured in **Duration of Lone Worker Tone** elapses, the transceiver enters Emergency Mode.

If any button is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, the Lone Worker Tone (2 beeps) stops sounding, and **Lone Worker Interval** is reset, and then restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

Configuring **Duration of Lone Worker Tone** ( See Radio Configuration > Global Options > Emergency > General > Lone Worker)

4.10 Placing the Transceiver in Emergency Mode by Using the Activity Detection Function

Supported Models: Portable

Activity Detection is the function to detect the status of the transceiver by analyzing the behavior of the transceiver by using the acceleration sensor and tilt sensor embedded in the transceiver, and to automatically place the transceiver in Emergency Mode.

Using this function, if the transceiver detects that the transceiver is tilted, remains stationary, or moves vigorously for a certain period of time due to an accident, the transceiver automatically enters Emergency Mode and notifies the base station of the emergency status.

To use this function, **Activity Detection** must be enabled.

Operating the transceiver

● Enabling Activity Detection/ Disabling Activity Detection

1 Do either of the following operations while Activity Detection is disabled:

- Press the **Activity Detection** button.
- Select a channel where **Activity Detection** is enabled.
- Press the **Menu** button to enter Menu Mode, and select “Activity Detection” and then select “On”.

The “” icon appears and **Activity Detection** will be enabled.

If **Activity Detection** is enabled by using the **Activity Detection** button or the **Menu** button, the Button Beep A (1 beep) sounds from the transceiver.



2 Do either of the following operations while Activity Detection is disabled:

- Press the **Activity Detection** button.
- Select a channel where **Activity Detection** is disabled.
- Press the **Menu** button to enter **Menu Mode**, and select “Activity Detection” and then select “Off”.

The “” icon disappears and Activity Detection will be disabled.

If **Activity Detection** is disabled by using the **Activity Detection** button or the **Menu** button, the Button Beep B (2 beeps) sounds from the transceiver.



Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)
- Configuring **Activity Detection (DMR Conventional)** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > General > Emergency)
- ( See Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > General > Emergency)

Man-down Detection

Man-down Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver becomes tilted and continues this position even after the time configured in **Man-down Delay Time** elapses.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when a user falls due to an accident.

If **Man-down Pre-alert** is configured, a Man-down Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode. The transceiver does not enter Emergency Mode if the transceiver returns from the tilted position before the time configured in **Man-down Delay Time** elapses.

The threshold value of the tilt angle (**Man-down Angle**) to be used to detect that the transceiver is tilted can be configured to 45 °, 60 °, or 75 °.

Note

- Pressing the **PTT** switch while the time configured in **Man-down Delay Time** elapses pauses the **Man-down Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** button resets the **Man-down Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

- Configuring **Man-down Detection** to be enabled or disabled ( **See** Radio Configuration > Global Options > Emergency > General > Man-down)
- Configuring **Man-down Delay Time** ( **See** Radio Configuration > Global Options > Emergency > General > Man-down)
- Configuring **Man-down Pre-alert** to be enabled or disabled ( **See** Radio Configuration > Global Options > Emergency > General > Man-down)
- Configuring **Man-down Angle** ( **See** Radio Configuration > Global Options > Emergency > General > Man-down)

Stationary Detection

Stationary Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver becomes stationary and continues this position even after the time configured in **Stationary Delay Time** elapses.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when a user cannot operate the transceiver due to an accident.

If **Stationary Pre-alert** is configured, a Stationary Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode. The transceiver does not enter Emergency Mode if the transceiver returns from the stationary state before the time configured in **Stationary Delay Time** elapses.

Note

- Pressing the **PTT** switch while the time configured in **Stationary Delay Time** elapses pauses the **Stationary Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** button resets the **Stationary Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

- Configuring **Stationary Detection** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > General > Stationary)
- Configuring **Stationary Delay Time** ( [See](#) Radio Configuration > Global Options > Emergency > General > Stationary)
- Configuring **Stationary Pre-alert** ( [See](#) Radio Configuration > Global Options > Emergency > General > Stationary)

Motion Detection

Motion Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver receives strong shocks by being strongly shaken or swung and continues this state for the time configured in **Motion Delay Time**.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when the transceiver repeatedly receives powerful shocks due to an accident.

If **Motion Pre-alert** is configured, a Motion Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode.

The transceiver does not enter Emergency Mode if the severe movement of the transceiver stops before the time configured in **Motion Delay Time** elapses.

Note

- Pressing the **PTT** switch while the time configured in **Motion Delay Time** elapses pauses the **Motion Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** button resets the **Motion Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

- Configuring **Motion Detection** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > General > Motion)
- Configuring **Motion Delay Time** ( [See](#) Radio Configuration > Global Options > Emergency > General > Motion)
- Configuring **Motion Pre-alert** ( [See](#) Radio Configuration > Global Options > Emergency > General > Motion)

Using Man-down Detection and Stationary Detection Simultaneously (Man-down with Stationary)

Man-down with Stationary is the function to detect emergency using both the **Man-down Detection** and **Stationary Detection** functions.

If this function is enabled, the transceiver detects emergency using both the **Man-down Detection** and **Stationary Detection** functions. If both **Man-down Detection** and **Stationary Detection** enter the detection state, **Man-down Delay Time** is activated. If the time configured in **Man-down Delay Time** elapses while the transceiver continues to be in the state, the transceiver enters Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Man-down with Stationary** to be enabled or disabled ( **See** Radio Configuration > Global Options > Emergency > General > Man-down)

4.11 Transceiver Behavior When the Transceiver Receives an Emergency Status

An Alert Tone can sound when the transceiver receives a DMR Emergency Status. This behavior can be configured for **Emergency Status Response**.

Refer to “[Emergency Status Response](#)” for details of Emergency Response.

Encryption is the function that enhances secrecy in communications on the DMR digital channels by encrypting voice data or user data such as a Short Message and a Long Message.

The following Encryption function can be used in a DMR system.

However, for a Trunking 2.5 system and S-Trunking system, the Enhanced Encryption format is not supported.

- Bit scramble encryption type
- AES/ DES encryption type (AES/DES Advanced Encryption)
- Enhanced Encryption type

To transmit or receive a signal, the communication data can be encrypted or decrypted using the encryption key data configured in the transceiver.

The following are the types of user data and whether the various user data can be encrypted or not:

Table 5-1 Encryptable User Data

User Data	Bit Scramble Encryption Type	AES/ DES Encryption Type (AES/DES Advanced Encryption)/ DES Dedicated Encryption Type (DES Encryption)	Enhanced Encryption Type
Status Message	No	No	No
Short Message	No	Yes	Yes
Long Message	No	Yes	Yes
Transparent	No	Yes	Yes
GPS Data	No	No	No
GPS Combination	Voice: Yes Data: No	Voice: Yes Data: No	Voice: Yes Data: No
GPS Report with Voice	Voice: Yes Data: No	Voice: Yes Data: No	Voice: Yes Data: No
BLE Data	No	No	No
BLE Combination	Voice: Yes Data: No	Voice: Yes Data: No	Voice: Yes Data: No
BLE Report with Voice	Voice: Yes Data: No	Voice: Yes Data: No	Voice: Yes Data: No

Yes: Encryptable, No: Not encryptable

Note

- “Key Fail” appears on the display when the status of the transceiver changes as follows: The transceiver cannot transmit when in the Key Fail status.
 - A channel is changed.
 - Encryption is changed from disabled to enabled.
 - A display reverts to the channel display from Function Mode.
 - Encryption key data is deleted by Key Delete or Zeroize.
 - Emergency Mode is exited.

5.1 Bit Scramble Encryption Type

The bit scramble encryption type is the Encryption function embedded in the transceiver.

To transmit or receive a signal, the communication data can be encrypted or decrypted using the encryption key data configured in the transceiver. By means of bit scramble, the transceiver can encrypt audio data only.

Transmit Behavior

By means of bit scramble, the transceiver can encrypt audio data only. If Encryption is enabled, the transceiver encrypts and then sends audio data. If Encryption is disabled, the transceiver transmits audio data without encryption.

Operating the transceiver

Press the **PTT** switch while Encryption is enabled.

The transceiver encrypts audio data and then sends the data.



Note

- The “◆” icon appears if Encryption is enabled.

Receive Behavior

Upon receipt of the encrypted communication data, the transceiver behaves as follows according to the Encryption status (enabled or disabled) and the configuration for **Encryption Type** (DMR).

If Encryption is enabled:

For audio data, regardless of the configuration for **Encryption Type** (DMR), the received audio sounds from the speaker according to the audio control conditions and the configuration in the Multi-key List.

By means of bit scramble, the transceiver can decrypt encrypted audio data only. Upon receipt of the encrypted audio data, the transceiver decrypts the received data using the encryption key data that is corresponding to the Multi-key List Number configured for the channel on which the transceiver waited. If the data is properly decrypted, the received audio sounds from the speaker. If the data is decrypted incorrectly, the received audio sounds incompletely from the speaker.

If Encryption is disabled:

The following are the transceiver behaviors that may vary depending on the configuration for **Encryption Type** (DMR) (Type 1 or Type 2):

● Type 1

The transceiver behaves in the same manner as a transceiver with Encryption enabled.

However, if the transceiver receives an encrypted signal on the channel with Encryption disabled, no received audio sounds from the speaker.

● Type 2

No received audio sounds from the speaker.

Note

- When unencrypted communication data is received, the transceiver emits the received audio from the speaker according to the audio control conditions regardless of the Encryption status (enabled or disabled) or configuration for **Encryption Type** (DMR).

Transceiver behavior

Receives an encrypted signal.

The “◆” icon blinks if all of the following codes and IDs match:

- Color Code (DMR Conventional only)
- Key ID
- Group ID (upon receipt of an Unaddressed Call/ Group Call) (DMR Conventional only)
- Talkgroup ID (upon receipt of a Group Call) (DMR-based Trunking only)
- Unit ID (upon receipt of an Individual Call/ Telephone Call (DMR-based Trunking only))



Configuration using KPG-D3/ D3N

Configuring **Encryption Type** (DMR) ( See Radio Configuration > Global Options > Security > Scrambler/Encryption > DMR)

About the Configuration of Encryption Key Data

The encryption key data that is used for the Encryption function by means of bit scramble can be configured by up to 32 entries in the Multi-key List by using KPG-D3/ D3N.

The Encryption status (to be enabled or disabled) and the Multi-key List Number with the encryption key data can be configured for each channel. (Refer to [Multi-key List](#).)

Also, the Encryption status (enabled or disabled) and the encryption key data used for communication can be changed by operating the transceiver. (Refer to [Toggling the Encryption during Transmission between Enabled and Disabled](#), [Configuring the Encryption Key Data Used for Communications](#).)

5.2 AES/ DES Encryption Type (AES/DES Advanced Encryption)

The AES/ DES encryption type is the Encryption function that encrypts user data, such as audio data or a Short Message, by using AES-256 bit/ DES-56 bit.

The encryption function for the AES/ DES encryption type is a Software Option. To use this function, the **AES/DES Advanced Encryption** (KWD-3503AE) function needs to be enabled for the transceiver with KPT-300LMC.

Transmit Behavior

If Encryption is enabled, the transceiver encrypts and then sends voice data or user data such as audio data or a Short Message. If Encryption is disabled, the transceiver transmits communication data without encryption.

Operating the transceiver

Press the **PTT** switch while Encryption is enabled.

The transceiver encrypts various communication data and then sends the data.



- The “” or “” icon appears if Encryption is enabled.

Receive Behavior

Upon receipt of the encrypted communication data, the transceiver behaves as follows according to the Encryption status (enabled or disabled) and the configuration for **Encryption Type** (DMR).

If Encryption is enabled:

For audio data, regardless of the configuration for **Encryption Type** (DMR), the received audio sounds from the speaker according to the audio control conditions and the configuration in the Multi-key List.

For user data such as a Short Message, the data receiving behavior is executed according to the registration status of Multi-key List.

The transceiver scans Key IDs (1 to 255) in the transceiver if the transceiver receives an encrypted signal.

If the Algorithm (AES or DES) and Key ID included in the encryption key data used for encryption of the received communication data match the Algorithm and Key ID included in the encryption key data configured in the transceiver, the transceiver uses the encryption key data to decrypt the data. If the data is properly decrypted, the received audio sounds from the speaker. If the data is decrypted incorrectly, the received audio sounds incompletely from the speaker. The transceiver mutes the speaker if the parameters for Algorithm do not match or if the Key IDs do not match.

Data is decrypted by the same method when user data such as a Short Message is received. If data is correctly decrypted, the data receiving behavior is executed. If data is not correctly decrypted, the data is canceled.

If Encryption is disabled:

The following are the transceiver behaviors that may vary depending on the configuration for **Encryption Type** (DMR) (Type 1 or Type 2):

● Type 1

The transceiver behaves in the same manner as a transceiver with Encryption enabled.

However, if the transceiver receives an encrypted signal on the channel with Encryption disabled, no received audio sounds from the speaker.

● Type 2

No received audio sounds from the speaker.

Note

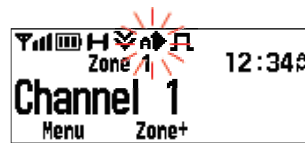
- When unencrypted communication data is received, the transceiver emits the received audio from the speaker according to the audio control conditions regardless of the Encryption status (enabled or disabled) or configuration for **Encryption Type** (DMR).

Transceiver behavior

Receives an encrypted signal.

The “**A**” or “**D**” icon blinks if all of the following codes and IDs match:

- Color Code
- Key ID
- Group ID (upon receipt of an Unaddressed Call/ Group Call)
- Unit ID (upon receipt of an Individual Call)

**Configuration using KPG-D3/ D3N**

Configuring **Encryption Type** (DMR) ( See) Radio Configuration > Global Options > Security > Scrambler/Encryption > DMR)

About the Configuration of Encryption Key Data

A maximum of 256 entries of AES/ DES encryption key data can be configured in the transceiver. The AES/ DES encryption key data is written to the transceiver by using Software Key Loader (KPG-AE1/ KPG-DE1).

The Encryption status (to be enabled or disabled) and the Multi-key List Number with the encryption key data can be configured for each channel. (Refer to [Multi-key List](#).)

Also, the Encryption status (enabled or disabled) and the encryption key data used for communication can be changed by operating the transceiver. (Refer to [Toggling the Encryption during Transmission between Enabled and Disabled](#), [Configuring the Encryption Key Data Used for Communications](#).)

About writing AES encryption key data

To write AES encryption key data to the transceiver, the Encryption Library corresponding to the firmware of the transceiver needs to be written to the transceiver by using Kenwood Firmware Loader (KFL).

Note

- The version of Encryption Library can be confirmed in Transceiver Information Mode. (Refer to Common Function Part [Checking the Firmware Version \(Transceiver Information Mode\)](#).)
- If the Encryption Library written to the transceiver does not correspond to the firmware version of the transceiver, “Enc Lib Ver Er” appears on the display when the transceiver is turned ON.
- Encryption Library can be deleted by executing Cancellation of **AES/DES Advanced Encryption** (KWD-3503AE) with KPT-300LMC. In this case, AES encryption key data is deleted when the transceiver is turned ON again.
- Encryption Library can be deleted with Kenwood Firmware Loader (KFL). In this case, AES encryption key data is deleted at the same time.

Behavior When the Transceiver Is Turned ON

When the transceiver is turned ON, The following procedures are executed until the transceiver migrates to the standby status:

- 1) Self Test
- 2) Key Retention (Timed)
- 3) External Zeroize (Mobile only)
- 4) Zeroize when data changed

Transceiver behavior

1 The transceiver is turned ON.

Self Test and Key Retention of Encryption Library are executed.

2 Various procedures end.

When various procedures end, the transceiver turns ON in user mode.



Note

- The Following messages appear on the display for 2 sec depending on the result of the procedures:

Table 5-2 Display When the Transceiver Is Turned ON

Display	Description
Enc Lib Ver Er	The version of Encryption Library does not correspond to the firmware version of the transceiver. In this case, encrypted communications by means of AES/ DES are not available.
Selftest Error	The result of Self Test is an error. In this case, encrypted communications by means of AES/ DES are not available.
Key Erased	Zeroize is executed due to the following causes: - Timed Key Retention - FPU Key Retention - External Zeroize (Mobile only)

5.3 DES Dedicated Encryption Type (DES Encryption)

The DES dedicated encryption type is the Encryption function that encrypts user data, such as audio data or a Short Message, by using DES-56 bit. DES encrypted communication can be done even if the Encryption Library is not written to the transceiver.

The Encryption function for the DES dedicated encryption type is a Software Option. To use this function, the **DES Encryption** (KWD-3505DE) function needs to be enabled for the transceiver with KPT-300LMC.

The Encryption function for the DES dedicated encryption type is the same as the DES encryption type of the AES/ DES encryption type. Refer to "[AES/ DES Encryption Type \(AES/DES Advanced Encryption\)](#)" for details of the function.

5.4 Enhanced Encryption

The Enhanced Encryption type is the encryption type that is defined by the DMR Association, and is the Encryption function using a 40 bit encryption key.

The Encryption function for the ARC4 encryption type is a Software Option. To use this function, the **Enhanced Encryption** (KWD-3502EE) function needs to be enabled for the transceiver with KPT-300LMC.



- **Enhanced Encryption** is not supported in a Trunking 2.5 system and S-Trunking system.

Transmit Behavior

If Encryption is enabled, the transceiver encrypts and then sends voice data or user data such as audio data or a Short Message. If Encryption is disabled, the transceiver transmits communication data without encryption.

Operating the transceiver

Press the **PTT** switch while Encryption is enabled.

The transceiver encrypts various communication data and then sends the data.



- The “**E**◆” icon appears if Encryption is enabled.

Receive Behavior

Upon receipt of the encrypted communication data, the transceiver behaves as follows according to the Encryption status (enabled or disabled):

If Encryption is enabled:

For audio data, the received audio sounds from the speaker according to the audio control conditions and the configuration in the Multi-key List.

The transceiver scans Key IDs (1 to 255) in Multi-key List if the transceiver receives an encrypted signal.

For audio data, if the Key ID included in the encryption key data of the received signal matches the Key ID included in the encryption key data configured for the transceiver, the transceiver uses this encryption key data to decrypt the data. If the data is properly decrypted, the received audio sounds from the speaker. If the data is decrypted incorrectly, the received audio sounds incompletely from the speaker. The transceiver mutes the speaker if the Key IDs do not match.

Data is decrypted by the same method when user data such as a Short Message is received. If data is correctly decrypted, the data receiving behavior is executed. If data is not correctly decrypted, the data is canceled.

In a DMR-based Trunking system, the transceiver does not behave on a channel with Trunking 2.5 or S-Trunking configured in **Trunking Format** even if the transceiver receives the data encrypted by using ARC4.

If Encryption is disabled:

The transceiver behaves in the same manner as a transceiver with Encryption enabled.

Note

- Upon receipt of unencrypted communication data, the transceiver emits the received audio from the speaker according to the audio control conditions regardless of the Encryption status (enabled or disabled).

Transceiver behavior

Receives an encrypted signal.

The “” icon blinks if all of the following codes and IDs match:

- Color Code (DMR Conventional only)
- Key ID
- Group ID (upon receipt of an Unaddressed Call/ Group Call) (DMR Conventional only)
- Talkgroup ID (upon receipt of a Group Call) (DMR-based Trunking only)
- Unit ID (upon receipt of an Individual Call/ Telephone Call) (DMR-based Trunking only)



About the Configuration of Encryption Key Data

The encryption key data that is used for the Encryption function by means of ARC4 can be configured by up to 32 entries in the Multi-key List by using KPG-D3/ D3N.

The Encryption status (to be enabled or disabled) and the Multi-key List Number with the encryption key data can be configured for each channel. (Refer to [Multi-key List](#).)

Also, the Encryption status (enabled or disabled) and the encryption key data used for communication can be changed by operating the transceiver. (Refer to [Toggling the Encryption during Transmission between Enabled and Disabled](#), [Configuring the Encryption Key Data Used for Communications](#).)

Note

- **Enhanced Encryption** is the function to convert audio data or communication data to encrypted data. ARC4 (Alleged RC4) used for **Enhanced Encryption** and RC4 use the same encryption type. Secrecy in communications can be enhanced by encryption.
- “RC4” is a registered trademark of RSA Security LLC.

5.5 Toggling the Encryption during Transmission between Enabled and Disabled

Pressing the **Scrambler/Encryption** button toggles the status of Encryption during transmission between enabled and disabled.

Or, Encryption during transmission can be toggled between enabled and disabled by pressing the **Menu** button to enter Menu Mode, and then selecting “Scrambler/Encryption”. (Refer to Common Function Part [Using Menu Mode.](#))

If Encryption is enabled, the transceiver encrypts and then sends voice data or user data such as audio data or a Short Message. If Encryption is disabled, the transceiver transmits communication data without encryption.

Note

- The Encryption status (to be enabled or disabled) can be configured for each channel, so the configured Encryption status applies only for the selected channel.
- If the status of Scrambler/Encryption (to be enabled or disabled) is switched for the channel where “Mixed” is configured in **Channel Type**, the status of Scrambler/Encryption (to be enabled or disabled) applies for a channel according to the mode (either Analog or DMR) configured in **Transmit Mode** of the channel.

Operating the transceiver

● Configuring Encryption during transmission to be enabled

Press the **Scrambler/Encryption** button while Encryption is disabled.

- For the bit scramble encryption type

The “◆” icon appears and then Encryption will be enabled.



- For the Enhanced Encryption type

The “E◆” icon appears and then Encryption will be enabled.



- For the AES/ DES encryption type

The “A◆” icon or “D◆” icon appears and Encryption is enabled.



Pressing the **PTT** switch encrypts and sends the audio data.

Note

- The “A◆” icon appears if the encryption type is AES, and the “D◆” icon appears if the encryption type is DES.

● Configuring Encryption during transmission to be disabled

Press the **Scrambler/Encryption** button while Encryption is enabled.

- Bit scramble encryption type
The “◆” icon disappears and Encryption will be disabled.
- For the Enhanced Encryption type
The “E◆” icon disappears and Encryption will be disabled.
- For the AES/ DES encryption type
The “A◆” icon or “D◆” icon disappears and Encryption is disabled.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

5.6

Configuring the Encryption Key Data Used for Communications

The encryption key data used for communications can be configured by selecting the encryption key data from the **Multi-key List**.

The encryption key data used for transmission can be configured for each channel by selecting the encryption key data from **Multi-key List** by using KPG-D3/ D3N. (Refer to [Multi-key List](#).)

To change the encryption key data, place the transceiver in Scrambler/Encryption Code Mode. In Scrambler/Encryption Code Mode, a **Multi-key List Number** corresponding to the encryption key data used for transmission can be selected from the **Multi-key List** configured for the transceiver.

Pressing and holding the **Scrambler/Encryption** button causes the transceiver to enter Encryption Code Mode.

Or, the transceiver can also enter Scrambler/Encryption Code Mode by pressing the **Menu** button to place the transceiver in Menu Mode and then selecting “Scrambler/Encryption Code”. (Refer to Common Function Part [Using Menu Mode](#).)

Note

- For a Trunking 2.5 system and S-Trunking system, a Multi-key corresponding to ARC4 (Enhanced Encryption) cannot be configured from the Multi-key List.

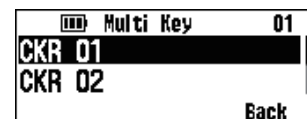
Operating the transceiver

1 Press and hold the **Scrambler/Encryption** button.

The transceiver enters Scrambler/Encryption Code Mode.

The Multi-key configured for a channel appears.

The following operations are identical even if the transceiver enters Scrambler/Encryption Code Mode by pressing the **Menu** button.



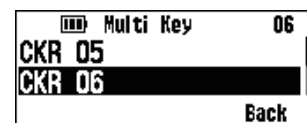
Note

- If Encryption is disabled, Encryption will be enabled when the transceiver enters Scrambler/Encryption Code Mode. Even after the transceiver exits from Scrambler/Encryption Code Mode, Encryption remains enabled.

2 Select the Multi-key by pressing the [▲] or [▼] button.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

Selecting “Preset” can restore the value preconfigured for the selected channel.



Note

- If the encryption key data corresponding to the selected Multi-key is not configured in the transceiver, or if the encryption key data is deleted from the transceiver, “Erased” appears (the AES/ DES encryption type only).

3 Press the Menu ([□]) or [*] button.

The Multi-key selected in step 2 is configured for the selected channel.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver (See Radio Configuration > Global Options > Button Assignment)

5.7 Multi-key List

Multi-key List is the list to configure the encryption key data used for the encryption and decryption of communication data. A maximum of 32 entries of encryption key data can be configured in the **Multi-key List** by using KPG-D3/ D3N. However, only one of the encryption key data can be used for transmission.

Multi-key List can be configured with encryption key data by means of bit scramble and encryption key data by means of AES/ DES and ARC4 mixed.

The parameters that need to be configured vary depending on the encryption type to be used.

Common configuration

● Protocol

In **Protocol**, the type of the Encryption function can be configured. In a DMR Conventional system, “DMR” is configured in **Protocol**.

● Type

In **Type**, the encryption type can be configured.

Scrambler: Bit scramble encryption type

AES/ DES: AES/ DES encryption type

DES: DES dedicated encryption type

Enhanced: ARC4 encryption type

Bit scramble encryption type

- **Key Data**

In **Key Data**, the encryption key data in the range between 1 and 32767 can be configured.

- **Key Name**

In **Key Name**, a name corresponding to the encryption key data can be configured by using a maximum of 14 alphanumeric characters and symbols.

AES/ DES encryption type

Key ID and Key Data are written to the transceiver by using Software Key Loader (KPG-AE1/ KPG-DE1).

In Multi-key List, a CKR ID, which is encryption key information used to associate it with encryption key data written in the transceiver, must be configured.

- **CKR ID**

CKR ID allows you to configure a CKR ID of the encryption key data configured in the transceiver by using Software Key Loader in the range between 1 and 4095.

- **Key Name**

In **Key Name**, a name corresponding to the encryption key data can be configured by using a maximum of 14 alphanumeric characters and symbols.

ARC4 encryption type

- **Key Data**

In **Key Data**, the encryption key data in the range between 1 and FFFFFFFFEE can be configured.

- **Key ID**

Key ID allows you to configure an ID code to identify the encryption key data in the range of 1 to 255.

- **Key Name**

In **Key Name**, a name corresponding to the encryption key data can be configured by using a maximum of 14 alphanumeric characters and symbols.

Configuration using KPG-D3/ D3N

Configuring **Multi-key List** ( See Radio Configuration > Global Options > Security > Encryption Multi-key List)

5.8 Protection Function of Encryption Key Data (Key Retention)

Key Retention is the function to delete the encryption key data information stored in the transceiver according to the configuration using KPG-D3/ D3N.

Using this function, the encryption key data can automatically be deleted, for instance, in case the transceiver is stolen or the transceiver has been left unused.

The transceiver behaves as follows according to the configuration in Key Retention:

Table 5-3 Key Retention

Configuration	Description
Infinite	The encryption key data is not deleted.
Timed (Other than Portable (Basic Model))	If the transceiver is turned OFF for a duration longer than the duration configured by using KPG-D3/ D3N, the encryption key data is deleted. For the duration that can be configured by using KPG-D3/ D3N, 1, 3, 7, 10, or 30 (days) can be selected. By directly editing the memory map, a duration other than the value above can also be configured. In addition to when the transceiver is turned OFF, in consideration that the battery pack may be removed, the date and time history of when the transceiver is turned OFF is backed up once an hour while the transceiver behaves in user mode.

Note

- The AES/ DES encryption key data is not deleted even if **AES/DES Advanced Encryption** is changed from enabled to disabled using KPG-D3/ D3N while the AES/ DES encryption key data is configured in the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Key Retention** ( See Radio Configuration > Global Options > Security > Scrambler/Encryption > Key Retention)
- Configuring **Duration** ( See Radio Configuration > Global Options > Security > Scrambler/Encryption > Key Retention)

5.9 Deleting Encryption Key Data (Key Delete)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Key Delete is the function to delete the encryption key data configured in the transceiver by Software Key Loader.

The transceiver needs to enter Key Delete Mode in order to delete the encryption key data by using this function.

Pressing the **Key Delete** button places the transceiver in Key Delete Mode.

The transceiver can also enter Key Delete Mode by pressing the **Menu** button to place the transceiver in Menu Mode and then selecting "Key Delete". (Refer to Common Function Part [Using Menu Mode.](#))

Operating the transceiver

- **Deleting one encryption key data**

1 Press the **Key Delete** button.

Enters Key Delete Mode.

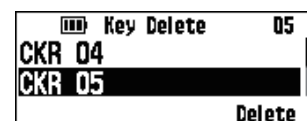
The following operations are identical even if the transceiver enters Key Delete Mode by pressing the **Menu** button.

2 Select the encryption key data from Multi-key List by pressing the [▲] or [▼] button.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

Note

- The encryption key data configured as follows in Multi-key List is not displayed:
 - Protocol:** NXDN, **Type:** NXDN
 - Protocol:** DMR, **Type:** DMR or ARC4



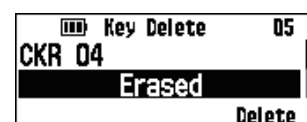
3 Press the Back ([↩]) or [#] button.

“Delete?” appears.



4 Press the Menu ([□]) or [*] button.

The selected encryption key data is deleted.



● Deleting all encryption key data

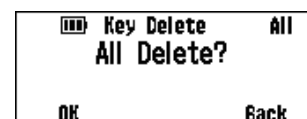
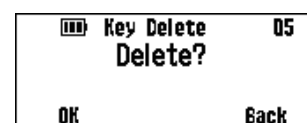
1 Press the Key Delete button.

Enters Key Delete Mode.

The following operations are identical even if the transceiver enters Key Delete Mode by pressing the **Menu** button.

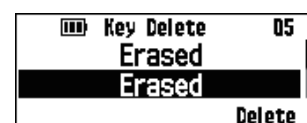
2 Press and hold the Back ([↩]) or [#] button.

“Delete?” appears, and then “All Delete?” appears.



3 Press the Menu ([□]) or [*] button.

All encryption key data are deleted.



Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)

5.10 Deleting Encryption Key Data by Using the Zeroize Function

Zeroize is the function to delete all encryption key data configured in the transceiver by Software Key Loader.

The transceiver executes Zeroize in the following cases:

- 1) If Zeroize is executed by pressing the **Zeroize** button
 - Refer to [Executing the Zeroize process by using the Zeroize button](#).
- 2) If Zeroize is executed from Menu Mode
 - Refer to [Executing the Zeroize process by using the Menu Mode](#).
- 3) If Zeroize of the AUX Input port is executed on Mobile
 - Refer to [Executing the Zeroize process by using the AUX Input port](#).
- 4) If the transceiver has been turned OFF longer than the time configured in KPG-D3/ D3N when the transceiver is turned ON
 - Refer to [Protection Function of Encryption Key Data \(Key Retention\)](#).
- 5) If **Zeroize** is enabled when configuration data is written to the transceiver using KPG-D3/ D3N

If the configuration data is written to the transceiver by clicking on **Zeroize** of **Write Data List** in KPG-D3/ D3N, all encryption key data configured in the transceiver by Software Key Loader are deleted.
- 6) If Transceiver Password entry fails 15 times in a row

All encryption key data configured in the transceiver by Software Key Loader are deleted if an incorrect password is entered 15 times in a row when the transceiver is turned ON with the transceiver password configured. In this case, the user will not be notified that the encryption key data has been deleted. Therefore, "Key Erased" does not appear on the display.

Also, the number of failed times cannot be reset until the entered password matches the password configured in the transceiver even if the transceiver is turned OFF.
- 7) If all Keys are deleted in Key Delete Mode
 - Refer to [Deleting Encryption Key Data \(Key Delete\)](#).
- 8) If AES/DES Advanced Encryption (KWD-3503AE) is changed from permitted to not permitted in KPT-300LMC

The following describes the operation from 1) to 3):

Executing the Zeroize process by using the Zeroize button

1 Press the **Zeroize** button.

"Key Erasing" appears and Zeroize is executed.



2 Zeroize completes.

A Button Beep C (3 beeps) sounds from the transceiver, and "Key Erased" appears on the display for 2 sec.



Then, A Key Fail Alert Tone (6 beeps) sounds from the transceiver every 10 sec and displays "Key Fail" for 1 sec, and then the transceiver restores the channel display.



Executing the Zeroize process by using the Menu Mode

1 Press the **Menu** button to enter Menu Mode and then select “Zeroize”.

“Key Erasing” appears and Zeroize is executed.

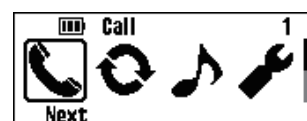


2 Zeroize completes.

A Button Beep C (3 beeps) sounds from the transceiver, and “Key Erased” appears on the display for 2 sec.



Then, the transceiver returns to Menu Mode.



Executing the Zeroize process by using the AUX Input port

Supported Models: Mobile

The encryption key data can be deleted by assigning “Zeroize” to an AUX Input port and toggling the status of the port between High and Low.

All encryption key data configured in the transceiver by Software Key Loader are deleted if Low or High level is continuously detected for the time configured in **Zeroize Delay Time**.

Note

- If Active High is configured for the logic of the Zeroize port, and if High level is detected when the transceiver is turned ON, Zeroize is executed regardless of the configuration in **Zeroize Delay Time**.
- If the transceiver is in the following state, the Zeroize is not executed:
 - In the Transceiver Inhibit state
 - In the Transmit Inhibit state
 - In the Stun state
 - While transmitting Power-off Status
 - While executing Zeroize

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver (See Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port (See Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)
- Configuring **Zeroize Delay Time** (See Radio Configuration > Global Options > External Device > Mobile AUX > AUX Input)
- Configuring **Zeroize** to be enabled or disabled (See Read/Write > Write Configuration > Write Data List)

5.11 Unencrypted Call Alert Tone

Unencrypted Call Alert Tone is the function used to notify a user with a short beep that the communication data is not encrypted when the transceiver starts transmitting without communication data being encrypted.

If this function is enabled, an Unencrypted Call Alert Tone (1 beep) sounds from the transceiver if Encryption of the channel is disabled when the transceiver transmits.

Note

- If both **Unencrypted Call Alert Tone** and **PTT Proceed Tone** are enabled, a Proceed Tone (3 beeps) sounds from the transceiver after an Unencrypted Call Alert Tone (1 beep) sounds.

Configuration using KPG-D3/ D3N

Configuring **Unencrypted Call Alert Tone** to be enabled or disabled ( See Radio Configuration > Global Options > Security > Scrambler/Encryption)

5.12 Retain Scrambler/Encryption Status

Retain Scrambler/Encryption Status is the function to retain the enabled or disabled status of the Encryption function for each channel and the configuration of a Multi-key for each channel.

If **Retain Scrambler/Encryption Status** is enabled, the stored configurations of the Encryption function status (enabled or disabled) and **Multi-key List Number** are read as defaults when data is read from the transceiver by using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

Configuring **Retain Scrambler/Encryption Status** ( See Radio Configuration > Global Options > Security > Scrambler/Encryption)

5.13 About the Behavior of the LED (Secure Indicator) (DMR-based Trunking System Only)

Secure Indicator is the function to flash the LED green when the transceiver receives an encrypted voice call in a DMR-based Trunking system.

If this function is enabled, the LED of the transceiver flashes green when the transceiver receives an encrypted voice call on a communication channel.

The following is the relationship between **Busy LED** and **Secure Indicator**:

Table 5-4 Secure Indicator

Configuration using KPG-D3/ D3N		Encryption status of the received signal	
Secure Indicator	Busy LED	Clear	Secure
Check	Check	Lights	Flashes
	Uncheck	Disappears	Flashes
Uncheck	Check	Lights	Lights
	Uncheck	Disappears	Disappears

Configuration using KPG-D3/ D3N

Configuring **Secure Indicator** to be enabled or disabled ( See Radio Configuration> System Properties> Systems> DMR-based Trunking> RX/TX Options> RX Options)

Scan is the function to check whether the transceiver receives a call from other transceivers.

The transceiver sequentially searches for availability of signal on each channel, and the transceiver receives on the channel where the signal is detected.

Three methods are available for Scan as shown below.

● Single Scan

The transceiver scans target channels in the same zone.

● List Scan

The transceiver scans the Zone-channel registered as a member in a Scan List.

● Multi-Zone Scan

The transceiver scans all target channels in the target zones.

Note

- Because Site Roaming is executed for a channel with “DMR Site Roaming” configured in **Protocol Type**, the configuration in **Scan Type** is disabled. Refer to “[Migrating Automatically to the Site Providing Better Radio Environment \(Site Roaming\)](#)” for instructions on scanning by Site Roaming.

6.1

Starting the Scan

Scan can be started by one of the following methods:

● Operating the PF buttons

- Pressing the **Scan** button starts or stops scanning.
- Pressing the **Scan Normal** button starts or stops scanning.
- Even if the Priority Channel is configured, pressing the **Scan Normal** button disables the Priority Channel and mandatorily executes Non-Priority Scan.
- Executing “Scan” or “Scan Normal” after pressing the **Menu** button to enter Menu Mode starts or stops scanning.

● Status changes of the AUX Input port (Mobile only)

When the AUX Input port where “Scan” is assigned goes low level, the scan starts. When the AUX Input port where “Scan” is assigned goes high level, the scan stops.

● Turning the transceiver on

If **Power-on Scan** is enabled, the scan starts when the transceiver is turned on. (Refer to [Power-on Scan](#).)

● Selecting a channel

The scan starts if a channel with **Auto Scan** enabled is selected. (Refer to [Auto Scan](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port ( [See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)

6.2 Scanning in One Zone (Single Scan)

The transceiver scans using Single Scan all the added channels in the zone where the transceiver starts scanning.

If a scan starts in the zone where “Single-Zone” is configured in **Scan Type**, Single Scan is executed. Or, if the transceiver migrates during the scan to the zone where “Single” is configured in **Scan Type**, Single Scan is executed.

The target channel for scan is either the channel with **Scan Add** enabled by using KPG-D3/ D3N or the channel with **Scan Add** enabled by using the **Scan Delete/Add** button.

Operating the transceiver

1 Press the **Scan** button.

The scan starts after a Button Beep A (1 beep) sounds from the transceiver.

The “” icon appears.

If **Revert Channel Display** is enabled, Revert Channel is displayed.

For Portable, if the scan is not Priority Scan, the LED flashes according to the configuration of **Non-Priority Scan LED**, and if the scan is Priority Scan, the LED flashes according to the configuration of **Priority Scan LED**.



Note

- The transceiver behaves in the same manner even if the scan is started by other method. (Refer to [Starting the Scan.](#))
- For Portable (Basic Model), **Revert Channel Display** cannot be configured.

2 Press the **Scan** button during the scan.

The scan completes after a Button Beep B (2 beeps) sounds from the transceiver and the “” icon disappears.



Note

- Single Scan functions only in the zone consisting of channels of the same system. However, Single Scan functions even when the zone includes Conventional channels of other systems or channels of an LTR Trunking system.
- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to [Selected Channel Scan.](#))
- If All Group IDs are selected in the channel of a DMR-based Trunking system and even if the All Group IDs are excluded from the target for scanning, those All Group IDs are scanned.
- For Portable, if a zone is changed by using the **Selector** with “Zone Select” configured during Single Scan and if the zone is not configured, the “” icon blinks and the scan pauses.
- If another zone is selected during the Single Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Scan Add** in DMR Conventional to be enabled or disabled ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Individually > DMR Conventional > Channel Information > Scan)
- Configuring **Scan Add** in DMR-based Trunking to be enabled or disabled ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Individually > DMR-based Trunking > Channel Information > Scan)
- Configuring **Scan Type** ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan)
- Configuring **Revert Channel Display** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > General > Indicator)

Conditions to Activate the Scan (Single Scan)

One of the following conditions must be satisfied for the transceiver to start the Single Scan:

- **For a DMR Conventional system:**
 - Two or more channels exist in the zone where the transceiver scans.
 - A channel to be scanned and a Priority Channel exist in the zone.
 - Even if no channel to be scanned exists, Priority Channel 1 and Priority Channel 2 exist in the zone.
- **For a DMR-based Trunking system:**
 - Two or more channels to be scanned exist in the zone.
 - One channel to be scanned and one Group ID configured in Priority Monitor ID exist in the zone.
 - Two Group IDs configured in Priority Monitor ID exist in the zone even if a channel to be scanned does not exist in the zone.

Conditions to Resume the Scan (Single Scan)

One of the following conditions must be satisfied to resume the scan while the transceiver pauses the scan:

- Two or more channels exist in the zone where the transceiver scans.
- A channel to be scanned and a Priority Channel to be scanned exist in the zone.
- Even if no channel to be scanned exists, Priority Channel 1 and Priority Channel 2 to be scanned exist in the zone.

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (Single Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the **Revert Channel**. Upon elapse of the time configured in **Dwell Time** after completion of the transmission, the transceiver reverts to the selected channel, and the scan does not resume.

6.3 Scan by Registering Multiple Target Channels for Scan in the List (List Scan)

Using the List Scan enables the transceiver to scan the Zone-channels registered as a member in a Scan List.

If a scan starts in a zone where “List” is configured in **Scan Type** or on a channel where a Scan List number is configured, List Scan is executed. Or, if the transceiver is in the zone where “List” is configured in **Scan Type** and migrates to the channel where a Scan List number is configured during the scan, List Scan is executed.

Note

- List Scan cannot be executed in a DMR-based Trunking system.

Operating the transceiver

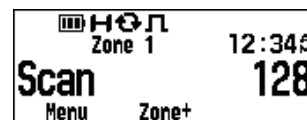
1 Press the **Scan** button.

The scan starts after a Button Beep A (1 beep) sounds from the transceiver.

The “” icon appears.

If **Revert Channel Display** is enabled, Revert Channel is displayed.

For Portable, if the scan is not Priority Scan, the LED flashes according to the configuration of **Non-Priority Scan LED**, and if the scan is Priority Scan, the LED flashes according to the configuration of **Priority Scan LED**.



Note

- The transceiver behaves in the same manner even if the scan is started by other method. (Refer to [Starting the Scan](#).)
- For Portable (Basic Model), **Revert Channel Display** cannot be configured.

2 Press the **Scan** button during the scan.

The scan completes after a Button Beep B (2 beeps) sounds from the transceiver and the “” icon disappears.



Note

- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to [Selected Channel Scan](#).)
- If another zone is selected during the List Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Scan List** ( [See](#) Radio Configuration > Global Options > Scan > List Scan > List)
- Configuring a Scan List number ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Individually > DMR Conventional > Channel Information > Scan)
- Configuring **Scan Type** ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan)
- Configuring **Revert Channel Display** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > General > Indicator)

Conditions to Activate the Scan (List Scan)

For the transceiver to start the List Scan, 2 or more Zone-channels must be registered as members in a Scan List.

Note

- A Priority Channel is always registered as a member in a Scan List. However, if “Selected” is configured for the type of the Priority Channel (**Type**), the selected channel becomes the Priority Channel and target channel for scan, regardless of the configuration in **Selected Channel Scan** or whether the selected channel is registered as a member in a Scan List. (Refer to [Priority Channel Type \(Type\)](#).)
- If **Selected Channel Scan** is enabled, the scan can be initiated even if only a single Zone-channel is configured as a member in a Scan List because the selected channel also becomes the target channel for scan.

Conditions to Resume the Scan (List Scan)

For the transceiver to resume the List Scan, 2 or more Zone-channels to be scanned must be registered as members in a Scan List.

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

Note

- If a channel is temporarily excluded from the target channels for scanning by the **Temporary Delete/Add** function, the channel is not scanned even if the channel is registered as a member in Scan List.
- If **Selected Channel Scan** is enabled, the scan can be resumed even if only a single Zone-channel is configured as a member in a Scan List because the selected channel also becomes the target channel for scan.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (List Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the **Revert Channel**. Upon elapse of the time configured in **Dwell Time** after completion of the transmission, the transceiver reverts to the selected channel, and the scan does not resume.

Scan List

In order to use List Scan, target members for List Scan must be registered in a Scan List. A maximum of 128 Scan Lists can be configured. In each Scan List, a maximum of 31 Zone-channels can be registered as target members for List Scan.

Scan Type (List Scan)

In order to register a target member for List Scan, **Scan Type (List Scan)** must be configured.

Table 6-1 Scan Type (List Scan)

Configuration	Description
Conventional	A Zone-channel in a system where “Analog Conventional”, “NXDN Conventional”, or “DMR Conventional” is configured in Protocol Type can be registered as a member for List Scan. Configuring a Priority Channel enables Priority Scan.
LTR and Conventional	A Zone-channel in a system where “LTR Trunking”, “Analog Conventional”, “NXDN Conventional”, or “DMR Conventional” is configured in Protocol can be registered as a member for List Scan.

Scan List number (Channel)

List Scan is executed according to the Scan List number configured for the channel where scan is initiated. According to the configuration in **Scan List**, List Scan is executed as follows:

Table 6-2 Scan List (Channel)

Configuration	Description
Zone Common	List Scan is executed by referring to the Scan List number configured for the zone.
1 to 128	List Scan is executed according to the list number in the corresponding Scan List.
None	List Scan is not executed.

Configuration using KPG-D3/ D3N

- Configuring **Scan List** ( [See](#) Radio Configuration > Global Options > Scan > List Scan > List)
- Configuring a Scan List number (Zone Common) ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > List Scan)
- Configuring a Scan List number (Channel) ( [See](#) Zone/Channel > Zone/Channel > Zone/Channel Information > Individually > DMR Conventional > Channel Information > Scan)

Changing the Scan List (Scan Program)

A desired Zone-channel can be registered as a member for List Scan in the Scan List by operating the transceiver. Also, a registered member in the Scan List can be deleted from the list.

The Scan List can be edited in Scan Program Mode.

Pressing the **Scan Program** button places the transceiver in Scan Program Mode.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “Scan Program” places the transceiver in Scan Program Mode. (Refer to Common Function Part [Using Menu Mode.](#))

Operating the transceiver

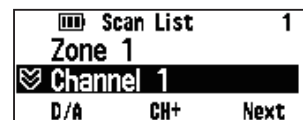
● Adding a member for List Scan

1 Select the channel for which the Scan List to be edited is configured and then press the **Scan Program** button.

A Button Beep A (1 beep) sounds from the transceiver.

The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are the same even if the transceiver enters Scan Program Mode by pressing the **Menu** button.



Note

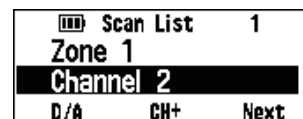
- If the selected channel is registered in the Scan List, the “✓” icon appears on the left of the channel name.

2 Select a Zone-channel to add to the Scan List.

Pressing the [▲] or [▼] button selects a channel.

Pressing the [◀] or [▶] button selects a zone.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

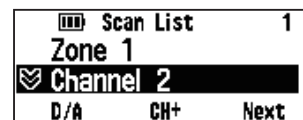


3 Press the **Menu** ([□]) or [*] button.

A Button Beep A (1 beep) sounds from the transceiver, and then the Zone-channel selected in step 2 is added to the Scan List. The “✓” icon appears on the left of the channel name.

Note

- In the following cases, a member cannot be added to a Scan List:
 - If the zone channel to be added to a Scan List is already configured as a member in the Scan List
 - If a channel which is inappropriate for the configuration in **Scan Type (List Scan)**, such as a channel in an NXDN Trunking system, is selected for the Scan List with “Conventional” configured in **Scan Type (List Scan)**



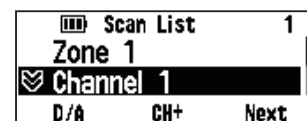
● Deleting a member from List Scan

1 Select the channel for which the Scan List to be edited is configured and then press the **Scan Program** button.

A Button Beep A (1 beep) sounds from the transceiver.

The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are the same even if the transceiver enters Scan Program Mode by pressing the **Menu** button.



Note

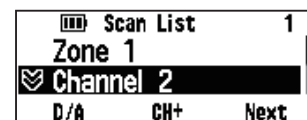
- If the selected channel is registered in the Scan List, the “✓” icon appears on the left of the channel name.

2 Select a Zone-channel to be deleted from the Scan List.

Pressing the [▲] or [▼] button selects a channel.

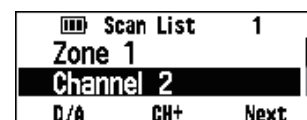
Pressing the [◀] or [▶] button selects a zone.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **Menu** ([□]) or [*] button.

A Button Beep B (2 beeps) sounds from the transceiver, and then the Zone-channel selected in step 2 is deleted from the Scan List. The “✓” icon disappears from the left of the channel name.



Note

- In the following cases, a member cannot be deleted from the Scan List:
 - If the zone channel to be deleted from the Scan List is a Priority Channel
 - If the number of members registered in the Scan List is zero

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

6.4 Scanning All Target Zones for Scanning (Multi-Zone Scan)

In a DMR Conventional system, by using Multi-Zone Scan, the transceiver can scan all channels to be scanned in the target zones.

If a scan starts in the zone where “Multi-Zone” is configured in **Scan Type**, Multi-Zone Scan is executed. Or, if the transceiver migrates during the scan to the zone where “Multi-Zone” is configured in **Scan Type**, Multi-Zone Scan is executed.

The target zone for scanning is either the zone with **Zone Add** enabled by using KPG-D3/ D3N or the zone with **Zone Add** enabled by using the **Zone Delete/Add** button.

The target channel for scan is either the channel with **Scan Add** enabled by using KPG-D3/ D3N or the channel with **Scan Add** enabled by using the **Scan Delete/Add** button.

Note

- Multi-Zone Scan cannot be executed in a DMR-based Trunking system.

Operating the transceiver

1 Press the **Scan** button.

The scan starts after a Button Beep A (1 beep) sounds from the transceiver.

The “” icon appears.

If **Revert Channel Display** is enabled, Revert Channel is displayed.

For Portable, if the scan is not Priority Scan, the LED flashes according to the configuration of **Non-Priority Scan LED**, and if the scan is Priority Scan, the LED flashes according to the configuration of **Priority Scan LED**.



Note

- The transceiver behaves in the same manner even if the scan is started by other method. (Refer to [Starting the Scan](#).)
- For Portable (Basic Model), **Revert Channel Display** cannot be configured.

2 Press the **Scan** button during the scan.

The scan completes after a Button Beep B (2 beeps) sounds from the transceiver and the “” icon disappears.



 Note

- “Multi-Zone” can be configured in **Scan Type** only for the zones structured with the following systems:

- Protocol Type = Analog Conventional
- Protocol Type = NXDN Conventional
- Protocol Type = LTR Trunking
- Protocol Type = DMR Conventional

Even if these systems exist in the same zone, “Multi-Zone” can be configured in **Scan Type**. In this case, “Single-Zone” can also be configured in **Scan Type**, and starting Multi-Zone Scan can also scan the zones with “Single-Zone” configured in **Scan Type**.

- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to [Selected Channel Scan](#).)
- For Portable, if a zone is changed by using the **Selector** with “Zone Select” configured during Multi-Zone Scan and if the zone is not configured, the “” icon blinks and the scan pauses.
- If another zone is selected during the Multi-Zone Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Scan Add** to be enabled or disabled ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Individually > DMR Conventional > Channel Information > Scan)
- Configuring **Zone Add** to be enabled or disabled ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Multi-Zone Scan)
- Configuring **Scan Type** ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan)
- Configuring **Revert Channel Display** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > General > Indicator)

Conditions to Activate the Scan (Multi-Zone Scan)

One of the following conditions must be satisfied for the transceiver to start the Multi-Zone Scan:

- When a total of two or more channels targeted to be scanned exists in the zone targeted to be scanned
- When only one target zone exists, and when one target channel exists in the target zone and a Priority Channel exists in the target zone or another zone
- When Priority Channel 1 and Priority Channel 2 exist in another zone, even if no zone to be scanned exists

Conditions to Resume the Scan (Multi-Zone Scan)

One of the following conditions must be satisfied to resume the Multi-Zone Scan while the transceiver pauses the scan:

- When a total of two or more channels targeted to be scanned exists in the zone targeted to be scanned
- When only one target zone exists, and when one target channel exists in the target zone and a Priority Channel exists in the target zone or another zone
- When Priority Channel 1 and Priority Channel 2 exist in another zone, even if no zone to be scanned exists

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (Multi-Zone Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the **Revert Channel**. Upon elapse of the time configured in **Dwell Time** after completion of the transmission, the transceiver reverts to the selected channel, and the scan does not resume.

6.5 Scanning the Specific Channel Preferentially (Priority Scan)

Priority Scan is the function to prioritize and scan the target channels.

This function can be used for Single Scan, Multi-Zone Scan, or List Scan in a Conventional channel.

● Single Scan

A maximum of 2 Priority Channels can be configured in each zone.

● Multi-Zone Scan

A maximum of 2 Priority Channels can be configured.

● List Scan

A maximum of 2 Priority Channels can be configured in each Scan List.

Note

- For Portable, if the Priority Scan is activated, LED flashes according to the configuration of **Priority Scan LED**.

If a Priority Channel is configured, the transceiver monitors Priority Channel by executing Lookback even when receiving on a normal channel.

On the channel where Priority 1 has the highest priority, Lookback is not executed while receiving on Priority 1.

Priority 2 is the channel prioritized next to Priority 1; therefore, Lookback is executed on Priority 1 while receiving on Priority 2.

Priority Channel Type (Type)

Priority Channel Type can be selected from “None”, “Fixed”, “Selected” and “Operator Selectable”.

Table 6-3 Type

Configuration	Description
None	No Priority Channel is configured.
Fixed	The channel configured using KPG-D3/ D3N is configured as the Priority Channel. The Priority cannot be changed by operating the transceiver.
Selected	The channel selected on the Transceiver is configured as the Priority Channel.
Operator Selectable	The channel configured by a user in Priority-channel Select Mode (Single Scan/ Multi-Zone Scan) or Scan Program (List Scan) is configured as the Priority Channel. (Refer to Changing the Priority Channel , Changing the Scan List (Scan Program) .)

Transceiver behavior

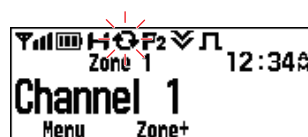
- If the Zone-channel configured for the Priority 1 is selected, or if the scan is paused on the Zone-channel configured for the Priority 1

The “**P1**” icon appears. When Priority Scan is paused, the “” icon blinks.



- If the Zone-channel configured for the Priority 2 is selected, or if the scan is paused on the Zone-channel configured for the Priority 2

The “**P2**” icon appears. When Priority Scan is paused, the “” icon blinks.



- If the same Zone-channel is selected for Priority 1 and the Priority 2, or if the scan is paused on the same Zone-channel configured for Priority 1 and the Priority 2

The “**P1**” icon with higher priority appears. When Priority Scan is paused, the “” icon blinks.



Note

- Priority Scan cannot be executed in a DMR-based Trunking system.
- If **Priority-channel Stop Tone** is enabled, a Priority-channel Tone (1 beep) sounds from the transceiver when the scan is paused and the speaker is unmuted on the Priority Channel.
- The Priority Channel is scanned even if the Priority Channel is excluded from the target channels for scan. However, the Priority Channel can be temporarily excluded from the target channels for scan by using the **Temporary Delete/Add** function.
- If the same channel is selected for **Priority 1** and **Priority 2**, and if **Temporary Delete/Add** of either Priority 1 or Priority 2 is permitted, **Temporary Delete/Add** is executed only on the permitted Priority Channel when the **Scan Delete/Add** button is pressed.
- Pressing the **Home Channel** button during the scan does not change the Priority Channel even if “Selected” is configured in **Type**.
- If “Selected” is configured in **Type**, the transceiver behaves as follows when one of the **Direct Channel 1** to **Direct Channel 5** buttons is pressed, or one of the External PTT (Direct Channel 1 Voice) to External PTT (Direct Channel 5 Voice) ports becomes active during the Scan:
 - If **Return** is disabled, Direct Channel 1 to Direct Channel 5 become the Priority Channels if Direct Channel 1 to Direct Channel 5 are Conventional channels.
 - If **Return** is enabled, the Priority Channel does not change.

Configuration using KPG-D3/ D3N

- Configuring **Priority Scan** (Single Scan) ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan > Priority Scan > Priority1,2)
- Configuring **Priority Scan** (Multi-Zone Scan) ( [See](#) Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters > Priority Scan > Priority 1, 2)
- Configuring **Priority Scan** (List Scan) ( [See](#) Radio Configuration > Global Options > Scan > List Scan > Parameters > Priority Scan > Priority 1, 2)
- Configuring **Priority-channel Stop Tone** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > General > Indicator)

Changing the Priority Channel

The Priority Channel can be changed by operating the transceiver.

● Single Scan/ Multi-Zone Scan

The Priority Channel can be changed in Priority-channel Select Mode.

Pressing the **Priority-channel Select** button places the transceiver in Priority-channel Select Mode.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “Priority-channel Select” places the transceiver in Priority-channel Select Mode. (Refer to Common Function Part [Using Menu Mode.](#))

The transceiver can enter Priority-channel Select Mode only if “Operator Selectable” is configured in either **Priority 1** or **Priority 2**.

● List Scan

The Priority Channel can be changed on the Priority Channel edit screen in Scan Program Mode.

Pressing the **Scan Program** button places the transceiver in Scan Program Mode.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “Scan Program” places the transceiver in Scan Program Mode. (Refer to Common Function Part [Using Menu Mode.](#))

Pressing the **Back** () button in Scan Program Mode displays the Priority Channel edit screen.

The transceiver can enter the Priority Channel edit screen only if “Operator Selectable” is configured in either **Priority 1** or **Priority 2**.

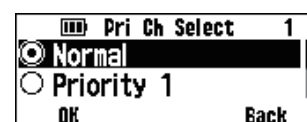
Operating the transceiver

● Changing the Priority Channel in Priority-channel Select Mode (Single Scan/ Multi-Zone Scan)

- 1 Press the **Priority-channel Select** button after selecting the channel to be configured as the Priority Channel.

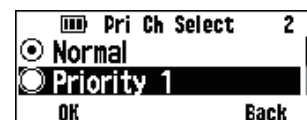
The transceiver enters Priority-channel Select Mode.

The following operations are identical even if the transceiver enters Priority-channel Select Mode by pressing the **Menu** button.



2 Select the priority of a channel by pressing the [▲] or [▼] button.

Priority can be selected from “Normal”, “Priority 1”, “Priority 2”, and “Priority 1&2”.



3 Press the Menu ([F1]) or [*] button.

After a Button Beep B (2 beeps) sounds from the transceiver, the transceiver exits Priority-channel Select Mode and restores the previous channel display.



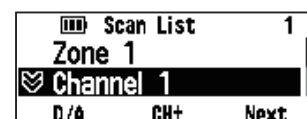
● Changing the Priority Channel in Scan Program Mode (List Scan)

1 Press the Scan Program button after selecting the channel to be configured as the Priority Channel.

A Button Beep A (1 beep) sounds from the transceiver.

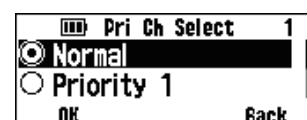
The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are the same even if the transceiver enters Scan Program Mode by pressing the **Menu** button.



2 Press the Back ([F2]) button.

The transceiver enters the Priority Channel edit screen.



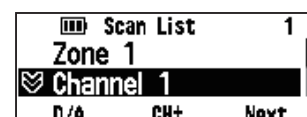
3 Select the priority of a channel by pressing the [▲] or [▼] button.

Priority can be selected from “Normal”, “Priority 1”, “Priority 2”, and “Priority 1&2”.



4 Press the Menu ([F1]) or [*] button.

After a Button Beep C (3 beeps) sounds from the transceiver, the transceiver exits Scan Program Mode and restores the previous channel display.



Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Lookback

Lookback is the function to periodically checks for a Priority Channel if a Priority Channel is configured for the transceiver and the transceiver receives on a normal channel (a channel which is not Primary Channel).

Either **Lookback Time A** or **Lookback Time B** is applied for the interval to initiate checking for a signal on a Priority Channel according to the receiving status of the Priority Channel.

Lookback Time A

Lookback Time A is the interval time to check during a Priority Scan for a signal on a Priority Channel without a carrier while the transceiver receives a signal on a normal channel whose carrier is different from the carrier of the Priority Channel. Since the transceiver may receive a call on the Priority Channel, the time configured in **Lookback Time A** must be shorter than the time configured in **Lookback Time B**.

Lookback Time B

Lookback Time B is the interval time to check during a Priority Scan for a signal on a Priority Channel which does not match the QT/DQT in an Analog Conventional system or a Priority Channel which does not match the Color Code in a DMR Conventional system even though a carrier exists, while the transceiver receives a signal on a normal channel whose carrier is different from the carrier of the Priority Channel.

Note

- If DMR digital signals are received on a normal channel in a DMR Conventional system, **Lookback Time A** and **Lookback Time B** function according to the sum of 500 ms added to the value configured using KPG-D3/ D3N.
- When DMR digital signals are received on the normal channel of the DMR Conventional system, the **Lookback** interval increases according to the configuration of KPG-D3/ D3N compared to the NXDN system and other systems.

Configuration example: DMR Repeater Mode

- Normal channel: slot 1, standby Group ID 1
- Priority channel: slot 2, standby Group ID 2
- When the normal and priority channels receive signals with the same channel (frequency) but a different slot
- The transceiver does not execute Lookback of the Priority Channel while 5-tone Encode Format or Digital Encode Format is being executed.

Configuration using KPG-D3/ D3N

- Configuring **Lookback Time A/ Lookback Time B** (Single Scan) ( See Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan)
- Configuring **Lookback Time A/ Lookback Time B** (Multi-Zone Scan) ( See Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters)
- Configuring **Lookback Time A/ Lookback Time B** (List Scan) ( See Radio Configuration > Global Options > Scan > List Scan > Parameters)

Temporary Delete/Add

A Priority Channel is always scanned regardless of the Scan Delete/Add configuration. If this function is enabled, pressing the **Scan Delete/Add** button temporarily deletes a Priority Channel from the target channels for scan when the scan pauses on the Priority Channel during the scan.

Configuration using KPG-D3/ D3N

- Configuring **Temporary Delete/Add** (Single Scan) to be enabled or disabled ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan > Priority Scan > Priority1,2)
- Configuring **Temporary Delete/Add** (Multi-Zone Scan) to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters > Priority Scan > Priority 1, 2)
- Configuring **Temporary Delete/Add** (List Scan) to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > List Scan > Parameters > Priority Scan > Priority 1, 2)

Scan Normal Channel

Scan Normal Channel is the function to execute the scan by disabling the Priority Channel configuration even if a Priority Channel is configured.

Even if the Priority Channel is configured, pressing the **Scan Normal** button disables the configuration and mandatorily executes Scan Normal Channel.

Note

- The condition for Scan Normal Channel to start is that two or more channels to be scanned need to exist in the same way as the normal scan.
In a DMR Conventional system, because a priority channel is treated as a normal channel, the priority channel is not the target for scanning if Scan Delete is executed for the priority channel.
In a DMR-based Trunking system, because a Group ID configured in Priority Monitor ID is treated as a normal Group ID, the Group ID configured in Priority Monitor ID is not the target for scanning if Scan Delete is executed for the Group ID.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

6.6 Transceiver Behavior during the Scan

This section describes various behaviors of the transceiver during the scan.

Note

- The length of time from when the transceiver pauses the scan for transmission or reception until the transceiver resumes the scan can be configured using **Dropout Delay Time** and **Dwell Time**. (Refer to [Dropout Delay Time](#), [Dwell Time](#).)

Transceiver Behavior When a Zone-channel Is Changed during the Scan

- During a scan, if a Zone-channel is changed by the following button operations, the transceiver behaves as either a) or b) according to the configuration of **Revert Channel Display**:
 - Channel Up** button
 - Channel Down** button
 - Zone Up** button
 - Zone Down** button
 - Channel Up/Down** button
 - Zone Up/Down** button
- a) If **Revert Channel Display** is disabled and "Scan" is displayed on the display
 - The scan pauses on the selected Zone-channel.
 - After a second elapses, the scan resumes.
- b) If **Revert Channel Display** is enabled and the Revert Channel is displayed on the display
 - If the Revert Channel and the selected channel differ, the scan pauses.
 - If the Revert Channel and the selected channel are the same, the Zone-channel is changed and the scan pauses on the new Zone-Channel.
 - After a second elapses, the scan resumes.

Note

- Because there is no configuration of **Revert Channel Display** for Portable (Basic Model), the transceiver always behaves as b).
- If the Zone-channel is changed during the scan by the following button operations, the Zone-Channel is changed according to the **Selector** position regardless of the configuration of **Revert Channel Display**:
 - Channel Select** button
 - Zone Select** button
 - Zone-Channel** button
- If a Zone-channel is changed manually while the scan pauses for reception, and if the channel where the scan is paused is different from the selected channel, the scan pauses on the selected channel.

Reception Behavior during the Scan in a DMR Conventional System

The following are the reception behaviors during the scan in a DMR Conventional system:

The transceiver receives a Color Code in each channel, and pauses the scan if it matches the Color Code preconfigured for the transceiver.

At this time, if the transceiver receives an Unaddressed Call, Individual Call, or Group Call in each channel and it matches the ID preconfigured for the transceiver, the scan will pause, and audio will be emitted from the speaker.

If the ID does not match when an Individual Call or Group Call is received, the scan will pause, and audio will not be emitted from the speaker.

If the Color Codes do not match, **Dropout Delay Time** is activated. After the time configured in **Dropout Delay Time** elapses, the transceiver resumes the scan.

Note

- When **Repeater Mode** or **Dual Slot Direct Mode** is enabled, the scan will stop if the Slot Selections match and the Color Codes match.
- When **Dual Slot Direct Mode** of DMR Direct Mode is disabled, the scan will stop only if the Color Codes match.

Reception Behavior during the Scan in a DMR-based Trunking System

The following are the reception behaviors during the scan in a DMR-based Trunking system:

- The transceiver pauses scanning when the decoded Group ID matches the Group ID to be scanned.
- The transceiver pauses scanning when the decoded Unit ID matches the Unit ID preconfigured for the transceiver.

Note

- Group ID Scan and Single Scan cannot be used at the same time.

6.7 Scan Function

The following functions are relevant to the scan.

- Scan Delete/Add
- Zone Delete/Add
- Revert Channel
- Dropout Delay Time
- Dwell Time
- Channel Recall
- Priority-channel Stop Tone
- Auto Scan
- Selected Channel Scan
- Power-on Scan
- Off-hook Scan (Mobile Only)
- Scan Stop Tone
- Preamble Length

Adding or Deleting a Channel to/from the Target Channels for Scan (Scan Delete/Add)

Scan Delete/Add is the function to add a channel to be scanned to the Scan List or delete a channel to be scanned from the Scan List.

This function is used to reliably receive a call from a primary channel by deleting unnecessary channels to increase the scan speed.

The following are the transceiver behavior:

● When Scan is disabled

For a zone with “Single-Zone” or “Multi-Zone” configured in Scan Type:

Pressing the **Scan Delete/Add** button can add the selected channel to the target channels for scan or delete the selected channel from the target channels for scan. The Scan Delete/ Add information is retained in the transceiver.

For a zone with “List” configured in Scan Type:

Pressing the **Scan Delete/Add** button can add the selected channel as a member to the Scan List configured for the selected channel, or delete the channel from the Scan List configured for the selected channel. The Scan Delete/ Add information is retained in the transceiver.

● When the scan is paused

For a zone with “Single-Zone” or “Multi-Zone” configured in Scan Type:

Pressing the **Scan Delete/Add** button can add the selected channel temporarily to the target channels for scan or delete the selected channel temporarily from the target channels for scan (Temporary Delete/ Add). This status is retained until the scan is terminated by operations such as pressing the **Scan** button, and the status is cleared when the scan completes.

For a zone with “List” configured in Scan Type:

Pressing the **Scan Delete/Add** button temporarily deletes a selected channel if the selected channel is registered as a member of Scan List, and pressing the **Scan Delete/Add** button again restores the selected channel (Temporary Delete/ Add). This status is retained until the scan is terminated by operations such as pressing the **Scan** button, and the status is cleared when the scan completes.

● During the scan

Pressing the **Scan Delete/Add** button causes a Button-entry Error Tone (1 beep) to sound from the transceiver but the transceiver does not respond at all.

 Note

- The operation above is enabled even if the transceiver enters Menu Mode by pressing the **Menu** button and then executes “Scan Delete/Add”. (Refer to Common Function Part [Using Menu Mode.](#))
- For the zone with “List” configured in **Scan Type**, a target channel for scan can also be added or deleted in Scan Program Mode. (Refer to [Changing the Scan List \(Scan Program\).](#))

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Adding or Deleting a Zone to or from the Target Zones for Scanning (Zone Delete/Add)

Zone Delete/Add is the function to add a zone to the target zones for scanning or delete a zone from the target zones for scanning when using Single Scan or Multi-Zone Scan.

For Multi-Zone Scan, this function is used to increase the scan speed and reliably receive a call from a primary zone by deleting unnecessary zones.

Pressing the **Zone Delete/Add** button adds or deletes a zone to or from the target zones for scanning.

Or, a zone can be added to or deleted from the target zones for scanning by executing “Zone Delete/Add” after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode.](#))

 Note

- For Single Scan, only zones structured with a Conventional system or an LTR Trunking system can be added to or deleted from the target zones for scanning.
- If there is only one target zone left while Multi-Zone Scan pauses, the zone cannot be deleted from the target zones even if Zone Delete/Add is executed.
- Even if Zone Delete/Add is executed while the scan other than Multi-Zone Scan pauses, the selected zone cannot be deleted from the target zones.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Revert Channel

Revert Channel is the Zone-channel which is used when the transceiver transmits by pressing the **PTT** switch during the scan.

Table 6-4 Revert Channel

Configuration	Description
Last Called + Selected	The transceiver transmits on the last-called Zone-channel by pressing the PTT switch during the scan. The transceiver transmits on the Zone-channel where the transceiver pauses the scan by pressing the PTT switch during the scan. If the Zone-channel is changed, the transceiver transmits using the new channel after the Zone-channel is changed until the transceiver receives another call.
Selected	The transceiver transmits on the new channel after the Zone-channel is changed regardless of the scan status.
Selected + Talkback	During the scan, the transceiver transmits on the new Zone-channel after the zone-channel is changed. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.
Priority 1	The transceiver transmits on a Priority 1 regardless of the scanning status.
Priority 1 + Talkback	The transceiver transmits on a Priority 1 during the scan. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.
Priority 2	The transceiver transmits on a Priority 2 regardless of the scanning status.
Priority 2 + Talkback	The transceiver transmits on a Priority 2 during the scan. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.

Note

- The Revert Channel is displayed according to the configuration of **Revert Channel Display**. However, for Portable (Basic Model), **Revert Channel Display** cannot be configured.
- For Single Scan of a zone in a DMR-based Trunking system, Priority 1/ Priority 1 + Talkback/ Priority 2/ Priority 2 + Talkback cannot be configured in **Revert Channel**.
- If Home Channel is activated, the transceiver transmits on the Home Channel regardless of the configuration in **Revert Channel**.
- If the Direct Channel function (Return = Check) is activated, the transceiver transmits on the Direct Zone-Channel regardless of the configuration in **Revert Channel**.

Configuration using KPG-D3/ D3N

- Configuring **Revert Channel** (Single Scan) ( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan)
- Configuring **Revert Channel** (Multi-Zone Scan) ( **See** Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters)
- Configuring **Revert Channel** (List Scan) ( **See** Radio Configuration > Global Options > Scan > List Scan > Parameters)

Dropout Delay Time

Dropout Delay Time is the time from when the transceiver finishes receiving signals until the transceiver resumes scanning. The transceiver pauses scanning when the transceiver receives a call during the scan. The transceiver resumes the scan when the time configured in **Dropout Delay Time** elapses after the transceiver finishes receiving.

The following are conditions to resume scanning:

- There is no signal to receive.
- The matching state of the Color Code becoming inconsistent

The transceiver activates Talkback according to the configuration in **Revert Channel** while the time configured in **Dropout Delay Time** elapses.

If the scan is paused while the time configured in **Dropout Delay Time** elapses, and if the channel is not the Priority Channel 1 or Priority Channel 2, the Priority Channel 1 and Priority Channel 2 are monitored by executing Lookback.

Configuration using KPG-D3/ D3N

Configuring **Dropout Delay Time** ( See Radio Configuration > Global Options > Scan > General > Timer)

Dwell Time

During the scan, the scan pauses when the **PTT** switch is pressed to transmit. **Dwell Time** is the time from when the transceiver completes transmitting until the transceiver resumes scanning.

The transceiver activates Talkback according to the configuration in **Revert Channel** while the time configured in **Dwell Time** elapses.

If the scan is paused while the time configured in **Dwell Time** elapses, and if the channel is not the Priority Channel 1 or Priority Channel 2, the Priority Channel 1 and Priority Channel 2 are monitored by executing Lookback.

Configuration using KPG-D3/ D3N

Configuring **Dwell Time** ( See Radio Configuration > Global Options > Scan > General > Timer)

Channel Recall

Channel Recall is the function to migrate to the last called Zone-channel by pressing the **Channel Recall** button during the scan.

Even if a user is away from the transceiver, the user can notice later that the transceiver has received a call during the scan.

Note

- If the **Channel Recall** button is pressed while no signal is received after scan starts, the transceiver migrates to the channel from which the transceiver started scanning.
- If **Channel Recall** is enabled, the transceiver does not resume the scan even if the time configured in **Dropout Delay Time** or **Dwell Time** elapses.
- **Channel Recall** is disabled if the channel is changed while **Channel Recall** is enabled. The transceiver resumes scanning after the Key Delay Time elapses (1 sec).
- The transceiver does not execute Lookback while **Channel Recall** is enabled.
- If the scan is paused with **Channel Recall** and **Scan Stop Tone** enabled, the Scan Stop Tone (2 beeps) sounds from the transceiver at 30-sec intervals.
- The channel to which the transceiver migrated using **Channel Recall** is not configured as the Selected Channel.
- Even if **Channel Recall** is enabled, the transmission using GPS Auto is executed by **Revert Channel**.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Priority-channel Stop Tone

Priority-channel Stop Tone is the function to emit a Priority-channel Tone (1 beep) from the transceiver when the scan pauses upon receipt of a signal and the speaker is unmuted on a Priority Channel during the scan.

Configuration using KPG-D3/ D3N

Configuring **Priority-channel Stop Tone** to be enabled or disabled ( See Radio Configuration > Global Options > Scan > General > Indicator)

Auto Scan

Auto Scan is the function to start the scan automatically by selecting the channel with **Auto Scan** enabled.

Whether to enable or disable **Auto Scan** can be configured for each channel. The scan on a channel where **Auto Scan** is enabled cannot be stopped. The scan starts unconditionally if the transceiver migrates to a channel with **Auto Scan** enabled.

Note

- Whether to enable or disable **Auto Scan** can be configured for each Personality.
- When the transceiver migrates to a channel where **Auto Scan** is enabled, the scan pauses if the conditions for starting the scan are not satisfied.
- If the transceiver migrates to a channel where **Auto Scan** is enabled after the scan is started by pressing the **Scan** button, the scan cannot be terminated even if the **Scan** button is pressed.
- In a zone where "None" is configured in **Scan Type**, the scan does not start even if the transceiver migrates to a channel with **Auto Scan** enabled.

Configuration using KPG-D3/ D3N

- Configuring **Auto Scan** in DMR Conventional to be enabled or disabled (Individually) ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > Individually > General)
- Configuring **Auto Scan** in DMR-based Trunking to be enabled or disabled (Individually) ( **See** Radio Configuration > System Properties > Systems > DMR-based Trunking > Personalities > Individually > General)

Selected Channel Scan

Selected Channel Scan is the function to add the selected channel to the target channels for scan even if the channel is excluded from the target.

Configuration using KPG-D3/ D3N

Configuring **Selected Channel Scan** to be enabled or disabled ( **See** Radio Configuration > Global Options > Scan > General > Option)

Power-on Scan

Power-on Scan is the function to start the scan automatically when the transceiver is turned on.

Portable

If “Zone Select” is configured in **Selector**, the transceiver starts the scan according to the configuration in **Scan Type** for the zone number indicated by the pointer of **Selector** when the transceiver is turned ON. If the zone number indicated by the pointer of the **Selector** is not configured for the transceiver, the scan does not start.

If anything other than “Zone Select” is configured in **Selector**, the transceiver starts the scan according to the configuration in **Scan Type** for the zone selected when the transceiver is turned ON.

Mobile

The transceiver starts the scan according to the configuration in **Scan Type** for the zone selected when the transceiver is turned on.

Configuration using KPG-D3/ D3N

Configuring **Power-on Scan** to be enabled or disabled ( See Radio Configuration > Global Options > Scan > General > Option)

Starting Scanning by Linking with the Microphone (Off-hook Scan)

Supported Models: Mobile

Off-hook Scan is the function to start scanning regardless of the microphone hook status.

The transceiver scans as follows according to the configuration in **Off-hook Scan**:

Table 6-5 Off-hook Scan

Configuration	Description
Enabled	Pressing the Scan button causes the transceiver to start scanning regardless of the microphone on- or off-hook state.
Disabled	If the microphone is in the on-hook state, pressing the Scan button causes the transceiver to start scanning; however if the microphone is in the off-hook state, the transceiver cannot start scanning. If the microphone changes from the on-hook state to off-hook state in Scan Mode, the scan pauses on the Revert Channel. When the microphone goes to on-hook state, the transceiver resumes scanning. However, if the microphone goes to on-hook state when the audio sounds, the transceiver continues the audio output status without resuming the scan. Thereafter, the transceiver resumes the scan when the signal disappears and the time configured in Dropout Delay Time elapses.

Note

- On-hook indicates the state that the microphone is hooked. Off-hook indicates the state that the microphone is not hooked.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Scan** to be enabled or disabled ( See Radio Configuration > Global Options > Scan > General > Option)

Scan Stop Tone

Scan Stop Tone is the function to emit the Scan Stop Tone (2 beeps) from the transceiver if the scan pauses and cannot resume, for example, while the transceiver migrates to a Home Channel or Direct Channel.

The transceiver pauses scanning if the conditions to start the scan are not satisfied, such as while the transceiver is migrating to a Home Channel or Direct Channel, and then a Scan Stop Tone (2 beeps) sounds from the transceiver at 30-sec intervals.

Note

- The Scan Stop Tone (2 beeps) does not sound while the transceiver is transmitting or while the speaker is unmuted for reception.

Configuration using KPG-D3/ D3N

Configuring **Scan Stop Tone** to be enabled or disabled ( **See** Radio Configuration > Global Options > Scan > General > Indicator)

Preamble Length

Preamble Length is the function to extend the duration for sending a preamble when the DMR frame is sent.

Extending the time for sending a preamble at the beginning of transmission makes the receiving transceiver easier to receive a call and reduces missing of the beginning of the audio during the scan.

The range is from 0 to 144.

Configuration using KPG-D3/ D3N

Configuring **Preamble Length**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > DMR Parameters)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > DMR Parameters)

Data communications are available for the transceiver by using the functions of DMR, or by using an external device connected to the transceiver.

7.1 Prioritizing Data Communications Using an External Device (Data Override)

Data Override is the function that allows prioritization of data communication using an external device even if the communication is made by a user operating the transceiver.

This function is used to send GPS data periodically even during reception.

The transceiver behaves as follows according to the configuration in **Data Override**:

Table 7-1 Data Override

Configuration	Description
Enabled	Data communications using an external device has a high priority level. Data Override is activated when the following AUX Input ports (Mobile only) are activated and when the transceiver receives a PC command from the serial port: • External PTT (Data) • Data PTT • DTC • Channel Select A to Channel Select D When Data Override is activated, the transceiver automatically exits the following statuses: • Function Mode • Public Address Mode (Mobile only) • The state when the transceiver temporarily migrates to a channel by pressing one of the Direct Channel 1 to Direct Channel 5 buttons, Home Channel button, or Channel Recall button
Disabled	The transceiver key control has the priority. The transceiver suspends the transmission even if the transceiver receives the above data transmission request from an external device.

Note

- While the transceiver is under the following conditions, **Data Override** is not activated:
 - While the transceiver is transmitting
 - While transmitting with the Public Address function (Mobile only)
 - While External PTT (PA) is active (Mobile only)
 - While the transceiver is in Emergency Mode
 - In Transceiver Password Mode
 - In the Stun state

Configuration using KPG-D3/ D3N

- Configuring **Data Override** to be enabled or disabled ( See Radio Configuration > Global Options > External Device > General > Serial Interface)
- Configuring **Data Override** to be enabled or disabled ( See Radio Configuration > Global Options > External Device > Mobile AUX > AUX Input)

7.2 Restricting the Warning Display during Data Communications (Silent Report)

Silent Report is the function to configure whether the transceiver transmits in standby display state without emitting the Alert Tone and flashing or lighting the LED, when sending and receiving the status and GPS data.

This function is used to keep a user from noticing the data communication request from a base station and GPS data transmission.

If this function is enabled, the LCD display, the LED display, and emitting the Alert Tone during data communications can be restricted as follows:

- The display during data communications (such as “Send Data”, “Complete”, “Busy”, and “No Reply”) is not displayed.
- The LED does not light or flash during data transmission.
- The Alert Tone, Control Tone, or Warning Tone is not emitted.

This function can be used for the following communications in a DMR Conventional system:

- AUX Input Status Message transmission (Mobile Only)
- Status transmission on receipt of Status Request
- Automatic GPS data transmission
- Automatic BLE data transmission
- GPS transmission by GPS Polling reception
- BLE transmission by BLE Polling reception

Note

- Silent Report is not applied when the transceiver receives a Status Request or receives GPS Polling.

Configuration using KPG-D3/ D3N

Configuring **Silent Report** to be enabled or disabled ( See Radio Configuration > Global Options > Basics > General > Data Communication)

7.3 Transparent

Transparent is the function that allows data communications using the DMR protocol. This function can be used by connecting a PC, card reader or telemetry devices to the transceiver. Using this function, the transceiver can send or receive data without limiting the data type.

This function can be used without operating the transceiver. All operations are controlled by data from other devices.

Using this function, a PC connected to the receiving transceiver can decode the transmitted bar-code data, for instance, while the bar-code reader is connected to a PC on the transmitting transceiver to transmit the bar-code data.

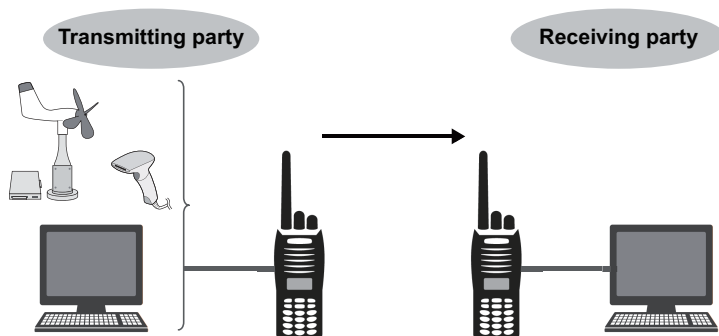


Figure 7-1 Image of Transparent

Data communications using Transparent can be used to send or receive the ASCII characters of 0x00 to 0xFF without any restriction.

In addition, data communications using Transparent supports baud rates of 1200 bps, 2400 bps, 4800 bps, 9600 bps and 19200 bps. (Refer to Common Function Part [COM Port Functions](#).)

Note

- To use this function, "Transparent (Digital)" must be assigned to the communication port connecting the transceiver and an external device by using KPG-D3/ D3N.

Transmitting Transceiver Behavior

The ASCII characters from 0x00 to 0xFF can be sent or received.

The communication port of the transceiver assigned "Transparent (Digital)" sends the received data automatically using the DMR protocol if the received data size exceeds 1570 bytes upon the receipt of data from an external device.

The transceiver automatically sends the received data if the transceiver does not receive any data for a duration sufficient to receive 16 characters after receiving the last data.

The transmitting transceiver transmits over the Air when the data time elapses in the following way:

- **If a baud rate of 19200 and 1 stop bit are configured for the PC and transmitting transceiver:**

When a duration equal to or more than $1/19200 \times 10 \times 16 = 8.3$ ms elapses

- **If a baud rate of 9600 and 2 stop bit are configured for the PC and transmitting transceiver:**

When a duration equal to or more than $1/9600 \times 11 \times 16 = 18.3$ ms elapses

Data is transmitted to the IDs configured in the Base ID Type and Base ID.

The maximum data capacity for the receive buffer of the transmitting transceiver in order to receive data from a PC is limited to 2048 bytes. If the transmit speed and reception from a PC is unbalanced and the overflowing received data exceeds 2048 bytes, the excessive data may not be sent.

If the transceiver receives the 2048 bytes of data while the transceiver is configured for which the RTS and CTS ports are available, the transceiver starts the flow control to an external device. (Refer to Common Function Part [Available Functions for COM Port.](#))

The transceiver can control not to overflow from the buffer the data sent from the external device as soon as the transceiver has started the flow control, so that the transceiver can receive the 2048 bytes of data. In the RTS and CTS ports, the data communications with an external device are controlled as follows.

RTS:

When the buffer of the transceiver for serial communications becomes full, the status of the RTS port will be the low level^{*1}.
(Portable: Pin No. 9 (14-pin universal connector), Mobile: Pin No. 8 (25-pin connector on the back panel))

CTS:

When the status of the CTS port becomes the low level^{*1}, the serial data will not be sent from the transceiver. (Portable: Pin No. 4 (14-pin universal connector), Mobile: Pin No. 9 (25-pin connector on the back panel))

^{*1} Portable: 0 V, Mobile: -5 V

Note

- In a DMR-based Trunking system, the transceiver sends data on a traffic channel regardless of the data size.

Transceiver behavior

Data is sent from a device to the transceiver.

The communication port of the transceiver assigned “Transparent (Digital)” automatically starts transmitting if the received data size reaches 1570 bytes.



“Complete” appears for 1 sec when the transmission completes, and the transceiver restores the previous display.



In a DMR-based Trunking system, the transceiver display behaves as follows depending on the response message from the system when data is sent automatically:

Table 7-2 Trunking Format

Configuration	Description
If no traffic channel is available in the system and if the transceiver receives a response message indicating the queue state from the system:	The transceiver enters the standby state while “Send Data” remains displayed. No tone sounds.
If the transceiver receives a response message from the system indicating a busy state of the receiving transceiver:	The Busy Tone 2 (3 beeps) sounds from the transceiver, and “Busy” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a response message from the system indicating such as a temporary failure:	The System Busy Tone (3 beeps) sounds from the transceiver and “System Busy” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a response message from the system indicating no response from the receiving transceiver:	The No Reply Tone (4 beeps) sounds from the transceiver, and “No Reply” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver receives a message from the system, such as a service invalid message:	The Call Invalid Tone (4 beeps) sounds from the transceiver, and “Invalid” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.
If the transceiver does not receive any message from the system:	The Call Fail Tone (2 beeps) sounds from the transceiver, and “Fail” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends. Note If a random access and Unsolicited Radio Check from the system are performed at the same time, the transceiver stops the random access because the transceiver prioritizes a response behavior to Unsolicited Radio Check. Even if the transceiver stops the random access, the transceiver performs the behavior of “If the transceiver does not receive any message from the system”.

Note

- In a DMR Conventional system, if the transceiver cannot transmit because the channel is busy, the Busy Tone 2 (3 beeps) sounds from the transceiver, and “Busy” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission ends.

Receiving Transceiver Behavior

The transceiver which receives the Transparent data from the transceiver for which “Transparent (Digital)” is assigned to its communication port sends the data received from the communication port to which “Transparent (Digital)” is assigned. If the Header function is enabled using KPG-D3/ D3N, the transmitting transceiver’s ID information is automatically added to the beginning of the transmission data. When another transceiver receives the data, the ID information can easily be identified. (Refer to [Transparent Header](#).)

Transceiver behavior

Data is received.



“Complete” appears for 1 sec when the reception completes, and then the transceiver restores the previous display.



Note

- In a DMR Conventional system, if the transceiver cannot send an ACK, “Ack Error” appears on the display for 1 sec. Then, the transceiver restores the channel display and ends the reception of data.

Timing for Sending and Receiving Data

● Example in a DMR Conventional system

Example: If “Transparent (Digital)” is assigned to a communication port

The following assumes that 3600 bytes of Transparent Data are sent from a PC to the transmitting transceiver. If “Enable” is configured in Transparent Header, the data is sent on a traffic channel as shown in the block diagram below. There is no Gap Time between data blocks to be sent.

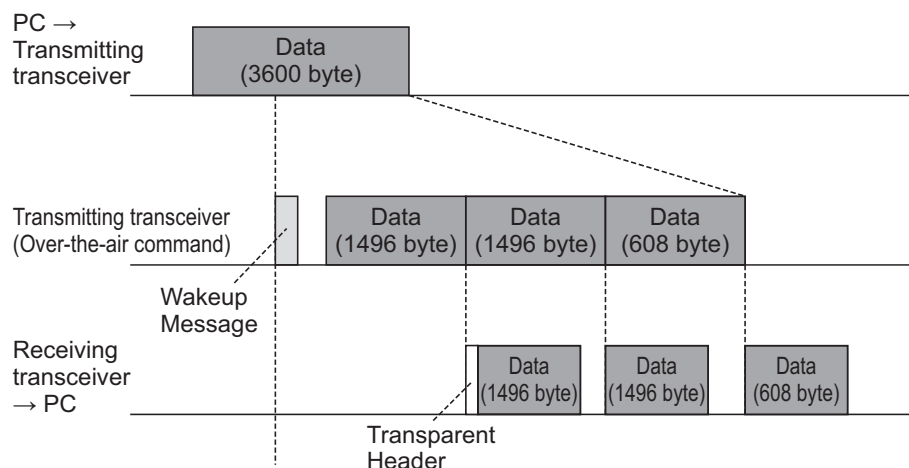


Figure 7-2 Transparent (DMR Conventional)

If a synchronization signal from a repeater cannot be detected, the transceiver resends a Wakeup Message for the number of times configured in **Number of Wakeup Message Retries**.

● Example in a DMR-based Trunking system

Example: If “Transparent (Digital)” is assigned to a communication port

The following assumes that 3600 bytes of Transparent Data are sent from a PC to the transmitting transceiver. If “Enable” is configured in Transparent Header, the data is sent on a traffic channel as shown in the block diagram below. There is no Gap Time between data blocks to be sent.

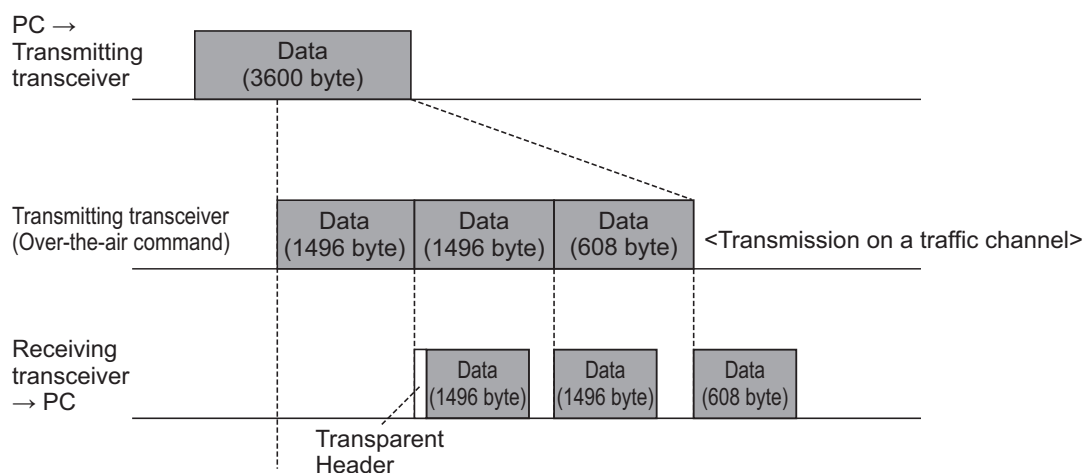


Figure 7-3 Transparent (DMR-based Trunking)

Transparent

The following functions are relevant to data communications using Transparent:

- Transparent Header
- COM port Priority
- Transparent on Data System-personality
- Preamble Length

Transparent Header

Transparent Header is the function to send the KENWOOD proprietary sentence to an application which is used during data communications using Transparent.

The Header is sent for data sent first. Transparent Data is sent after sending the Header.

The application software may be able to recognize from where the data is sent by analyzing this Header information.

Configuration using KPG-D3/ D3N

Configuring **Transparent Header** ( See Radio Configuration > Protocol Options > DMR > General > Serial Output)

COM port Priority

The transceiver can make data communications if “Data”, “Data + GPS Data Output”, “Data + Location Data Output”, “Transparent”, or “Transparent (Digital)” is assigned to its communication port. COM port Priority can be used to improve the reliability of the communication between a PC and the transceiver.

Table 7-3 COM port Priority

Configuration	Description
Serial Data	Transparent Data sent from a PC has the higher priority level. If the PC that is connected using a serial port sends Transparent Data while the transceiver is receiving data over the Air, the transceiver stops receiving data over the Air and then immediately starts sending Transparent Data.
Receiving Data	Receiving over the Air has the higher priority level. If the PC that is connected using a serial port sends Transparent Data while the transceiver is receiving data over the Air, the transceiver does not send Transparent Data until the transceiver completes receiving data over the Air.

Configuration using KPG-D3/ D3N

Configuring **COM port Priority** ( See Radio Configuration > Global Options > External Device > General > Serial Interface)

Transparent on Data System-Personality

Transparent on Data System-Personality is the function that allows the transceiver to automatically change the channel to Data System-Personality to send Transparent data.

The transceiver automatically changes the channel to the channel of a DMR Conventional system configured in **Data System-Personality (DMR)** when sending Transparent data. When the transmission ends, the transceiver restores the Zone-channel used before sending the Transparent data. **Transparent on Data System-Personality** can be used for data communications on a specific dedicated channel.



Note

- This function can be only used in a DMR Conventional system.

Configuration using KPG-D3/ D3N

- Configuring **Transparent on Data System-personality** (See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications > Data System-personality)
- Configuring **Data System-personality (DMR)** (See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Data Communications > Data System-personality)

Preamble Length

Preamble Length is the function to extend the duration for sending a preamble when the DMR frame is sent.

Extending the time for sending a preamble at the beginning of transmission makes the receiving transceiver easier to receive a call and reduces missing of the beginning of the audio during the scan.

The extended time of a preamble is determined by using the following equation.

$$\text{Time [sec]} = 60 \text{ ms} \times \text{Configuration value for Preamble Length}$$

Configuration using KPG-D3/ D3N

Configuring **Preamble Length** (See Radio Configuration > System Properties > Systems > DMR Conventional > DMR > DMR Parameters)

Digital Encode/ Decode Format is a function that controls the behavior of the transceiver using commands when calls are received via DMR digital communication.

The Decode Format that is executed when the following calls are received can be configured as a digital profile. A maximum of 16 digital profiles can be configured.

- Individual Call
- Group Call
- Broadcast Group Call
- Paging Call
- Status Message Call

By specifying a digital profile number for each Personality, the corresponding Decode Format will be executed when calls are received.

Note

- Digital Encode/ Decode Format is not supported for NXDN Trunking and DMR-based Trunking systems.

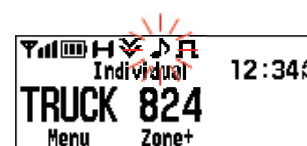
Transceiver behavior

Below is an example of the behavior when an Individual Call is received.

The transceiver stands by with the Personality that specifies the digital profile number for which Decode Format is configured in **Individual Call** of **Decode Format**.

1 The transceiver receives an Individual Call.

The “” icon blinks, and the ID Name of the transmitting transceiver appears.



2 The transceiver executes the Decode Format configured in Individual Call.

For example, if the following Decode Format is configured, the transceiver executes the **ENCA enc** command and executes the Encode Format specified in enc if the received ID matches with the ID configured on the transceiver. “Dec Individual” or “Individual call from Atlanta office” appears on the display.

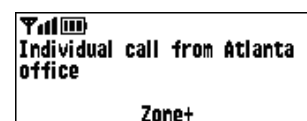
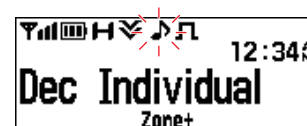
Decode Format:

CMP #C 824 ENCA ENC_TEXT

Encode Format (ENC_TEXT):

TEXT ‘Dec Individual’ (when the TEXT command is 14 characters or less)

TEXT ‘Individual call from Atlanta office’ (when the TEXT command is 15 characters or more)



 Note

- When Decode Format is configured for the different types of calls, the Tone Number that is configured for that call will not function.
- When the **Alert Tone Restriction from 2nd Call** configuration is enabled and the Decode Format command related to the following behavior is configured, the said command will not run if a call is received from the same ID for two consecutive times.
 - Alert Tone
 - Selectable Call Alert LED
 - Horn Alert
 - Caller ID Stack
- If Decode Format is configured, the following functions when receiving a call will be subject to restrictions, and the LED may flash or an Alert Tone may be emitted from the transceiver according to the configuration of the Decode Format.
 - Selective Call Alert LED
 - Caller ID Stack
 - Status Message Stack
 - Alert Tone
 - Horn Alert
 - Vibrator
 - Auto Backlight (ID/Message Reception)

Configuration using KPG-D3/ D3N

- Configuring the Digital Profile Number
 - ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > Individually > DMR)
 - ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > Table > Personality Table > DMR)
 - ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > Individually > DMR)
 - ( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > Personalities > Table > Personality Table > DMR)
- Configuring the Decode Format to be Executed for Each Profile When a Call is Received ( **See** Radio Configuration > Special Settings > Digital Profiles > Profiles > Decode Format Assignment)

Auto Reset Timer

Auto Reset Timer in this section is the Auto Reset Timer to be configured in Digital Profile.

Auto Reset Timer is the time until the status of the sounding of an Alert Tone or the status of the LCD display executed by Digital Encode/ Decode Format is automatically reset. If the **AUTR** command is executed by Digital Encode/ Decode Format, the transceiver starts counting down by the Auto Reset Timer. Upon lapse of the time configured in Auto Reset Timer, the following command statuses executed by Digital Encode/ Decode Format are reset:

- ALERT num
- BEEP num
- DISPF
- LEDF
- LEDF2
- HORN

Auto Reset Timer can be configured by using KPG-D3/ D3N. Also, how the transceiver behaves after the length of time configured in **Auto Reset Timer** elapses can be configured.

Table 8-1 Auto Reset Timer Configuration

Configuration		Description
Auto Reset Timer	Off	Auto Reset Timer does not function. The transceiver behaves the same as when the AUTR command is not configured.
	0 sec to 300 sec	Upon lapse of the configured time, the statuses configured in the following are reset. If “0” is configured, the statuses configured in the following are reset at the same time as when the AUTR command is executed: • LCD • LED • Alert Tone Horn Alert activated by executing the HORN command does not depend on the configurations of above items. Horn Alert stops when the amount of time configured in Auto Reset Timer elapses.
LCD	Enabled	Upon lapse of the time configured in Auto Reset Timer , the blinking of the content displayed on the transceiver display executed by the DISPF command stops.
	Disabled	Even if the time configured in Auto Reset Timer elapses, the blinking of the content displayed on the transceiver display executed by the DISPF command continues.
LED	Enabled	Upon lapse of the time configured in Auto Reset Timer, the flashing of the LED executed by the following commands stops: • LEDF • LEDF2
	Disabled	Even if the time configured in Auto Reset Timer elapses, the flashing of the LED executed by the following commands continues: • LEDF • LEDF2
Alert Tone	Enabled	Upon lapse of the time configured in Auto Reset Timer, the Alert Tone and beep sounding intermittently by the following commands stop: • ALERT num • BEEP num
	Disabled	Even if the time configured in Auto Reset Timer elapses, the Alert Tone and beep sounding intermittently by the following commands continue: • ALERT num • BEEP num

Table 8-2 AUTR Command Configuration

Configuration Status	Description
Not Configured	If Digital Encode/ Decode Format is executed during the scan, the configuration statuses of the following continue when the transceiver resumes the scan: • LCD • LED • Alert Tone
Configured	If Digital Encode/ Decode Format is executed during the scan, the configuration statuses of the following do not continue when the transceiver resumes the scan: • LCD • LED • Alert Tone However, if “Off” is configured in Auto Reset Timer, the configuration statuses of the above continue. Also, even if anything other than “Off” is configured in Auto Reset Timer, the configuration statuses of the above continue if the above are disabled.

 Note

- The Auto Reset Timer of Optional Signaling and the Auto Reset Timer of Digital Encode/ Decode Format behave independently. The LCD display and the flashing of **Optional Signaling LED** (including the “” icon) executed by anything other than the Digital Encode/ Decode Format command function by the Auto Reset Timer in a DMR Conventional system. (Refer to [Auto Reset Timer](#).)

Configuration using KPG-D3/ D3N

- Configuring **Auto Reset Timer** ( [See](#) Radio Configuration > Special Settings > Digital Profiles > Profiles > General > Auto Reset)
- Configuring **LCD** to be enabled or disabled ( [See](#) Radio Configuration > Special Settings > Digital Profiles > Profiles > General > Auto Reset)
- Configuring **LED** to be enabled or disabled ( [See](#) Radio Configuration > Special Settings > Digital Profiles > Profiles > General > Auto Reset)
- Configuring **Alert Tone** to be enabled or disabled ( [See](#) Radio Configuration > Special Settings > Digital Profiles > Profiles > General > Auto Reset)

8.1 Encode Format

Encode Format is a script that is used when executing the Decode Format. When Decode Format is executed, the Encode Format that is described in the Decode Format is being called and executed. The script for the Encode Format can be created using the following commands.



- This section explains the description of each command, the usage example, and the transceiver behavior. In addition, configuration range is also described for commands having a limit in its configuration range.

ALERT num

Description	When the ALERT num command is executed, the transceiver emits the Alert Tone configured for “num”. The Alert Tone can be configured by selecting from 8 types of Alert Tones configured for the transceiver. (Refer to Common Function Part Configuring the Alert Tone (Special Alert Tone) .)
Range	num: 1 to 8
Usage Example	Sample Script
	Decode Format: CMP #C 100 ENCA enc_alert
	Encode Format (enc_alert): LEDF ALERT 2
	Transceiver behavior When a call is received from a station whose Caller ID is 100, the transceiver executes Encode Format ‘enc_alert’. When ‘enc_alert’ is executed, the LED flashes in yellow color and the ALERT 2 tone is emitted from the transceiver.

AUTR

Description	When the AUTR command is executed, Auto Reset Timer is activated and then the timer for Auto Reset Timer starts counting down. The timer counts down the time configured in Auto Reset Timer. When the time configured in Auto Reset Timer elapses, the following enabled functions become disabled according to the configuration in Auto Reset Timer: - LCD - LED - Alert Tone Note Auto Reset Timer in this section is the Auto Reset Timer to be configured in Digital Profile.
Usage Example	Sample Script
	Decode Format: CMP #C 1000 ENCA ind_call
	Encode Format (ind_call): LEDF ALERT 1 DISPF AUTR
	Transceiver behavior When a call is received from a station whose Caller ID is 1000, the transceiver executes Encode Format ‘ind_call’. When ‘ind_call’ is executed, the LED flashes in yellow color and the ALERT 1 tone is emitted from the transceiver. The LCD display blinks, and the transceiver activates the Auto Reset Timer.

BEEP num

Description	When the BEEP num command is executed, the transceiver emits the beep tone configured for “num”. The beep can be configured by selecting from 48 types of beep patterns (0 to 47).
Range	num: 0 to 47
Usage Example	Sample Script
	Decode Format: CMP #C 110 ENCA enc_beep
	Encode Format (enc_beep): LEDF2 BEEP 10
	Transceiver behavior When a call is received from a station whose Caller ID is 110, the transceiver executes Encode Format ‘enc_beep’. When ‘enc_beep’ is executed, the LED flashes in blue color and the BEEP 10 tone is emitted from the transceiver.

BLTOF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Portable: When the BLTOF command is executed is executed, the display backlight goes off. Mobile: When the BLTOF command is executed, “Off” is configured in LCD Brightness .
Usage Example	Sample Script
	Decode Format: CMP #S 30 ENCA enc_bltoff
	Encode Format (enc_bltoff): BEEP 20 BLTOF
	Transceiver behavior When a call with Status ID 30 is received, the transceiver executes Encode Format ‘enc_bltoff’. When ‘enc_bltoff’ is executed, the BEEP 20 tone is emitted from the transceiver and the backlight goes off.

DEL xtime

Description	When the DEL xtime command is executed, the transceiver waits to execute the next command for the length of time configured for “xtime”. DEL stands for “Delay”.
Range	xtime: 0 ms to 7000 ms (in steps of 1 ms)
Usage Example	Sample Script
	Decode Format: CMP #S 200 ENCA auxa_act
	Encode Format (auxa_act): RAUXA1 DEL 1000 RAUXA0
	Transceiver behavior When a call with Status ID 200 is received, the transceiver executes Encode Format ‘auxa_act’. When ‘auxa_act’ is executed, the transceiver activates the AUX A port for 1000 ms and deactivates it again.

DELL Itime

Description	When the DELL Itime command is executed, the transceiver waits to execute the next command for the length of time configured for "Itime". DELL stands for "Delay Long".
Range	Itime: 0 sec to 255 sec (in steps of 1 sec)
Usage Example	Sample Script
	Decode Format: CMP #S 30 ENCA auxb_act
	Encode Format (auxb_act): RAUXB1 DELL 3 RAUXB0
	Transceiver behavior When a call with Status ID 30 is received, the transceiver executes Encode Format 'auxb_act'. When 'auxb_act' is executed, the transceiver activates the AUX B port for 3 seconds and deactivates it again.

DISPF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the DISPF command is executed, the information on the transceiver display starts blinking.
Usage Example	Sample Script
	Decode Format: CMP #C 2000 ENCA call_2000
	Encode Format (call_2000): TEXT 'CALL 2000' DISPF
	Transceiver behavior When a call is received from a station whose Caller ID is 2000, the transceiver executes Encode Format 'call_2000'. When 'call_2000' is executed, a blinking "CALL 2000" message appears on the display.

DISPS

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the DISPS command is executed, the blinking of the display by the execution of the DISPF command stops and the transceiver returns to the normal display.
Usage Example	Sample Script
	Decode Format: CMP #C 2000 ENCA call2_2000
	Encode Format (call2_2000): TEXT 'CALL 2000' DISPF DELL 3 DISPS
	Transceiver behavior When a call is received from a station whose Caller ID is 2000, the transceiver executes Encode Format 'call2_2000'. When 'call2_2000' is executed, a blinking "CALL 2000" message appears on the display for 3 seconds after which the display returns to the illuminated state.

ENC enc

Description	When the ENC enc command is executed, the transceiver executes the Encode Format configured for “enc”. When the Encode Format is executed repeatedly with the “REP ~ RSML/ RSMS” command, Encode Format is executed when repeat ends.
Usage Example	Sample Script
	Decode Format: CMP #S 15 ENCA auxa_act
	Encode Format (auxa_act): RAUXA1 DELL 3 RAUXA0 ENC auxb_act
	Encode Format (auxb_act): RAUXB1 DELL 3 RAUXB0
	Transceiver behavior When a call with Status ID 15 is received, the transceiver executes Encode Format ‘auxa_act’. When ‘auxa_act’ is executed, the transceiver activates the AUX A port for 3 seconds and deactivates it again, followed by executing Encode Format ‘auxb_act’. When ‘auxb_act’ is executed, the transceiver activates the AUX B port for 3 seconds and deactivates it again.

KEYD

Description	When the KEYD command is executed, the transceiver locks all buttons, and all button operations become disabled. Using this command in combination with the Decode Format forbids button operation by the receiving transceiver.
Usage Example	Sample Script
	Decode Format: CMP #S 10 ENCA key_lock
	Encode Format (key_lock): KEYD
	Transceiver behavior
	When a call with Status ID 10 is received, the transceiver executes Encode Format ‘key_lock’. When ‘key_lock’ is executed, Button Lock is turned on and button operation is disabled.  Note • The “” icon appears when Button Lock is turned on by executing the KEYD command. • After Button Lock is turned on by executing the KEYD command, the Button Lock pop-up will not appear on the display.

KEYE

Description	When the KEYE command is executed, the transceiver unlocks all buttons. Using this command in combination with the Decode Format unlocks the button lock state of the receiving transceiver.
Usage Example	Sample Script
	Decode Format: CMP #S 20 ENCA key_unlock
	Encode Format (key_unlock): KEYE
	Transceiver behavior
	When a call with Status ID 20 is received, the transceiver executes Encode Format 'key_unlock'. When 'key_unlock' is executed, Button Lock is turned off and button operation is enabled.
	 Note - After Button Lock is turned on by executing the KEYE command, the Button Lock pop-up will not appear on the display. - If no button is operated within the length of time configured in Auto Button Lock Timer after the button lock state is unlocked by the KEYE command, the transceiver automatically enters the button lock state.

LEDF

Description	When the LEDF command is executed, the LED flashes in yellow color.
Usage Example	Sample Script
	Decode Format: CMP #C 1000 ENCA call_1000
	Encode Format (call_1000): TEXT 'CALL 1000' LEDF
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the transceiver executes Encode Format 'call_1000'. When 'call_1000' is executed, "CALL 1000" appears on the display and the LED flashes in yellow color.

LEDF2

Description	When the LEDF2 command is executed, the LED flashes in blue color.
Usage Example	Sample Script
	Decode Format: CMP #C 2000 ENCA call_2000
	Encode Format (call_2000): TEXT 'CALL 2000' LEDF2
	Transceiver behavior When a call is received from a station whose Caller ID is 2000, the transceiver executes Encode Format 'call_2000'. When 'call_2000' is executed, a blinking "CALL 2000" message appears on the display and the LED flashes in blue color.

LEDS

Description	When the LEDS command is executed, the flashing LED goes off.
Usage Example	Sample Script
	Decode Format: CMP #S 30 ENCA call_end
	Encode Format (call_end): TXTOF LEDS
	Transceiver behavior When a call with Status ID 30 is received, the transceiver executes Encode Format 'call_end'. When 'call_end' is executed, the text display disappears, the transceiver returns to the standby mode and the LED light goes off.

RACK stime dec

Description	When the RACK stime dec command is executed, the transceiver enters the standby state with the Decode Format configured for “dec” for the length of time configured for “stime”.
Range	stime (Standard Time): 0 ms to 60000 ms (in steps of 10 ms) dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA auxa_act
	Encode Format (auxa_act): REP 10 RAUXA0 RAUXA1 DELL 1 RAUXA0 RACK 5000 act_stop RSML 5
	Decode Format (act_stop): CMP #S 200 REPOF BEEP 16
	Transceiver behavior When a call with Status ID 100 is received, the transceiver executes Encode Format ‘auxa_act’. When ‘auxa_act’ is executed, the transceiver deactivates the AUX A port temporarily, switches to the active state for 1 second, followed by restoring it to the inactive state. Next, the transceiver executes Decode Format ‘act_stop’ for 5000 ms. After executing ‘act_stop’ and 5 seconds have elapsed after deactivating the AUX A port, the transceiver executes Encode Format ‘auxa_act’ again. Encode Format ‘auxa_act’ can be executed repeatedly up to 10 times. If Status ID 200 is received before 5000 ms have elapsed, the transceiver emits a BEEP 16 tone and execution of ‘auxa_act’ ends.

RAUXA0

Supported Models: Mobile

Description	When the RAUXA0 command is executed, the AUX A port becomes inactive. If the AUX A function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxa_on CMP #S 111 ENCA auxa_off
	Encode Format (auxa_on): RAUXA1
	Encode Format (auxa_off): RAUXA0
	Transceiver behavior When a call with Status ID 123 is received, the transceiver executes Encode Format ‘auxa_on’. When ‘auxa_on’ is executed, the transceiver activates the AUX A port. When a call with Status ID 111 is received, the transceiver executes Encode Format ‘auxa_off’. When ‘auxa_off’ is executed, the transceiver deactivates the AUX A port.

RAUXA1

Supported Models: Mobile

Description	When the RAUXA1 command is executed, the AUX A port becomes active. If the AUX A function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxa_on CMP #S 111 ENCA auxa_off
	Encode Format (auxa_on): RAUXA1
	Encode Format (auxa_off): RAUXA0
	Transceiver behavior When a call with Status ID 123 is received, the transceiver executes Encode Format 'auxa_on'. When 'auxa_on' is executed, the transceiver activates the AUX A port. When a call with Status ID 111 is received, the transceiver executes Encode Format 'auxa_off'. When 'auxa_off' is executed, the transceiver deactivates the AUX A port.

RAUXB0

Supported Models: Mobile

Description	When the RAUXB0 command is executed, the AUX B port becomes inactive. If the AUX B function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxb_on CMP #S 111 ENCA auxb_off
	Encode Format (auxb_on): RAUXB1
	Encode Format (auxb_off): RAUXB0
	Transceiver behavior When a call with Status ID 123 is received, the transceiver executes Encode Format 'auxb_on'. When 'auxb_on' is executed, the transceiver activates the AUX B port. When a call with Status ID 111 is received, the transceiver executes Encode Format 'auxb_off'. When 'auxb_off' is executed, the transceiver deactivates the AUX B port.

RAUXB1

Supported Models: Mobile

Description	When the RAUXB1 command is executed, the AUX B port becomes active. If the AUX B function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxb_on CMP #S 111 ENCA auxb_off
	Encode Format (auxb_on): RAUXB1
	Encode Format (auxb_off): RAUXB0
	Transceiver behavior When a call with Status ID 123 is received, the transceiver executes Encode Format 'auxb_on'. When 'auxb_on' is executed, the transceiver activates the AUX B port. When a call with Status ID 111 is received, the transceiver executes Encode Format 'auxb_off'. When 'auxb_off' is executed, the transceiver deactivates the AUX B port.

RAUXC0

Supported Models: Mobile

Description	When the RAUXC0 command is executed, the AUX C port becomes inactive. If the AUX C function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxc_on CMP #S 111 ENCA auxc_off
	Encode Format (auxc_on): RAUXC1
	Encode Format (auxc_off): RAUXC0
	Transceiver behavior When a call with Status ID 123 is received, the transceiver executes Encode Format 'auxc_on'. When 'auxc_on' is executed, the transceiver activates the AUX C port. When a call with Status ID 111 is received, the transceiver executes Encode Format 'auxc_off'. When 'auxc_off' is executed, the transceiver deactivates the AUX C port.

RAUXC1

Supported Models: Mobile

Description	When the RAUXC1 command is executed, the AUX C port becomes active. If the AUX C function is assigned to an AUX Output port, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #S 123 ENCA auxc_on CMP #S 111 ENCA auxc_off
	Encode Format (auxc_on): RAUXC1
	Encode Format (auxc_off): RAUXC0
	Transceiver behavior
When a call with Status ID 123 is received, the transceiver executes Encode Format 'auxc_on'. When 'auxc_on' is executed, the transceiver activates the AUX C port. When a call with Status ID 111 is received, the transceiver executes Encode Format 'auxc_off'. When 'auxc_off' is executed, the transceiver deactivates the AUX C port.	

REP rep

Description	When the REP rep command is executed, the transceiver executes Encode Format repeatedly for the number of times configured for "rep".
Range	rep: 0 (infinite) or 1 time to 255 times
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA auxa_act
	Encode Format (auxa_act): REP 10 RAUXA0 RAUXA1 DELL 1 RAUXA0 RACK 5000 act_stop RSML 5
	Decode Format (act_stop): CMP #S 200 REPOF BEEP 16
	Transceiver behavior
When a call with Status ID 100 is received, the transceiver executes Encode Format 'auxa_act'. When 'auxa_act' is executed, the transceiver deactivates the AUX A port temporarily, switches to the active state for 1 second, followed by restoring it to the inactive state. Next, the transceiver executes Decode Format 'act_stop' for 5000 ms. When 5 seconds have elapsed after restoring the AUX A port to the inactive state, the transceiver executes Encode Format 'auxa_act' again. Encode Format 'auxa_act' can be executed repeatedly up to 10 times. If Status ID 200 is received before 5000 ms have elapsed, the transceiver emits a BEEP 16 tone and execution of 'auxa_act' ends.	

RSML ltime

Description	When the RSML ltime command is executed, the transceiver executes Encode Format repeatedly by the REP rep command at the intervals configured for “ltime”. (Refer to REP rep .) The RSML ltime command is used for the transceiver to wait to receive an acknowledgment.
Range	ltime: 0 sec to 255 sec (in steps of 1 sec)
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA auxa_act Encode Format (auxa_act): REP 10 RAUXA0 RAUXA1 DELL 1 RAUXA0 RACK 5000 act_stop RSML 5 Decode Format (act_stop): CMP #S 200 REPOF BEEP 16
	Transceiver behavior
	When a call with Status ID 100 is received, the transceiver executes Encode Format ‘auxa_act’. When ‘auxa_act’ is executed, the transceiver deactivates the AUX A port temporarily, switches to the active state for 1 second, followed by restoring it to the inactive state. Next, the transceiver executes Decode Format ‘act_stop’ for 5000 ms. When 5 seconds have elapsed after restoring the AUX A port to the inactive state, the transceiver executes Encode Format ‘auxa_act’ again. Encode Format ‘auxa_act’ can be executed repeatedly up to 10 times. If Status ID 200 is received before 5000 ms have elapsed, the transceiver emits a BEEP 16 tone and execution of ‘auxa_act’ ends.

RSMS stime

Description	When the RSMS stime command is executed, the transceiver executes Encode Format repeatedly by the REP rep command at the intervals configured for “stime”. (Refer to REP rep .)
Range	stime (Standard Time): 0 ms to 2550 ms (in steps of 10 ms)
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA auxa_act Encode Format (auxa_act): REP 10 RAUXA0 RAUXA1 DELL 1 RAUXA0 RACK 2000 act_stop RSMS 2500 Decode Format (act_stop): CMP #S 200 REPOF BEEP 16
	Transceiver behavior
	When a call with Status ID 100 is received, the transceiver executes Encode Format ‘auxa_act’. When ‘auxa_act’ is executed, the transceiver deactivates the AUX A port temporarily, switches to the active state for 1 second, followed by restoring it to the inactive state. Then, the transceiver executes Decode Format ‘act_stop’ for 2000 ms. When 2500 ms have elapsed after restoring the AUX A port to the inactive state, the transceiver executes Encode Format ‘auxa_act’ again. Encode Format ‘auxa_act’ can be executed repeatedly up to 10 times. If Status ID 200 is received before 2000 ms have elapsed, the transceiver emits a BEEP 16 tone and execution of ‘auxa_act’ ends.

SELCH channel

Description	When the SELCH channel command is executed, the transceiver migrates to the channel configured for “channel”. If UP is configured for “channel”, executing the SELCH channel command increases the channel number by one. If DOWN is configured for “channel”, executing the SELCH channel command decreases the channel number by one.
Range	channel: Channel number 1 to Channel number 512, UP or DOWN
Usage Example	Sample Script
	Decode Format: CMP #S 10 ENCA set_10ch
	Encode Format (set_10ch): SELCH 10
	Transceiver behavior
	When a call with Status ID 10 is received, the transceiver executes Encode Format ‘set_10ch’. When ‘set_10ch’ is executed, the transceiver moves to Channel 10.  Note If Digital Profile is configured to “None” for the selected zone channel, the SELCH channel command will not function.

SELGR zone

Description	When the SELGR zone command is executed, the transceiver migrates to the zone configured for “zone”. If UP is configured for “zone”, executing the SELGR zone command increases the zone number by one. If DOWN is configured for “zone”, executing the SELGR zone command decreases the zone number by one.
Range	zone: Zone number 1 to Zone number 128, UP or DOWN
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA set_zone100
	Encode Format (set_zone100): SELGR 100 SELCH 10
	Transceiver behavior
	When a call with Status ID 100 is received, the transceiver executes Encode Format ‘set_zone100’. When ‘set_zone100’ is executed, the transceiver moves to Channel 10 of Zone 100.  Note If Digital Profile is configured to “None” for the selected zone channel, the SELGR zone command will not function.

STOPS

Description	When the STOPS command is executed, the transceiver stops scanning.
Usage Example	Sample Script
	Decode Format: CMP #S 30 ENCA scan_stop
	Encode Format (scan_stop): STOPS ALERT 2
	Transceiver behavior When a call with Status ID 30 is received, the transceiver executes Encode Format 'scan_stop'. When 'scan_stop' is executed, scanning ends and the transceiver emits the ALERT 2 tone.

STRTS

Description	When the STRTS command is executed, the transceiver starts scanning.
Usage Example	Sample Script
	Decode Format: CMP #S 50 ENCA scan_start
	Encode Format (scan_start): ALERT 1 STRTS
	Transceiver behavior When a call with Status ID 50 is received, the transceiver executes Encode Format 'scan_start'. When 'scan_start' is executed, the transceiver emits the ALERT 1 tone and scanning starts.

TEXT 'text'

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the TEXT 'text' command is executed, the transceiver displays the text string configured for "text" on the display. Execution of the TXTOF command restores the previous display. (Refer to TXTOF.)  Note - When the TEXT command is executed, the following are the cases according to the number of characters to be displayed: - For 14 characters or less: The text appears in Basic Frame 1. - For 15 characters or more: For Portable, the text appears in Message Frame, and for Mobile, the text appears in Function Frame 1.
Range	text: A maximum of 48-digit alphanumeric character
Usage Example	Sample Script
	Decode Format: CMP #C 2000 ENCA call_2000
	Encode Format (call_2000): TEXT 'CALL 2000'
	Transceiver behavior When a call is received from a station whose Caller ID is 2000, the transceiver executes Encode Format 'call_2000'. When 'call_2000' is executed, a "CALL 2000" message appears on the display.

TXTOF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the TXTOF command when a text string appears on the display by executing the TEXT command, the display returns to the previous display.
Usage Example	Sample Script
	Decode Format: CMP #S 30 ENCA call_end
	Encode Format (call_end): TEXT 'CALL END' DELL 3 TXTOF
	Transceiver behavior When a call with Status ID 30 is received, the transceiver executes Encode Format 'call_end'. When 'call_end' is executed, a "CALL END" message appears on the display for 3 seconds, after which the original display is being restored.

VIB

Supported Models: Portable (NX-3200/ NX-3300/ NX-3400)

Description	Upon execution of the VIB command when Vibrator is enabled, the Vibrator unit vibrates. The Vibrator unit vibrates for 10 sec at 500-ms intervals. Pressing any button while the Vibrator unit is vibrating stops the Vibrator unit from vibrating.
Usage Example	Sample Script
	Decode Format: CMP #C 500 ENCA act_vib
	Encode Format (act_vib): ALERT 2 LEDF VIB
	Transceiver behavior When a call is received from a station whose Caller ID is 500, the transceiver executes Encode Format 'act_vib'. When 'act_vib' is executed, the LED flashes in yellow color after the ALERT 2 tone is emitted from the transceiver. If Vibrator is enabled, the vibrator will be activated.

8.2 Decode Format

Decode Format is a script that is executed when receiving calls via DMR digital communication. The script for the Decode Format can be created using the following commands.

Note

- This section explains the description of each command, the usage example, and the transceiver behavior. In addition, configuration range is also described for commands having a limit in its configuration range.

ALERT num

Description	When the ALERT num command is executed, the transceiver emits the Alert Tone configured for “num”. The Alert Tone can be configured by selecting from 8 types of Alert Tones configured for the transceiver. (Refer to Common Function Part Configuring the Alert Tone (Special Alert Tone) .)
Range	num: 1 to 8
Usage Example	Sample Script
	Decode Format: CMP #C 100 ALERT 8
	Transceiver behavior
	When a call is received from a station whose Caller ID is 100, the transceiver emits the ALERT 8 tone.

AUTR

Description	When the AUTR command is executed, Auto Reset Timer is activated and then the timer for Auto Reset Timer starts counting down. The timer counts down the time configured in Auto Reset Timer. When the time configured in Auto Reset Timer elapses, the following enabled functions become disabled according to the configuration in Auto Reset Timer: - LCD - LED - Alert Tone Note Auto Reset Timer in this section is the Auto Reset Timer to be configured in Digital Profile.
Usage Example	Sample Script
	Decode Format: CMP #C 1000 LEDF2 ALERT 8 DISPF AUTR
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the following statuses occur, and the transceiver activates the Auto Reset Timer: - The LED flashes blue. - The ALERT 8 tone sounds from the transceiver. - The LCD display blinks.

BEEP num

Description	When the BEEP num command is executed, the transceiver emits the beep tone configured for “num”. The beep can be configured by selecting from 48 types of beep patterns (0 to 47).
Range	num: 0 to 47
Usage Example	Sample Script
	Decode Format: CMP #C 100 ALERT 8 CMP ^OWNID BEEP 10
	Transceiver behavior
	When a call is received from a station whose Caller ID is 100, the transceiver emits the ALERT 8 tone. If the destination is Unit ID (Own), the transceiver emits the BEEP 10 tone.

BLTOF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Portable: When the BLTOF command is executed is executed, the display backlight goes off. Mobile: When the BLTOF command is executed, “Off” is configured in LCD Brightness .
Usage Example	Sample Script
	Decode Format: CMP #C 1000 BEEP 10 BLTOF
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the transceiver emits the BEEP 10 tone and the backlight of the display goes off.

BLTON

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Portable: When the BLTON command is executed, the display backlight lights up. Mobile: When the BLTON command is executed, “High” is configured in LCD Brightness .
Usage Example	Sample Script
	Decode Format: CMP #S 10 ALERT 1 BLTON CMP #S 30 ALERT 3 BLTOF
	Transceiver behavior
	When a call with Status ID 10 is received, the transceiver emits the ALERT 1 tone and the backlight of the display is turned on. When a call with Status ID 30 is received, the transceiver emits the ALERT 3 tone and the backlight of the display goes off.

CMP #C num

Description	When the CMP #C num command is executed, the transceiver compares the received ID with the ID specified in “num” and executes the subsequent commands if the IDs are found to be matching. It is possible to specify the range of IDs (0 to 9) by replacing a specific digit with a wild card “*”. When the wild card “*” is configured, zero-fill is executed as follows and a check to determine whether the IDs are matching is performed regardless of the preconfigured number of digits. Matching range in the case of CMP #C **: 1 (= 01) to 99 Matching range in the case of CMP #C ***: 1 (= 001) to 999 Matching range in the case of CMP #C *1: 1 (= 01), 11, 21, 31, 41, 51, 61, 71, 81 or 91
Range	num: 1 to 16776415 (in steps of 1)
Usage Example	Sample Script
	Decode Format: CMP #C 100* DECA id_1000 CMP #C 20** DECA id_2000 CMP ^OWNID DECA id_other
	Decode Format (id_1000): CMP #C 100* LEDF ALERT 1
	Decode Format (id_2000): CMP #C 20** LEDF2 ALERT 2
Usage Example	Decode Format (id_other): CMP ^OWNID DISPF ALERT 3
	Transceiver behavior
	When a call is received from a station whose Caller ID is from 1000 to 1009, the transceiver executes Decode Format ‘id_1000’. When ‘id_1000’ is executed, the LED flashes in yellow color and the ALERT 1 tone is emitted from the transceiver.
	When a call is received from a station whose Caller ID is from 2000 to 2099, the transceiver executes Decode Format ‘id_2000’. When ‘id_2000’ is executed, the LED flashes in blue color and the Alert 2 tone is emitted from the transceiver.
Usage Example	If the destination is Unit ID (Own), the transceiver executes Decode Format ‘id_other’. When ‘id_other’ is executed, the information on the display flashes and the ALERT 3 tone is emitted from the transceiver.

CMP ^OWNID

Description	When the CMP ^OWNID command is executed, the transceiver compares the received ID with its own ID and executes the subsequent commands if the IDs are found to be matching.
Usage Example	Sample Script
	Decode Format: CMP #C 100 ALERT 5 CMP ^OWNID ALERT 6
	Transceiver behavior
	When a call is received from a station whose Caller ID is 100, the transceiver emits the ALERT 5 tone.
Usage Example	If the destination is Unit ID (Own), the transceiver emits the ALERT 6 tone.

CMP #G num

Description	When the CMP #G num command is executed, the transceiver compares the received Group ID with the Group ID specified in “num” and executes the subsequent commands if the IDs are found to be matching. It is possible to specify the range of IDs (0 to 9) by replacing a specific digit with a wild card “*”. When the wild card “*” is configured, zero-fill is executed as follows and a check to determine whether the IDs are matching is performed regardless of the preconfigured number of digits. Matching range in the case of CMP #G **: 1 (= 01) to 99 Matching range in the case of CMP #G ***: 1 (= 001) to 999 Matching range in the case of CMP #G *1: 1 (= 01), 11, 21, 31, 41, 51, 61, 71, 81 or 91
Range	num: 1 to 16776415 (in steps of 1)
Usage Example	Sample Script
	Decode Format: CMP #G 100 ALERT 5 CMP #G 20* ALERT 6 CMP #G 3** ALERT 7
	Transceiver behavior
	When a call with Group ID 100 is received, the transceiver emits the ALERT 5 tone. When a call with a Group ID from 200 to 209 is received, the transceiver emits the ALERT 6 tone. When a call with a Group ID from 300 to 399 is received, the transceiver emits the ALERT 7 tone.

CMP ^GL

Description	When the CMP ^GL command is executed, the transceiver determines whether the Group ID received is registered in the Group ID List and executes the subsequent commands if it is registered.
Usage Example	Sample Script
	Decode Format: CMP #G 100 ALERT 5 CMP ^GL ALERT 6
	Transceiver behavior
	When a call with Group ID 100 is received, the transceiver emits the ALERT 5 tone. If the ID of the received Group Call is registered in the Group ID List, the transceiver emits the ALERT 6 tone.

CMP ^PGL

Description	When the CMP ^PGL command is executed, the transceiver determines whether the Group ID received is registered in the Persistent Group ID List and executes the subsequent commands if it is registered.
Usage Example	Sample Script
	Decode Format: CMP #G 100 BEEP 10 CMP ^PGL BEEP 20
	Transceiver behavior
	When a call with Group Call 100 is received, the transceiver emits the BEEP 10 tone. If the ID of the received Group Call is registered in the Persistent Group ID List, the transceiver emits the BEEP 20 tone.

CMP ^ALL

Description	When the CMP ^ALL command is executed, the transceiver determines whether the Group ID received is an ALL Group ID and executes the subsequent commands if it is an ALL GROUP ID.
Usage Example	Sample Script
	Decode Format: CMP ^ALL ALERT 3 CMP ^GL ALERT 4
	Transceiver behavior
	If the ID of the received Group Call matches the ALL Group ID, the transceiver emits the ALERT 3 tone. If the ID of the received Group Call is registered in the Group ID List, the transceiver emits the ALERT 4 tone.

CMP #S num

Description	When the CMP #S num command is executed, the transceiver compares the received Status ID with the Status ID specified in “num” and executes the subsequent commands if the IDs are found to be matching. It is possible to specify the range of IDs (0 to 9) by replacing a specific digit with a wild card “*”. When the wild card “*” is configured, zero-fill is executed as follows and a check to determine whether the IDs are matching is performed regardless of the preconfigured number of digits. Matching range in the case of CMP #S *: 0 to 9 Matching range in the case of CMP #S **: 0 (= 00) to 99 Matching range in the case of CMP #S *1: 1 (= 01), 11, 21, 31, 41, 51, 61, 71, 81 or 91
Range	num: 0 to 1023 (in steps of 1)
Usage Example	Sample Script
	Decode Format: CMP #S 10 ALERT 1 CMP #S 2* ALERT 2 CMP #S 1** ALERT 3
	Transceiver behavior
	When a call with Status ID 10 is received, the transceiver emits the ALERT 1 tone. When a call with a Status ID from 20 to 29 is received, the transceiver emits the ALERT 2 tone. When a call with a Status ID from 100 to 199 is received, the transceiver emits the ALERT 3 tone.  Note - Decode Format does not apply to Horn Alert Status. Upon receiving a Horn Alert Status, the transceiver activates the Horn Alert. The transceiver will not execute the subsequent commands in this case even when the same Status ID as Horn Alert Status is specified in “num” and the IDs are found to be matching. - Decode Format does not apply to Terminate Emergency Status. Upon receiving a Terminate Emergency Status, the transceiver cancels the Emergency status. The transceiver will not execute the subsequent commands in this case even when the same Status ID as Terminate Emergency Status is specified in “num” and the IDs are found to be matching.

CMP ^EMG

Description	When the CMP ^EMG command is executed, the transceiver determines whether the Status ID received is an Emergency Status and executes the subsequent commands if it is an Emergency Status.
Usage Example	Sample Script
	Decode Format: CMP ^EMG ENCA emg_act
	Encode Format (emg_act): ALERT 8 TEXT 'EMERGENCY' DISPF DELL 10 TXTOF
	Transceiver behavior If the Status ID received is an Emergency Status, the transceiver executes Encode Format 'emg_act'. When 'emg_act' is executed, the transceiver emits the ALERT 8 tone and an "EMERGENCY" message appears blinking on the display for 10 seconds.  Note • Emergency Status can be configured in Emergency Call .

Configuration using KPG-D3/ D3NConfiguring **Emergency Call**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency > Emergency Status)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency > Emergency Status)

CMP ^EOMD

Description	When the CMP ^EOMD command is executed, the transceiver determines whether the Status ID received is a Man-down Status and executes the subsequent commands if it is a Man-down Status.
Usage Example	Sample Script
	Decode Format: CMP ^EOMD ENCA emg_mandown
	Encode Format (emg_mandown): ALERT 8 TEXT 'MAN - DOWN' DISPF DELL 10 TXTOF
	Transceiver behavior If the Status ID received is a Man-down Status, the transceiver executes Encode Format 'emg_mandown'. When 'emg_mandown' is executed, the transceiver emits the ALERT 8 tone and a "MAN - DOWN" message appears blinking on the display for 10 seconds.  Note • Man-down Status can be configured in Man-down .

Configuration using KPG-D3/ D3NConfiguring **Man-down**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency > Emergency Status)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency > Emergency Status)

CMP ^EOS

Description	When the CMP ^EOS command is executed, the transceiver determines whether the Status ID received is a Stationary Status and executes the subsequent commands if it is a Stationary Status.
Usage Example	Sample Script
	Decode Format: CMP ^EOS ENCA emg_sta
	Encode Format (emg_sta): ALERT 8 TEXT 'STATIONARY' DISPF DELL 10 TXTOF
	Transceiver behavior If the Status ID received is a Stationary Status, the transceiver executes Encode Format 'emg_sta'. When 'emg_sta' is executed, the transceiver emits the ALERT 8 tone and a "STATIONARY" message appears blinking on the display for 10 seconds.  Note • Stationary Status can be configured in Stationary .

Configuration using KPG-D3/ D3NConfiguring **Stationary**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency > Emergency Status)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency > Emergency Status)

CMP ^EOM

Description	When the CMP ^EOM command is executed, the transceiver determines whether the Status ID received is a Motion Status and executes the subsequent commands if it is a Motion Status.
Usage Example	Sample Script
	Decode Format: CMP ^EOM ENCA meg_mot
	Encode Format (meg_mot): ALERT 8 TEXT 'MOTION' DISPF DELL 10 TXTOF
	Transceiver behavior If the Status ID received is a Motion Status, the transceiver executes Encode Format 'emg_mot'. When 'emg_mot' is executed, the transceiver emits the ALERT 8 tone and a "MOTION" message appears blinking on the display for 10 seconds.  Note • Motion Status can be configured in Motion .

Configuration using KPG-D3/ D3NConfiguring **Motion**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency > Emergency Status)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency > Emergency Status)

CMP ^EOLW

Description	When the CMP ^EOLW command is executed, the transceiver determines whether the Status ID received is a Lone Worker Status and executes the subsequent commands if it is a Lone Worker Status.
Usage Example	Sample Script
	Decode Format: CMP ^EOLW ENCA emg_lonewk
	Encode Format (emg_lonewk): ALERT 8 TEXT 'LONE WORKER' DISPF DELL 10 TXTOF
	Transceiver behavior If the Status ID received is a Lone Worker Status, the transceiver executes Encode Format 'emg_lonewk'. When 'emg_lonewk' is executed, the transceiver emits the ALERT 8 tone and a "LONE WORKER" message appears blinking on the display for 10 seconds.  Note • Lone Worker Status can be configured in Lone Worker .

Configuration using KPG-D3/ D3NConfiguring **Lone Worker**

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > DMR > Emergency > Emergency Status)

( **See** Radio Configuration > System Properties > Systems > DMR Site Roaming > DMR > Emergency > Emergency Status)

CMP ^EMGC

Description	When the CMP ^EMGC command is executed, the transceiver determines whether the call received is an Emergency Call and executes the subsequent commands if it is an Emergency Call. This is not applicable to Emergency Status.
Usage Example	Sample Script
	Decode Format: CMP ^EMGC LEDF2 CMP #C 12345 ALERT 7 ENCA enc_ecall
	Encode Format (enc_ecall): TEXT 'Calling Received' DELL 5 TXTOF
	Transceiver behavior If the received call is an Emergency Call, the LED flashes in blue color regardless of the Caller ID. When a call other than an Emergency Call is received from a station whose Caller ID is 12345, the transceiver emits the ALERT 7 tone and executes Encode Format 'enc_ecall'. When 'enc_ecall' is executed, a "Calling Received" message appears on the display for 5 seconds, after which the original display is being restored.

DECA dec

Description	When the DECA dec command is executed, the transceiver executes the Decode Format specified in “dec”.
Range	dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP #C 1000 DECA id_1000 CMP #C 2000 DECA id_2000 CMP ^OWNID DECA id_other
	Decode Format (id_1000): CMP #C 1000 LEDF ALERT 1
	Decode Format (id_2000): CMP #C 2000 LEDF2 ALERT 2
	Decode Format (id_other): CMP ^OWNID DISPF ALERT 3
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the transceiver executes Decode Format ‘id_1000’. When ‘id_1000’ is executed, the LED flashes in yellow color and the ALERT 1 tone is emitted from the transceiver.
	When a call is received from a station whose Caller ID is 2000, the transceiver executes Decode Format ‘id_2000’. When ‘id_2000’ is executed, the LED flashes in blue color and the ALERT 2 tone is emitted from the transceiver.
	If the destination is Unit ID (Own), the transceiver executes Decode Format ‘id_1000’. When ‘id_1000’ is executed, the LED flashes in yellow color and the ALERT 3 tone is emitted from the transceiver.

DECAT time dec

Description	When the DECAT time dec command is executed, the transceiver executes the Decode Format specified in “dec” during the time interval configured in “time”. This command is used when executing other Decode Formats for a specific period of time.  Note - While executing the DECAT time dec command, the Decode Format specified in “dec” will not be executed even upon receiving an incoming call for which Decode Format of FPU is configured to “None”. For example, if Decode Format of Group Call on the FPU is configured to “None”, the Decode Format specified in “dec” will not be executed even when a Group Call is received while waiting for a call during the standby interval configured in “time” of the DECAT time dec command. - While executing the DECAT time dec command, the Decode Format specified in “dec” instead of the configuration on the FPU will be executed upon receiving an incoming call for which Decode Format of FPU is configured to a value other than “None”. For example, if Decode Format of Group Call on the FPU is configured to a value other than “None”, the Decode Format specified in “dec” instead of the configuration on the FPU will be executed when a Group Call is received while waiting for a call during the standby interval configured in “time” of the DECAT time dec command.
Range	time: 0 ms to 60000 ms (in steps of 10 ms) dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP #C 1000 DECAT 3000 DecNextST
	Decode Format (DecNextST): CMP #S 100 LEDF ALERT 1 CMP #S 200 LEDF2 ALERT 2
	Transceiver behavior When a call is received from a station whose Caller ID is 1000, the transceiver executes the next Decode Format ‘DecNextST’ for a period of 3000 ms. When a call with Status ID 100 is received within 3000 ms, the LED flashes in yellow color and the ALERT 1 tone is emitted from the transceiver. When a call with Status ID 200 is received within 3000 ms, the LED flashes in blue color and the ALERT 2 tone is emitted from the transceiver.

DECF dec

Description	The transceiver executes the DECF dec command, followed by executing the Decode Format specified in “dec”. This command is normally used when the script to be executed in Decode Format is insufficient in size.
Range	dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^PGL BEEP 10 DECF none_pglist
	Decode Format (none_pglist): CMP ^GL LEDF BEEP 5
	Transceiver behavior The transceiver checks whether the received Group ID is registered in the Persistent Group ID List. If the received Group ID is registered in the Persistent Group ID List, the transceiver emits the BEEP 10 tone. If the received Group ID is not registered in the Persistent Group ID List, the transceiver executes Decode Format ‘none_pglist’. If the received Group ID is registered in the Group ID List, the LED flashes in yellow color and the BEEP 5 tone is emitted from the transceiver.

DISPF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the DISPF command is executed, the information on the transceiver display starts blinking.
Usage Example	Sample Script
	Decode Format: CMP #C 1000 LEDF DISPF
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the LED flashes in yellow color and the information on the display also starts blinking.

ENCA enc

Description	When the ENCA enc command is executed, the transceiver executes the Encode Format specified in “enc”.
Range	enc: Encode Format Name
Usage Example	Sample Script
	Decode Format: CMP #C 100 ENCA text_100 CMP #C 200 ENCA text_200
	Encode Format (text_100): ALERT 5 TEXT ‘CALL 100’ DSPF DELL 3 TXTOF
	Encode Format (text_200): ALERT 6 TEXT ‘CALL 200’ DSPF DELL 3 TXTOF
	Transceiver behavior When a call is received from a station whose Caller ID is 100, the transceiver executes Encode Format ‘text_100’. When ‘text_100’ is executed, the transceiver emits the ALERT 5 tone and a “CALL 100” message appears blinking on the display for 3 seconds. When a call is received from a station whose Caller ID is 200, the transceiver executes Encode Format ‘text_200’. When ‘text_200’ is executed, the transceiver emits the ALERT 6 tone and a “CALL 200” message appears blinking on the display for 3 seconds.

HORN

Supported Models: Mobile

Description	Executing the HORN command activates Horn Alert. Horn Alert functions according to the settings in Logic Pattern and Off-hook Horn Alert .
Usage Example	Sample Script
	Decode Format: CMP #S 50 LEDF HORN
	Transceiver behavior
	When a call with Status ID 50 is received, the LED flashes in yellow color and Horn Alert is activated.
	 Note If Horn Alert is disabled, the HORN command will not function.

LEDF

Description	When the LEDF command is executed, the LED flashes in yellow color.
Usage Example	Sample Script
	Decode Format: CMP #C 12345 LEDF VIB
	Transceiver behavior
	When a call is received from a station whose Caller ID is 12345, the LED flashes in yellow color. If Vibrator is enabled, the vibrator will be activated.

LEDF2

Description	When the LEDF2 command is executed, the LED flashes in blue color.
Usage Example	Sample Script
	Decode Format: CMP #S 100 LEDF2 ALERT 2
	Transceiver behavior
	When a call with Status ID 100 is received, the LED flashes in blue color and the ALERT 2 tone is emitted from the transceiver.

QUEUE

Description	When the QUEUE command is executed, the Caller ID received will be saved to the stack memory according to the stack setting of FPU (Status Message Stack, Caller ID Stack). Information that is saved can be viewed in the Stack Mode.
Usage Example	Sample Script
	Decode Format: CMP #C 100 QUEUE ALERT 5 CMP ^OWNID ALERT 5
	Transceiver behavior
	When a call is received from a station whose Caller ID is 100, the transceiver emits the ALERT 5 tone after the received Caller ID has been saved to the stack memory according to the Status Message Stack or Caller ID Stack setting. If the destination is Unit ID (Own), the transceiver emits the ALERT 5 tone without saving the received Caller ID to the stack memory.

REPOF

Description	When the REPOF command is executed, the transceiver stops the Encode Format from being executed repeatedly using the REP rep command of the Encode Format. (Refer to REP rep .)
Usage Example	Sample Script
	Decode Format: CMP #S 100 ENCA auxa_act
	Encode Format (auxa_act): REP 10 RAUXA0 RAUXA1 DELL 1 RAUXA0 RACK 5000 act_stop RSML 5
	Decode Format (act_stop): CMP #S 200 REPOF BEEP 16
	Transceiver behavior
	When a call with Status ID 100 is received, the transceiver executes Encode Format 'auxa_act'. When 'auxa_act' is executed, the transceiver deactivates the AUX A port temporarily, switches to the active state for 1 second, followed by restoring it to the inactive state. Next, the transceiver executes Decode Format 'act_stop' for 5000 ms. When 5 seconds have elapsed after restoring the AUX A port to the inactive state, the transceiver executes Encode Format 'auxa_act' again. Encode Format 'auxa_act' can be executed repeatedly up to 10 times. If Status ID 200 is received before 5000 ms have elapsed, the transceiver emits a BEEP 16 tone and execution of 'auxa_act' ends.

VIB

Supported Models: Portable (NX-3200/ NX-3300/ NX-3400)

Description	Upon execution of the VIB command when Vibrator is enabled, the Vibrator unit vibrates. The Vibrator unit vibrates for 10 sec at 500-ms intervals. Pressing any button while the Vibrator unit is vibrating stops the Vibrator unit from vibrating.
Usage Example	Sample Script
	Decode Format: CMP #C 1000 LEDF VIB
	Transceiver behavior
	When a call is received from a station whose Caller ID is 1000, the LED flashes in yellow color. If Vibrator is enabled, the vibrator will be activated.

Task Request is a function for performing task management using the Short Message function.

It allows the task administrator using the Dispatch Console to monitor the progress of a task by issuing work instructions to the transceiver users and having the transceiver users reply with a response message.

This function is only supported in a DMR Tier III Trunking system and S-Trunking system.

Table 9-1 Task Request Specifications

Item	Description
No. of Saved Items	Up to 100
Mode	Task Request Confirmation Mode
Ways to Enter the Mode	PF button • Task Request Confirmation Menu button • Execute "Task Request Confirmation" from Menu Mode
Way to Respond to Task Request	Select from the Response List
No. of Characters	Not more than 290

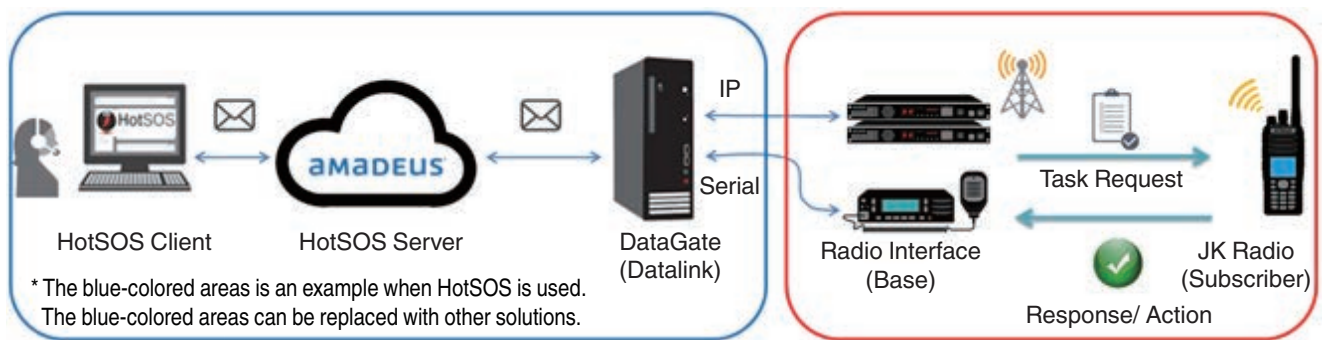


Figure 9-1 System Configuration Example for Task Request

Transceiver behavior

● State before Entering Task Request Confirmation Mode

To save the Task Request data, the following settings need to be configured on the transceiver.

Table 9-2 Settings for Saving Task Request Data

Transceiver	Configuration	Description
Subscriber	Task Request Receivable	Enabling this option allows saving or viewing of or reply to the Task Request messages.
	Message Deletable	Enabling this option allows a Task Request to be deleted in the Task Request Confirmation Mode.
	Response/ Category	A Response can be selected from below or a response text not longer than 14 characters can be registered. • No.1 Start/ Started (this is the default display and is changeable) • No.2 Stop/ Stopped (this is the default display and is changeable) • No.3 Complete/ Completed (this is the default display and is changeable) • No.4 to No.16: Blank (text can be registered manually)
	PF button	Refer to Table 9-1
Base	Short Message Serial Output	The reply message received from the subscriber is serially output as a Short Message command.
	COM portData or Data + GPS Data Output Data + Location Data Output	Allows a Task Request to be sent using a Short Message PC command.

The display in the LCD varies depending on whether there is saved Task Request data.

- When there are saved data and unread messages: “” appears blinking
- When there is saved data but no unread messages: “” lights up



The status of the transceiver changes as follows depending on whether there is saved Task Request data.

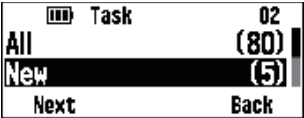
Table 9-3 Transceiver Status

Task Request	Tone	Display	Status
Saved data present	Button Beep A (1 beep)	“  ”	Task Request Confirmation Mode
No saved data	Button-entry Error Tone	Displays “Empty” for 1 second	Returns to operation display

Operating the Transceiver (Subscriber)

- Below are the steps for entering the Task Request Confirmation Mode to display the Task Request list.

1 Press the **Task Request Confirmation** button to enter Task Confirmation Mode.

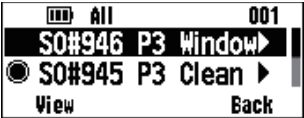


2 Press the **[▲]** button or **[▼]** button and select Category.

Below is an example of the display by Category.

- **All:** All
- **New:** Unread

(The above are a part of the displayed information)



Note

- Unread messages are indicated by the “” icon.
- The “All” and “New” categories are items that exist at all times regardless of the FPU settings. Other items will vary in name and quantity according to the FPU settings.

Behavior of the Transceiver (Subscriber)

- Below are the steps for receiving and displaying a Task Request Message.

1 Message receiving starts.



2 Message receiving is complete.

Saves the Task Request if **Task Request Receivable** is enabled.



If ACK cannot be sent out successfully, an "Ack Error" message is displayed for 1 second, after which data receiving ends.



3 Displays the Task Request details.

The first 3 lines of the message is displayed for 3 seconds, followed by scrolling down line by line every 2 seconds.

After the last line is shown, the display returns to the beginning of the message and scrolling repeats.



Note

- If **Alert Tone (Task Request)** is enabled, an Alert Tone is emitted from the transceiver.

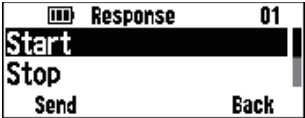
Operating the Transceiver (Subscriber)

- Below are the steps for responding to a Task Request.

1

In the Task Request View display, press the **Menu** ([) button or [*****] button.

A Task Request Response selection screen appears.



2

On the Response selection screen, press one of the **PTT** switch, **Menu** ([) button, or [*****] button.

The transceiver displays “Send Data” and starts sending the Response to the Caller ID. If TX LED is enabled, the LED lights up in red color during the transmission process.

When ACK is received, the transceiver emits the Complete Tone and displays “Complete” for 1 second. After the display disappears, the transceiver returns to the channel display screen.



Transceiver Behavior (Base)

- Below are the steps for sending a Task Request Message.

1

Message sending starts.

After receiving a PC command, sending of a Task Request to the subscriber starts.



2

Sending is complete.

When ACK is received, “Complete” appears for 1 sec, and sending is complete. After sending is complete, the transceiver returns to the channel display.

If ACK cannot be received, “No Reply” appears for 1 second, after which transmission of the Task Request ends.

If a Task Request cannot be sent due to the Busy state, “Busy” appears for 1 second, after which transmission of the Task Request ends.



● Below are the steps for receiving a response to the Task Request Message.

1 Message receiving starts.

“Receive Data” is displayed while a response to a Task Request is being received. If Busy LED is configured, the LED lights up in green color.



After data receiving is complete, the transceiver sends an ACK.



2 Receiving is complete.

When sending of ACK is complete, “Complete” appears for 1 sec and receiving is complete. After receiving is complete, the transceiver returns to the channel display.



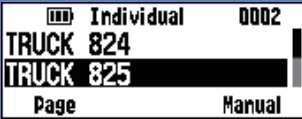
Note

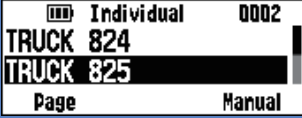
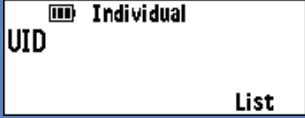
- If a new Task Request is received when there are 100 saved Task Requests, the stored messages will be deleted starting from the oldest data and the new message will be saved.
- The saved Task Request messages can be deleted in the following ways.
 - Deleting by selecting one or all Task Request messages from the Task Request Confirmation Mode (deletion by the user)
 - Receiving a message to delete Task Requests (deletion by Air)
- As Task Request is a function that makes use of Short Message, the following items will behave according to their settings even when the Task Request function is in use.
 - DMR Message Type
 - Short Message on Data System-personality
 - Short Message on Data Zone-Channel

Configuration using KPG-D3/ D3N

- Saving the **Task Request** (See Radio Configuration > Global Options > Basics > Task Request)
- Deleting the **Task Request** (See Radio Configuration > Global Options > Basics > Task Request)
- Responding to the **Task Request** (See Radio Configuration > Global Options > Basics > Task Request > No. 1~16)
- Selecting the Category of the **Task Request** (See Radio Configuration > Global Options > Basics > Task Request > No. 1~16)
- Configuring **Alert Tone (Task Request)** in DMR Conventional (See Radio Configuration > Protocol Options > DMR > Alert Tone/LED > Conventional > Task Request)
- Configuring **Tone Number (Task Request)** in DMR-based Trunking (See Radio Configuration > Protocol Options > DMR > Alert Tone/LED > Trunking > Task Request)

Button operations for selecting a list or entering characters are described for each mode in this chapter. Refer to Common Function Part “[Operating the Transceiver in Each Mode \(Common Operation\)](#)” for instruction.

Button		Individual Call Mode	
		Selecting a list	Manual entry
			
Menu ([M]) *1	Press	DMR Conventional: Initiates a Paging Call after aborting the current mode. DMR-based Trunking: Sends a message requesting a call after aborting the current mode.	DMR Conventional: Initiates a Paging Call after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (while the Digit No. is flashing). DMR-based Trunking: Sends a call after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (while the Digit No. is flashing).
	Hold	Migrates to Status Mode or Short Message Mode.	Migrates to Status Mode or Short Message Mode (after finalizing the Digit No.).
Back ([←]) *1	Press	Migrates to the code entry mode (only if Manual Dialing is enabled).	Deletes one character (While entering or after confirming the Digit No.). Migrates to the list selection mode (before entering the Digit No.).
	Hold Down	-	Deletes all characters (While entering or after confirming the Digit No.).
Function ([F]) *2	Press	The configured function functions.	The configured function functions.
Home ([H]) *1	Press	Aborts the current mode.	
	Hold	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Returns to the menu if no code is entered (if the transceiver enters this mode by pressing the Menu button).
Side 1 *3	Press	The configured function functions.	
Side 2 *3	Press	The configured function functions.	
[▲]/[▼] *1	Press	Selects Unit IDs registered in the Individual ID List one at a time.	Selects Digit No. one at a time.
	Hold Down	Selects Unit IDs registered in the Individual ID List continuously.	Selects Digit No. continuously.
[◀] *1	Press	-	
[▶] *1	Press	Migrates to Status Mode or Short Message Mode.	
Selector *3	-	The configured function functions after aborting the current mode.	
[0] to [9] *4	Press	Directly selects a Unit ID registered in the list.	Enters the Digit No.

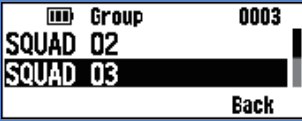
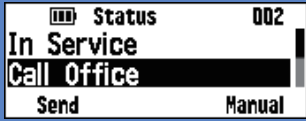
Button		Individual Call Mode	
		Selecting a list	Manual entry
			
[*] *4	Press	DMR Conventional: Initiates a Paging Call after aborting the current mode. DMR-based Trunking: Sends a message requesting a call after aborting the current mode.	DMR Conventional: Initiates a Paging Call after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (while the Digit No. is flashing). DMR-based Trunking: Sends a call after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)
	Hold	Migrates to Status Mode or Short Message Mode.	Migrates to Status Mode or Short Message Mode (after finalizing the Digit No.).
[#] *4	Press	Migrates to the code entry mode (only if Manual Dialing is enabled).	Deletes one character (While entering or after confirming the Digit No.). Migrates to the list selection mode (before entering the Digit No.).
	Hold Down	-	Deletes all characters (While entering or after confirming the Digit No.).
PTT Switch	Press	Transmits after aborting the current mode.	

*1 Portable (Full Key Model/ Standard Key Model)/ Mobile only

*2 Portable (Full Key Model/ Standard Key Model) only

*3 Portable only

*4 Portable (Full Key Model)/ Mobile only

Button		Group Call Mode	Status Mode
		Selecting a list 	Selecting a list 
Menu ([M]) * ¹	Press	-	Transmits the status after aborting the current mode.
	Hold	Migrates to Status Mode or Short Message Mode.	-
Back ([B]) * ¹	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Migrates to the status entry mode (only if Manual Dialing is enabled).
	Hold Down	-	-
Function ([F]) * ²	Press	The configured function functions.	
Home ([H]) * ¹	Press	Aborts the current mode.	
	Hold	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 * ³	Press	The configured function functions.	
Side 2 * ³	Press	The configured function functions.	
[▲]/[▼] * ¹	Press	Selects Group IDs registered in the Group ID List one at a time.	Selects statuses registered in the Status ID List one at a time.
	Hold Down	Selects Group IDs registered in the Group ID List continuously.	Selects statuses registered in the Status ID List continuously.
[◀] * ¹	Press	-	Migrates to Individual Call Mode or Group Call Mode.
[▶] * ¹	Press	Migrates to Status Mode or Short Message Mode.	-
Selector * ³	-	The configured function functions after aborting the current mode.	
[0] to [9] * ⁴	Press	Directly selects a Group ID registered in the list.	Directly selects a status registered in the list.
[*] * ⁴	Press	-	Transmits the status after aborting the current mode.
	Hold	Migrates to Status Mode or Short Message Mode.	-
[#] * ⁴	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Migrates to the status entry mode (only if Manual Dialing is enabled).
PTT Switch	Press	Transmits after aborting the current mode.	Transmits the status after aborting the current mode.

*¹ Portable (Full Key Model/ Standard Key Model)/ Mobile only*² Portable (Full Key Model/ Standard Key Model) only*³ Portable only*⁴ Portable (Full Key Model)/ Mobile only

Button		Status Mode	Short Message Mode
		Manual entry  Status Status List	Manual entry  Short Message  Message? Back
Menu () * ¹	Press	Transmits the status after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)	Sends the message after aborting the current mode (after finalizing the characters). Finalizes the characters. (While the characters are flashing)
Back () * ¹	Press	Deletes one character (While entering or after confirming the Digit No.). Migrates to the list selection mode (before entering the Digit No.).	Deletes one character (While entering or after confirming the character). Returns to the menu (if the transceiver enters this mode by pressing the Menu button (before entering the character)).
	Hold Down	Deletes all characters (While entering or after confirming the Digit No.).	Deletes all characters (While entering or after confirming the character).
Function () * ²	Press	The configured function functions.	
Home () * ¹	Press	Aborts the current mode.	
	Hold	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the Menu button).
Side 1 * ³	Press	The configured function functions.	
Side 2 * ³	Press	The configured function functions.	
 * ¹	Press	Selects Digit No. one at a time.	If “Characters” is configured in Up/Down: Selects characters one at a time. If “Line Up/Down” is configured in Up/Down: Shifts the cursor up and down.
	Hold Down	Selects Digit No. continuously.	If “Characters” is configured in Up/Down: Selects characters continuously. If “Line Up/Down” is configured in Up/Down: Shifts the cursor up and down continuously.
 * ¹	Press	Migrates to Individual Call Mode or Group Call Mode.	Shifts the cursor to the left. Migrates to Individual Call Mode or Group Call Mode if no character is entered.
	Hold Down	-	Shifts the cursor to the left continuously.
 * ¹	Press	-	Shifts the cursor to the right.
	Hold Down	-	Shifts the cursor to the right continuously.
Selector * ³	-	The configured function functions after aborting the current mode.	
[0] to [9] * ⁴	Press	Enters the Digit No.	Enters characters.
[*] * ⁴	Press	Transmits the status after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)	Switches character types (upper case/lower case/figure) (after finalizing the characters). Finalizes the characters. (While the characters are flashing)
[#] * ⁴	Press	Deletes one character (While entering or after confirming the Digit No.). Migrates to the list selection mode (before entering the Digit No.).	Deletes one character (While entering or after confirming the character). Returns to the menu (if the transceiver enters this mode by pressing the Menu button (before entering the character)).
	Hold Down	Deletes all characters (While entering or after confirming the Digit No.).	Deletes all characters (While entering or after confirming the character).
PTT Switch	Press	Transmits the status after aborting the current mode.	Sends the message after aborting the current mode.

*¹ Portable (Full Key Model/ Standard Key Model)/ Mobile only*² Portable (Full Key Model/ Standard Key Model) only*³ Portable only*⁴ Portable (Full Key Model)/ Mobile only

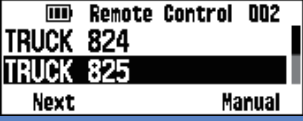
Button		Scrambler/Encryption Code Mode	
			
Menu ([) * ¹	Press	-	
Back ([) * ¹	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Function ([) * ²	Press	The configured function functions.	
Home ([) * ¹	Press	Aborts the current mode.	
	Hold	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 * ³	Press	The configured function functions.	
Side 2 * ³	Press	The configured function functions.	
[] / [] * ¹	Press	Selects Multi-keys registered in the Multi-key List one at a time.	
	Hold Down	Selects Multi-keys registered in the Multi-key List continuously.	
[] / [] * ¹	Press	-	
	Hold Down	-	
Selector * ³	-	The configured function functions after aborting the current mode.	
[0] to [9] * ⁴	Press	Directly selects a Multi-key registered in the list.	
[*] * ⁴	Press	-	
[#] * ⁴	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
PTT Switch	Press	Transmits after aborting the current mode.	

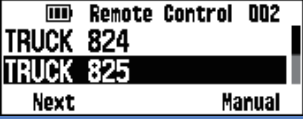
*¹ Portable (Full Key Model/ Standard Key Model)/ Mobile only

*² Portable (Full Key Model/ Standard Key Model) only

*³ Portable only

*⁴ Portable (Full Key Model)/ Mobile only

Button		Remote Control Mode		
		Selecting a list	Manual entry	Selecting a list
				
Menu ([) * ¹	Press	Migrates to the Remote Control Option selection display.	Migrates to the Remote Control Option selection display. Finalizes the Digit No. (While the Digit No. is flashing)	Transmits the selected Remote Control Message after aborting the current mode.
Back ([) * ¹	Press	Migrates to the code entry mode (only if Manual Dialing is enabled in a DMR Conventional system).	Deletes one character (While entering or after confirming the Digit No.). Migrates to the list selection mode (before entering the Digit No.).	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
	Hold Down	-	Deletes all characters (While entering or after confirming the Digit No.).	-
Function ([) * ²	Press	The configured function functions.		
	Press	Aborts the current mode.		
Home ([) * ¹	Hold	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Returns to the menu if no code is entered (if the transceiver enters this mode by pressing the Menu button).	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
Side 1 * ³	Press	The configured function functions.		
Side 2 * ³	Press	The configured function functions.		
[] / [] * ¹	Press	Selects Unit IDs registered in the Individual ID List one at a time.	Selects Digit No. one at a time.	Selects configuration items one at a time.
	Hold Down	Selects Unit IDs registered in the Individual ID List continuously.	Selects Digit No. continuously.	Selects configuration items continuously.
[] * ¹	Press	-	-	Migrates to the Unit ID list selection mode.
	Hold	-	-	-
[] * ¹	Press	Migrates to the Remote Control Option selection display.		
	Hold	-		

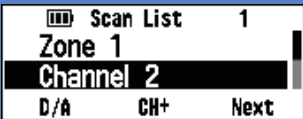
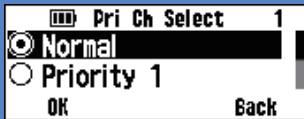
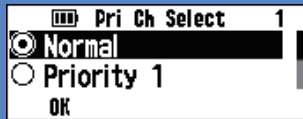
Button		Remote Control Mode		
		Selecting a list	Manual entry	Selecting a list
				
Selector ^{*3}	-	The configured function functions after aborting the current mode.		
[0] to [9] ^{*4}	Press	Directly selects a Unit ID registered in the list.	Enters the Digit No.	Selects a configuration item from the list.
[*] ^{*4}	Press	Migrates to the Remote Control Option selection display.	Migrates to the Remote Control Option selection display. Finalizes the Digit No. (While the Digit No. is flashing)	Transmits the selected Remote Control Message after aborting the current mode.
[#] ^{*4}	Press	Migrates to the code entry mode (only if Manual Dialing is enabled).	Deletes one character (While entering or after confirming the Digit No.). Migrates to the list selection mode (before entering the Digit No.).	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
	Hold Down	-	Deletes all characters (While entering or after confirming the Digit No.).	-
PTT Switch	Press	Transmits after aborting the current mode.		Transmits the selected Remote Control Message after aborting the current mode.

^{*1} Portable (Full Key Model/ Standard Key Model)/ Mobile only

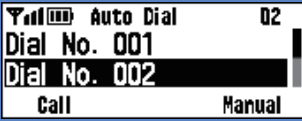
^{*2} Portable (Full Key Model/ Standard Key Model) only

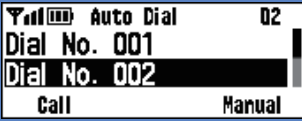
^{*3} Portable only

^{*4} Portable (Full Key Model)/ Mobile only

Button		Scan Program Mode	Priority-channel	Priority-channel Select Mode
				
Menu ([) * ¹	Press	Confirms addition or deletion.	Confirms the configuration and then restores the Scan List edit screen.	Confirms the configuration and then aborts the current mode.
Back ([) * ¹	Press	The transceiver enters the Priority Channel edit screen.	Restores the Scan List edit screen.	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
Function ([) * ²	Press	The configured function functions.		
Home ([) * ¹	Press	Aborts the current mode.		
	Hold	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).		
Side 1 * ³	Press	The configured function functions.		
Side 2 * ³	Press	The configured function functions.		
[]/ [] * ¹	Press	Selects channels one at a time.	Selects configuration items one at a time.	
	Hold Down	Selects channels continuously.	Selects configuration items continuously.	
[]/ [] * ¹	Press	Selects zones one at a time.	-	
	Hold Down	Selects zones continuously.	-	
Selector * ³	-	The configured function functions after aborting the current mode.		
[0] to [9] * ⁴	Press	-	Selects a configuration item from the list.	
[*] * ⁴	Press	Confirms addition or deletion.	Confirms the configuration and then restores the Scan List edit screen.	Confirms the configuration and then aborts the current mode.
[#] * ⁴	Press	The transceiver enters the Priority Channel edit screen.	Restores the Scan List edit screen.	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
PTT Switch	Press	-		Transmits after aborting the current mode.

*¹ Portable (Full Key Model/ Standard Key Model)/ Mobile only*² Portable (Full Key Model/ Standard Key Model) only*³ Portable only*⁴ Portable (Full Key Model)/ Mobile only

Button		Autodial Mode	
		Selecting a list	Manual entry
			
Menu ([)]* ¹	Press	Transmits after aborting the current mode.	Transmits after aborting the current mode (after finalizing the DTMF code). Confirms the DTMF code (while the DTMF code blinks).
	Hold Down	-	-
Back ([)]* ¹	Press	Migrates to the DTMF code entry mode (only if Store and Send is enabled).	Migrates to the list selection mode. Deletes one character (While entering and after confirming the DTMF code).
	Hold Down	-	Deletes all characters (While entering and after confirming the DTMF code).
Function ([)]* ²	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	The configured function functions.
	Hold Down	-	-
Home ([)]* ¹	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1* ³	Press	The configured function functions.	
	Hold Down	-	
Side 2* ³	Press	The configured function functions.	
	Hold Down	-	
[]/[ 1	Press	Selects DTMF codes registered in Autodial List one at a time.	Selects DTMF codes one at a time.
	Hold Down	Selects DTMF codes registered in Autodial List continuously.	Selects DTMF codes continuously.
[]/[ 1	Press	-	-
	Hold Down	-	-
Selector* ³	-	The configured function functions after aborting the current mode.	
[0] to [9]* ⁴	Press	Selects a DTMF code directly from the list.	Enters a DTMF code.
[A] to [D]* ⁴		-	Enters a DTMF code.

Button		Autodial Mode	
		Selecting a list	Manual entry
			
[*] ^{*4}	Press	Pressing the [0] button after pressing the [*] button enables redialing.	When “Function Button” is configured in * and # Buttons: Pressing the [0] button after migrating to the state that a DTMF code is entered allows redialing. Pressing the [*] or [#] button enters the character “*” or “#”. When “Direct Entry” is configured in * and # Buttons: Enters “*”.
	Hold Down	-	When “Function Button” is configured in * and # Buttons: Then, pressing the [2], [5], [8] or [0] button enters “A”, “B”, “C”, or “D” respectively.
[#] ^{*4}	Press	Migrates to the DTMF code entry mode (only if Store and Send is enabled).	When “Function Button” is configured in * and # Buttons: Migrates to the list selection mode. Deletes one character (While entering and after confirming the DTMF code). When “Direct Entry” is configured in * and # Buttons: Enters “#”.
	Hold Down	-	When “Function Button” is configured in * and # Buttons: Deletes all characters (While entering and after confirming the DTMF code).
PTT Switch	Press	Transmits after aborting the current mode.	

*1 Portable (Full Key Model/ Standard Key Model)/ Mobile only

*2 Portable (Full Key Model/ Standard Key Model) only

*3 Portable only

*4 Portable and KCH-20R (Featured Panel) only

Button		Dialing Mode
		Manual entry
		
Menu ([)] ^{*1}	Press	Transmits after aborting the current mode (if the entered code is enabled). Displays an error and continues the mode (if the entered code is disabled). Confirms the dialing code (while the dialing code blinks).
	Hold Down	-
Back ([)] ^{*1}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button). Deletes one character (While entering and after confirming the dialing code).
	Hold Down	Deletes all characters (While entering and after confirming the dialing code).
Function ([)] ^{*2}	Press	-
	Hold Down	-
Home ([)] ^{*1}	Press	Aborts the current mode.
	Hold Down	-
Side 1 ^{*3}	Press	The configured function functions.
	Hold Down	-
Side 2 ^{*3}	Press	The configured function functions.
	Hold Down	-
[]/[ *1	Press	Selects a dialing code one at a time.
	Hold Down	Selects a dialing code continuously.
[]/[ *1	Press	-
	Hold Down	-
Selector ^{*3}	-	The configured function functions after aborting the current mode.
[0] to [9] ^{*4}	Press	Enter a dialing code.
[A] to [D] ^{*4}		-

Button		Dialing Mode
		Manual entry
		
[*] ^{*4}	Press	When “Function Button” is configured in * and # Buttons (DMR Dialing): Confirms the dialing code (while the dialing code blinks). Pressing the [*] or [#] button after pressing the [*] button enters “*” or “#” (before entering and after confirming the dialing code). When “Direct Entry” is configured in * and # Buttons (DMR Dialing): Enters “*”.
	Hold Down	-
[#] ^{*4}	Press	When “Function Button” is configured in * and # Buttons (DMR Dialing): Returns to the menu (if the transceiver enters this mode by pressing the Menu button). Deletes one character (While entering and after confirming the dialing code). When “Direct Entry” is configured in * and # Buttons (DMR Dialing): Enters “#” (before entering a dialing code). Transmits after aborting the current mode (if the entered code is enabled). Displays an error and continues the mode (if the entered code is disabled).
	Hold Down	When “Function Button” is configured in * and # Buttons (DMR Dialing): Deletes all characters (While entering and after confirming the dialing code).
PTT Switch	Press	Transmits after aborting the current mode (if the entered code is enabled). Displays an error and continues the mode (if the entered code is disabled).

*1 Portable (Full Key Model/ Standard Key Model)/ Mobile only

*2 Portable (Full Key Model/ Standard Key Model) only

*3 Portable only

*4 Portable and KCH-20R (Featured Panel) only

Button		Redial Mode	
		Selecting a list	View
			
Menu ([M]) ^{*1}	Press	Transmits after aborting the current mode (if the selected code is enabled). Displays an error and continues the mode (if the selected code is disabled).	
	Hold Down	-	
Back ([B]) ^{*1}	Press	Displays a dialing code.	Migrates to the list selection mode.
	Hold Down	-	
Function ([F]) ^{*2}	Press	-	
	Hold Down	-	
Home ([H]) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*2}	Press	The configured function functions.	
	Hold Down	-	
Side 2 ^{*2}	Press	The configured function functions.	
	Hold Down	-	
[▲]/[▼] ^{*1}	Press	Selects a dialing code which is retained in the dialing history list one at a time.	Moves by line one at a time.
	Hold Down	Selects a dialing code which is retained in the dialing history list continuously.	Moves by line continuously.
[◀]/[▶] ^{*1}	Press	-	Moves by line one at a time.
	Hold Down	-	-
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Selects a list (only the [1] button to [3] button are available).	-
[A] to [D] ^{*4}		-	
[*] ^{*4}	Press	-	
	Hold Down	-	

Button		Redial Mode	
		Selecting a list	View
			
[#] ^{*4}	Press	When “Function Button” is configured in * and # Buttons (DMR Dialing): Returns to the menu (if the transceiver enters this mode by pressing the Menu button). When “Direct Entry” is configured in * and # Buttons (DMR Dialing): Transmits after aborting the current mode (if the selected code is enabled). Displays an error and continues the mode (if the selected code is disabled).	
	Hold Down	-	
PTT Switch	Press	Transmits after aborting the current mode (if the selected code is enabled). Displays an error and continues the mode (if the selected code is disabled).	

*1 Portable (Full Key Model/ Standard Key Model)/ Mobile only

*2 Portable (Full Key Model/ Standard Key Model) only

*3 Portable only

*4 Portable and KCH-20R (Featured Panel) only

● Control Tone

Tone Name	Pattern	Reference
Button Beep A	1 beep  1630 Hz (50 ms)	Broadcast Group Call Lone Worker Activity Detection Single Scan List Scan Multi-Zone Scan Scan Program Priority Scan
Button Beep B	2 beeps  1630 Hz (50 ms)	Lone Worker Activity Detection Single Scan List Scan Multi-Zone Scan Scan Program Priority Scan
Button Beep C	3 beeps  1630 Hz (50 ms)	Priority Scan
Button-entry Error Tone	1 beep  700 Hz (50 ms)	Scan Delete/Add Send the Location Data (Indoor Location)
Priority-channel Tone	1 beep  2000 Hz (50 ms)	Priority Scan Priority-channel Stop Tone
Scan Stop Tone	2 beeps  700 Hz (50 ms)	Channel Recall Scan Stop Tone
Search Mode Tone	1 beep  770 Hz (400 ms)	DMR Site Roaming
Call Request Tone	1 beep  1630 Hz (50 ms)	Individual Call Acknowledge Request Call Request Tone
Call In Progress Tone	2 beeps  980 Hz (100 ms)	Individual Call Acknowledge Request
Transaction Confirmed Tone	2 beeps  490 Hz (300 ms) 980 Hz (300 ms)	Call Interruption

Tone Name	Pattern	Reference
Complete Tone	5 beeps  980 Hz (20 ms)	Send the Location Data (Indoor Location)

● Warning Tone

Tone Name	Pattern	Reference
Warning Tone A	continuous beep  700 Hz (until the PTT switch is released)	Busy Channel Lockout
TOT Pre-alert Tone	3 beeps  1630 Hz (50 ms)	Time-out Timer
Busy Tone 2	3 beeps  940 Hz (150 ms)	Call Interruption Send the Location Data (Indoor Location)
System Select Tone	4 beeps  980 Hz (50 ms) 1220 Hz (50 ms) 980 Hz (50 ms) 1220 Hz (50 ms)	DMR Site Roaming
Call Fail Tone	2 beeps  440 Hz (50 ms) 440 Hz (1 sec)	Repeater Mode DMR Site Roaming
Lone Worker Tone	2 beeps  1630 Hz (150 ms) 940 Hz (150 ms)	Lone Worker
Group Subscription Invalid Indicator Tone	2 beeps  440 Hz (50 ms)	Group Subscription
Call Processing Tone	2 beeps  940 Hz (50 ms)	Individual Call Acknowledge Request Call Processing Tone
Network Failure Tone A	2 beeps  620 Hz (100 ms) 930 Hz (100 ms)	Network Failure Indicator

Tone Name	Pattern	Reference
Network Failure Tone B	1 beep  1630 Hz (1000 ms)	Network Failure Indicator
Man-down Pre-alert Tone	1 beep  1630 Hz (50 ms)	Man-down Detection
Stationary Pre-alert Tone	1 beep  770 Hz (50 ms)	Stationary Detection
Motion Pre-alert Tone	1 beep  1210 Hz (50 ms)	Motion Detection
Invalid Dialing Entry Tone	1 beep  490 Hz (2 sec)	Dialing

● Locator Tone

Tone Name	Pattern	Reference
Emergency Locator Tone	2 beeps  1630 Hz 940 Hz (90 ms) (90 ms)	Emergency Mode

● Sidetone

Tone Name	Pattern	Reference
Proceed Tone	3 beeps  1000 Hz (20 ms)	Individual Call Acknowledge Request Group Call

● Alert Tone

Tone Name	Pattern	Reference
Unencrypted Call Alert Tone	1 beep  1477 Hz (50 ms)	Unencrypted Call Alert Tone

● Transmit Tone

Tone Name	Pattern	Reference
Background Tone	1 beep  1630 Hz (50 ms)	Background Tone Transmission

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Functions for Analog Conventional System

Making a Selective Call Using Signaling

A user can initiate a selective call using signaling such as 2-tone, FleetSync, DTMF, and MDC-1200. Message communications including status messages and short messages are also available by using FleetSync.

[Using 2-tone to Initiate a Selective Call](#)
Page 1114

[Using FleetSync to Initiate a Selective Call](#)
Page 1128

[Using DTMF to Initiate a Selective Call](#)
Page 1128

[Using MDC-1200 to Initiate a Selective Call](#)
Page 1128

[Using 5-tone to Communicate](#)
Page 1128

Creating a Temporary Call Group

The transceiver can create a new group by registering an arbitrary channel in the Tactical Zone after selecting the channel from the channels configured for the transceiver.

[Using the Tactical Zone](#)
Page 1123

Avoiding Interference with Other Communications

If a channel to be used for the transceiver to transmit is being used by other parties, the transmission of the transceiver on the channel is automatically restricted.

[Avoiding Interference with Other
Communications \(Busy Channel Lockout\)](#)
Page 1098

Functions for FleetSync

Making a Selective Call

The transceiver can make various types of calls by using a FleetSync ID, such as an Individual Call or Group Call.

[Making a Selective Call](#)
Page 1170

Sending and Receiving a Short Message

A user can send and receive a message with a maximum of 48 characters.

[Sending and Receiving a Short Message
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Sending and Receiving a Status Message

A user can send and receive a simple message called a status.

[Sending and Receiving a Status Message
\(Status Call\)](#)
Page 1186

Sending GPS Data

By using a built-in or external GPS receiver unit, a user can send the own location information to the base station.

[Sending GPS Data](#)
Page 1207

Functions for 5-tone	Making an Individual Call Using 5-tone Signaling The transceiver can make voice communications to an individual transceiver or a group by using 5-tone signaling. Making a Selective Call Page 1282	Sending and Receiving a Status Message Using 5-tone Signaling A user can send and receive a simple message called a status by using 5-tone signaling. Sending and Receiving a Status Message (Status Call) Page 1297
	Sending and Receiving a Short Message Using 5-tone Signaling A user can send and receive a message with a maximum of 48 characters by a combination of the Short Message function of FleetSync and 5-tone code. Sending and Receiving a Short Message (Short Data Call) Page 1305	Learning About the Encode/ Decode Format Commands The script that determines the timing to send and receive a 5-tone code or the transceiver behavior when a 5-tone code is sent and received can be created by using various commands. USING THE 5-TONE ENCODE/ DECODE FORMAT Page 1317
Functions for an LTR Trunking System	Communicating in an LTR Trunking System The transceiver can communicate using the LTR Trunking protocol. Using the LTR ID for Basic Communications Page 1137	Connecting to a Public Switched Telephone Network In an LTR Trunking system, the transceiver can connect to a Public Switched Telephone Network (PSTN) via the Repeater Interconnect (RIC), which is a repeater connected to a telephone line. Connecting to a Public Switched Telephone Network (PSTN) (Telephone Interconnect) Page 1148
	Enhancing Communication Security The transceiver can scramble the audio signal so that the contents of communications can be prevented from being intercepted. USING COMMUNICATION SECURITY Page 1414	

In an Analog Conventional system, communications are realized by sending and receiving analog signals on an analog channel. The transceiver can make an Individual Call or a Group Call by using Optional Signaling such as DTMF, 2-tone, FleetSync, and 5-tone.

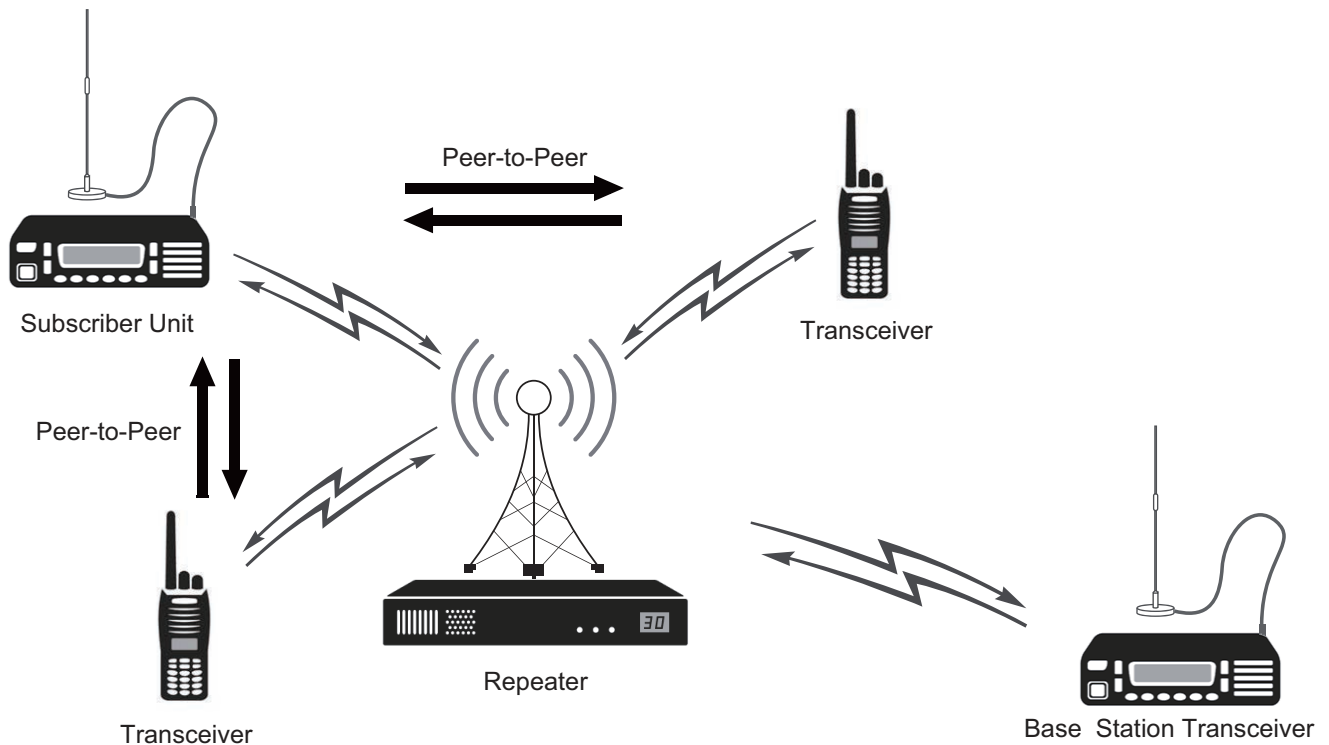


Figure 2-1 Image of Communications in an Analog Conventional System

Note

- This chapter describes the relevant transceiver behavior in a digital system too in case the transceiver is operated in Mixed Mode.

2.1 Initiating Voice Communications (Basic Transmission and Reception)

This section describes the basic methods for transmission and reception in an Analog Conventional system and the relevant functions.

About Communication Security (Voice Scrambler)

The transceiver is equipped with the Voice Scrambler function, which can enhance the confidentiality of communications by scrambling the audio signal when making various communications in an Analog Conventional system. (Refer to [USING COMMUNICATION SECURITY](#).)

Receiving

Received audio sounds from the speaker if the transceiver receives analog signals, and the frequency matches the frequency of the channel on which the transceiver has waited for or the Optional Signaling matches the Optional Signaling preconfigured for the transceiver. When the signaling (QT/DQT) is used, communications are possible if the received QT tone or DQT code matches the QT tone or DQT code for which the transceiver waits.

Participating in an On-going Voice Call Midway Through the Call (Late Entry)

The transceiver can participate in an on-going voice call even if the transceiver receives this call midway through. The transceiver in an Analog Conventional system can participate in an on-going voice call by decoding QT/DQT signaling always sent along with audio data, even if the transceiver receives a voice call midway through the call. However, the transceiver cannot participate in an on-going call from a group call or individual call using Optional Signaling (such as DTMF, 2-tone, and FleetSync) even if the transceiver receives a signal, since signaling is sent one-time when starting transmission.

Searching Whether the Transceiver Receives a Call (Scan)

Using the Scan function, the transceiver can check each channel in turn whether the channel has a signal. If a channel has a signal, the transceiver receives the signal on the channel.

The following scan functions can be used in an Analog Conventional system.

- Single Scan
- List Scan
- Multi-Zone Scan
- Priority Scan

Refer to "[USING SCAN](#)" for details of Scan.

Transmitting

Pressing the **PTT** switch starts transmitting. When the signaling (QT/DQT) is used, the transceiver sends the QT tone or DQT code. In this case, if the transmitted QT tone or DQT code matches the QT tone or DQT code preconfigured for the receiving transceiver, the transceivers can communicate.

Restricting the Continuous Transmission Duration (Time-out Timer)

Time-out Timer (TOT) is the function to restrict the duration for the transceiver to continuously transmit.

This function is used to prevent a user from occupying a repeater or frequency which is shared with other users. The transceiver automatically stops transmitting and releases the channel if it continuously transmits longer than the configured time.

Time-out Timer can be configured for each system. Also, timers, such as **TOT Pre-alert**, **TOT Rekey Time**, and **TOT Reset Time**, relevant to **Time-out Timer** can be configured.

TOT Pre-alert

TOT Pre-alert is the function to notify a user that a continuous transmission is about to end by the Time-out Timer. A TOT Pre-alert Tone (3 beeps) sounds from the transceiver before the transceiver stops the continuous transmission by the **Time-out Timer**.

Example: Time-out Timer: 30 sec, TOT Pre-alert: 4 sec

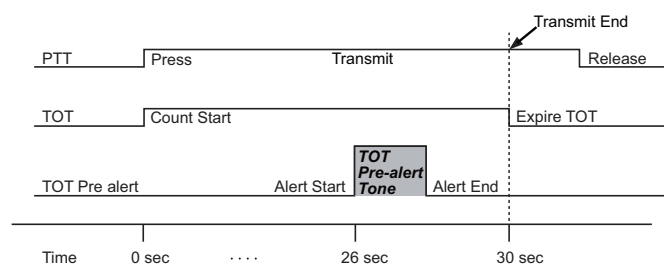


Figure 2-2 TOT Pre-alert

Note

- If "Off" is configured for **TOT Pre-alert**, no TOT Pre-alert Tone sounds from the transceiver.

TOT Rekey Time

TOT Rekey Time is the amount of time from when the transceiver stops the transmission by the **Time-out Timer** until transmission becomes possible again.

Example: Time-out Timer: 30 sec, TOT Rekey Time: 20 sec

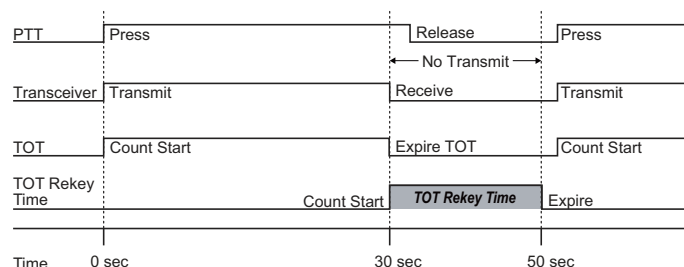


Figure 2-3 TOT Rekey Time

Note

- If "Off" is configured for **TOT Rekey Time**, the transceiver will immediately be ready to transmit.
- The timer will be reset and transmission becomes possible if the zone or channel is changed while the **TOT Rekey Time** is counting down.
- TOT Rekey Time** will not be reset if **Revert Channel** is not changed during the scan.

TOT Reset Time

TOT Reset Time is the time required to initialize and reset the elapsed time for **Time-out Timer**.

Example 1: Time-out Timer: 30 sec, TOT Reset Time: 10 sec

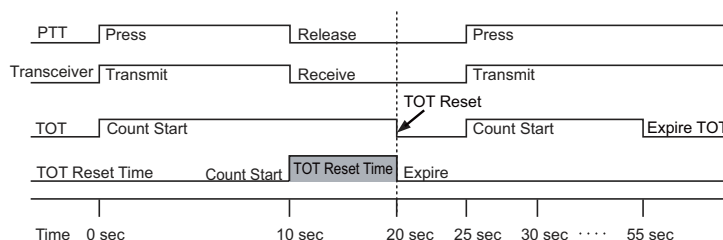


Figure 2-4 TOT Reset Time 1

The transceiver considers a retransmission within this configured length of time as a continuous transmission. In the following example, the counting of **Time-out Timer** continues because the transmission was started by a user pressing the **PTT** switch while the **TOT Reset Time** was counting down.

Example 2: Time-out Timer: 30 sec, TOT Reset Time: 10 sec

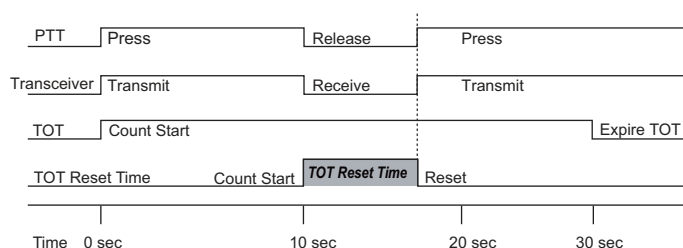


Figure 2-5 TOT Reset Time 2

Note

- If “Off” is configured for **TOT Reset Time**, the Time-out Timer will be reset immediately after the transceiver finishes transmitting.
- The timer will be reset if the zone or channel is changed while the **TOT Rekey Time** is counting down.
- **TOT Reset Time** will not be reset if **Revert Channel** is not changed during the scan.

Configuration using KPG-D3/ D3N

Configuring various functions of **Time-out Timer**

([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > General > MDC-1200 > Other Options > TX > Time-out Timer)

([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > General > FleetSync > Other Options > TX > Time-out Timer)

([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > General > 5-tone > Other Options > TX > Time-out Timer)

([See](#) Radio Configuration > System Properties > Analog Voting/Analog Voting with Signaling > General > MDC-1200 > Other Options > TX > Time-out Timer)

([See](#) Radio Configuration > System Properties > Analog Voting/Analog Voting with Signaling > General > FleetSync > Other Options > TX > Time-out Timer)

([See](#) Radio Configuration > System Properties > Analog Voting/Analog Voting with Signaling > General > 5-tone > Other Options > TX > Time-out Timer)

Avoiding Interference with Other Communications (Busy Channel Lockout)

Busy Channel Lockout is the function to automatically restrict the transmission so as not to interfere with other communications.

If an attempt is made to transmit on a channel that is already being used by other groups, the transceiver automatically restricts the transmission.

If the **PTT** switch is pressed while **Busy Channel Lockout** is enabled, a Warning Tone A (continuous beep) sounds from the transceiver, and transmission is disabled. In this case, “Busy” appears on the display. The Warning Tone A sounds from the transceiver until the **PTT** switch is released.

The following are conditions to disable transmission by **Busy Channel Lockout**:

Table 2-1 Busy Channel Lockout

Configuration	Description
No	Busy Channel Lockout is disabled. Transmission is not restricted even if the channel on which the transceiver attempts to transmit is busy.
Carrier Only	The transceiver cannot transmit while the transceiver is receiving a carrier.
Incorrect Tone	The transceiver cannot transmit if the transceiver receives a carrier and the received QT tone or DQT code does not match the QT tone or DQT code preconfigured for the transceiver. However, the transceiver can transmit if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver.
Optional Signaling	Transmission by the transceiver is not allowed until the Optional Signaling received matches the Optional Signaling configured for the transceiver.

The transceiver is controlled in the following manner according to the configuration for Transmit Mode on a channel with “Mixed” configured in **Channel Type**.

- **If “Analog” is configured for Transmit Mode:**

The transceiver transmits according to the configuration in **Busy Channel Lockout** (Analog).

- **If “NXDN” is configured for Transmit Mode:**

The transceiver transmits according to the configuration in **Busy Channel Lockout** (NXDN).

- **If “DMR” is configured for Transmit Mode:**

The transceiver transmits according to the configuration in **Busy Channel Lockout** (DMR).

Note

- Refer to each Function Part for details on the transceiver behavior for **Busy Channel Lockout** when “NXDN” or “DMR” is configured in Transmit Mode.
- **Busy Channel Lockout** cannot be activated in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Busy Channel Lockout** (Individually)

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Individually > Analog)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Individually > Analog)

Using a Channel Being Used by Other Parties (BCL Override)

BCL Override is the function to transmit on a busy channel even if **Busy Channel Lockout** is activated and transmission is restricted.

Operating the transceiver

1 Press the **PTT** switch while transmission is restricted by **Busy Channel Lockout**.

2 Release the **PTT** switch, then press the **PTT** switch again within 500 ms.

Busy Channel Lockout is temporarily disabled, and the transceiver starts transmitting.



- This function also works while the transceiver is transmitting using the VOX function. For a transmission using VOX, **Busy Channel Lockout** is temporarily disabled and the transceiver can transmit if audio is input within 500 ms after audio input terminates.

Configuration using KPG-D3/ D3N

Configuring **BCL Override** to be enabled or disabled

(**See**) Radio Configuration > System Properties > Systems > Analog Conventional > General > MDC-1200 > Other Options > TX)

(**See**) Radio Configuration > System Properties > Systems > Analog Conventional > General > FleetSync > Other Options > TX)

(**See**) Radio Configuration > System Properties > Systems > Analog Conventional > General > 5-tone > Other Options > TX)

(**See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > MDC-1200 > Other Options > TX)

(**See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > FleetSync > Other Options > TX)

(**See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > 5-tone > Other Options > TX)

Communicating Without Using a Repeater (Talk Around)

Talk Around is the function allowing direct communication between transceivers without using a repeater.

If the transceiver cannot link to a repeater due to too great distance between the transceiver and the repeater, the transceiver can directly communicate with the target transceiver by using **Talk Around**.

The transceiver, with **Talk Around** enabled, transmits on the receive frequency and uses the Decode Signaling (QT tone or DQT code) configured for the selected channel.

On a channel with **Allow Talk Around** enabled, **Talk Around** can be toggled between enabled and disabled by operating the transceiver.

- Pressing the **Talk Around** button toggles **Talk Around** between enabled and disabled.
- Pressing the **Menu** button causes the transceiver to enter Menu Mode, and then **Talk Around** can be toggled between enabled and disabled by selecting "Talk Around". (Refer to Common Function Part [Using Menu Mode](#).)

Note

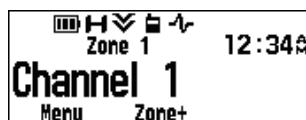
- For the 800 MHz/ 900 MHz model, the 800 MHz model, and the 900 MHz model, **Talk Around** cannot be toggled between enabled and disabled by operating the transceiver even on a channel with **Allow Talk Around** enabled.

Operating the transceiver

● Enabling Talk Around

Press the **Talk Around** button while **Talk Around** is disabled.

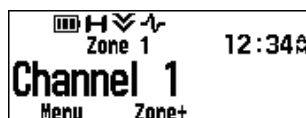
The "📡" icon appears and **Talk Around** will be enabled.



● Disabling Talk Around

Press the **Talk Around** button while **Talk Around** is enabled.

The "📡" icon disappears and **Talk Around** will be disabled.



Note

- Talk Around** is disabled by changing the zone or channel while **Talk Around** is enabled. On a channel with **Talk Around** disabled, **Talk Around** cannot be toggled between enabled and disabled by operating the **Talk Around** button.
- If **Talk Around** is enabled by operating the **Talk Around** button, **Talk Around** becomes disabled when the transceiver enters Emergency Mode.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Allow Talk Around** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > General)
- ([See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > General)

2.2 Using the Signaling

QT/DQT is the signaling to be used for facilitating communication within a group if the same channel is shared by several groups. Also, DTMF, 2-tone and FleetSync can be used as the Optional Signaling to initiate a selective call.

Sharing the Same Channel (Frequency) by Several Groups (QT/DQT)

QT/DQT is the signaling to be used for facilitating communication within a group if the same channel is shared by several groups.

QT tone or DQT code has no effect on normal voice communication since QT tone or DQT code uses a subaudible tone.

The transceiver mutes unwanted calls if QT tone or DQT code is configured for each channel. Therefore, a user can communicate in a group without listening to conversations from other groups.

This signaling does not affect voice communication since the signaling does not use the audible frequency spectrum above 300 Hz.

Also, the transceiver can discriminate the signaling even if reception starts midway through a call since this signaling type has a continuous waveform.

● QT (Quiet Talk)

QT is signaling using a continuous subaudible sine wave (67.0 Hz to 254.1 Hz). The frequency can be configured in steps of 0.1 Hz.

● DQT (Digital Quiet Talk)

DQT is a signaling that uses “1” and “0” in 23-bit words. An octadecimal code with a number between 000 and 777 can be configured. The DQT signal has a polarity and can be configured as Normal or Inverted, corresponding to the circuit configuration of repeater or the target transceiver.

The following are transmission and reception behaviors of QT tone or DQT code:

Table 2-2 QT/DQT Transmission/ Reception

Behavior	Description
Reception	If the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver, the transceiver unmutes the speaker, and received audio sounds from the speaker. The audio mutes when the transceiver receives a QT Reverse Burst code or DQT Turn-off code.
Transmission	The transceiver sends the configured QT tone or DQT code when the transceiver transmits. Pressing the PTT switch causes the transceiver to transmit the preconfigured QT tone or DQT code.

Note

- The transceiver transmits with the signaling of the received signal regardless of the configuration in Transmit Mode within a certain period of time after the transceiver receives a signal on a channel with “Mixed” configured in **Channel Type**.

Configuration using KPG-D3/ D3N

Configuring **QT/DQT Decode** and **QT/DQT Encode**

( See Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Analog)

( See Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Analog)

Using the Optional Signaling

Optional Signaling is the signaling used to initiate a selective call. DTMF, 2-tone, FleetSync, and MDC-1200 are the Optional Signaling which can be used in an Analog Conventional system. All these types of signaling make use of audio bandwidths. (Refer to [Using 2-tone to Initiate a Selective Call](#), [USING FLEETSYNC](#), and [USING DTMF](#).)

The transceiver behaves as follows according to the configuration for **Optional Signaling Decode Condition**.

- **When Optional Signaling Decode Condition is configured to “QT/DQT”**

When the QT tone or DQT code matches, and the Optional Signaling on standby matches with the received Optional Signaling, the transceiver outputs an Alert Tone and starts Transpond.

- **When Optional Signaling Decode Condition is configured to “Carrier”**

When the transceiver receives a carrier and the Optional Signaling on standby matches with that received, the transceiver outputs an Alert Tone and starts Transpond. In this case, matching of the QT tone or DQT code is not required.

The transceiver behaves as follows according to the type of a received signal on a channel with “Mixed” configured in **Channel Type**.

- **If the transceiver receives analog signals**

The transceiver behaves according to the configuration in **Optional Signaling (Analog)**.

- **If the transceiver receives NXDN digital signals**

The transceiver behaves according to the configuration in **Optional Signaling (NXDN)**.



- Refer to NXDN Function Part [“Using the Optional Signaling”](#) for details on the transceiver behavior of the **Optional Signaling (NXDN)**.

Configuration using KPG-D3/ D3N

Configuring **Optional Signaling**

([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Analog)

([See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Analog)

Unmuting the Speaker (Audio Control)

Audio Control is the condition which allows the transceiver to unmute the speaker by a QT tone or DQT code and Optional Signaling. Using KPG-D3/ D3N, the condition which allows the transceiver to unmute the speaker can be configured for each system configured with System Properties.

The transceiver unmutes the speaker and emits received audio if the conditions configured for **Audio Control** are satisfied. QT tone or DQT code can be combined with Optional Signaling to alter the conditions for the transceiver to unmute the speaker.

The following are the conditions to unmute the speaker:

Table 2-3 Audio Control

Configuration	Description
QT/DQT	The transceiver unmutes the speaker if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver. The conditions for unmuting the speaker do not change even if the transceiver transmits.
QT/DQT and Optional Signaling	The transceiver does not unmute the speaker unless the received Optional Signaling matches the Optional Signaling preconfigured for the transceiver. While the received Optional Signaling matches the Optional Signaling preconfigured for the transceiver, the transceiver unmutes the speaker if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver.
QT/DQT or Optional Signaling	While the received Optional Signaling does not match the Optional Signaling preconfigured for the transceiver, the transceiver unmutes the speaker if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver. The transceiver unmutes the speaker if the transceiver receives a carrier while the received Optional Signaling matches the Optional Signaling preconfigured for the transceiver. The conditions for unmuting the speaker do not change even if the transceiver transmits.

The transceiver behaves as follows according to the type of a received signal on a channel with “Mixed” configured in **Channel Type**.

- **If the transceiver receives analog signals**

The transceiver behaves according to the configuration in **Audio Control (Analog)**.

- **If the transceiver receives NXDN digital signals**

The transceiver behaves according to the configuration in **Audio Control (NXDN)**.



- Refer to NXDN Function Part “[Unmuting the Speaker \(Audio Control\)](#)” for details on the transceiver behavior of the **Audio Control (NXDN)**.

Configuration using KPG-D3/ D3N

Configuring **Audio Control**

([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > RX Options)

([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > RX Options)

Adjusting the Reception Sensitivity of the Transceiver (Squelch Level)

Squelch Level is the threshold receive level by which the transceiver can determine that the received signal has a carrier. If the received signal is weak, a low (decreased) **Squelch Level** value must be configured. If unwanted weak signals exist, raising (increasing) the **Squelch Level** improves the quality of communication.

- Configuring “0” in **Squelch Level** enters the Squelch Open status and the transceiver is always in receiving mode.
- Configuring “5” in **Squelch Level** enters the squelch level adjusted in Squelch Open of Tuning Mode.
- Configuring “9” in **Squelch Level** enters the squelch level adjusted in Squelch Tight of Tuning Mode.

Range: 0 (unmuted), 1 (low) to 9 (high)

Pressing the **Squelch Level** button changes the **Squelch Level**.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “Squelch Level” enables the **Squelch Level** to be changed. (Refer to Common Function Part [Using Menu Mode](#).)

Operating the transceiver

1 Press the **Squelch Level** button.

The transceiver enters Squelch Level Mode and the current **Squelch Level** appears on the main display.
The following operations are the same even if the transceiver enters Squelch Level Mode by pressing the **Menu** button.



2 Press the **[▲]** or **[▼]** button to change the **Squelch Level**.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for the selection methods.



3 Press the **Menu** (**[□]**) or **[*]** button.

Squelch Level changes and then the transceiver restores the normal display.

Note

- **Squelch Level** can be configured for a channel in an Analog Conventional system. Also, **Squelch Level** can be configured even for a channel where “Mixed” is configured for **Channel Type**. For other channels, the transceiver always behaves as the configuration of “5” in **Squelch Level**.
- Signaling is disabled while the **Squelch Level** is being changed.

Configuration using KPG-D3/ D3N

Configuring **Squelch Level**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > General > MDC-1200 > Other Options > RX)

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > General > FleetSync > Other Options > RX)

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > General > 5-tone > Other Options > RX)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > MDC-1200 > Other Options > RX)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > FleetSync > Other Options > RX)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > 5-tone > Other Options > RX)

Temporarily Disabling the Squelch (Squelch Off)

Squelch Off is the function to allow the transceiver to open the squelch and forcibly unmute the speaker.

With this function, the transceiver can unmute the speaker without receiving a carrier. A user can use this function to monitor the availability of channels prior to transmitting in order to prevent from interfering with other parties.

To use this function, the **Squelch Off** button or the **Squelch Off Momentary** button is used.

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then **Squelch Off** can be toggled between enabled and disabled by selecting “Squelch Off”. (Refer to Common Function Part [Using Menu Mode.](#))

Operating the transceiver

● **Squelch Off** button

1 Press the **Squelch Off** button while **Squelch Off** is disabled.

The “” icon appears.

The **Busy LED** lights green if **Busy LED** is enabled.

The transceiver unmutes the speaker and opens squelch regardless of the configuration for **QT/DQT Decode**. White noise is audible if no carrier is received.

2 Press the **Squelch Off** button while **Squelch Off** is enabled.

The “” icon disappears.

On a channel where QT tone or DQT code is configured, the transceiver restores Signaling Squelch, and on a channel where no QT tone or DQT code is configured, the transceiver restores Carrier Squelch.

● Squelch Off Momentary button

1 Press and hold the **Squelch Off Momentary** button.

The “” icon appears.

The **Busy LED** lights green if **Busy LED** is enabled.

The transceiver unmutes the speaker and opens squelch regardless of the configuration for **QT/DQT Decode**. White noise is audible if no carrier is received.

2 Release the **Squelch Off Momentary** button.

The “” icon disappears.

On a channel where QT tone or DQT code is configured, the transceiver restores Signaling Squelch, and on a channel where no QT tone or DQT code is configured, the transceiver restores Carrier Squelch.

Note

- If **Retain Monitor/Squelch Off Status** is enabled, the status of **Squelch Off**, either enabled or disabled, is retained in the transceiver even if the transceiver is turned OFF.
- Pressing the **Squelch Off** button or the **Squelch Off Momentary** button while the Optional Signaling matches resets the matching state of the Optional Signaling.
- If **Squelch Off** becomes enabled during the scan, the transceiver pauses scanning on a channel where the transceiver is scanning, and then unmutes the speaker. The transceiver does not resume scanning until **Squelch Off** is disabled.
- If **Squelch Off** is enabled on a channel with “Mixed” configured in **Channel Type**, the transceiver forcibly unmutes the speaker. White noise is audible if no carrier is present. At this time, the QT tone or DQT code is disabled. If the transceiver receives an analog signal, the transceiver unmutes the speaker only with a carrier.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Retain Monitor/Squelch Off Status** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > General > Power-on/off)

Temporarily Disabling the Signaling (Monitor)

Monitor is the function that temporarily disables the QT tone or DQT code and Optional Signaling that are configured for a channel on which the transceiver waits.

Monitor is used to check the availability of channels prior to transmitting in order to avoid interfering with other parties.

To use this function, the **Monitor** button or the **Monitor Momentary** button is used.

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then **Monitor** can be toggled between enabled and disabled by selecting “Monitor”. (Refer to Common Function Part [Using Menu Mode](#).)

While **Monitor** is enabled, the “” icon appears, and the QT tone or DQT code and Optional Signaling will be disabled.

The transceiver is controlled in the following manner according to the supported digital systems while **Monitor** is enabled on a channel with “Mixed” configured in **Channel Type**:

● NXDN

“” icon appears, and the RAN code, QT tone or DQT code and the Analog or NXDN Optional Signaling are disabled.

● DMR

“” icon appears, and the QT tone or DQT code and the Analog Optional Signaling are disabled.

Operating the transceiver

● Monitor button

1 Press the **Monitor** button while **Monitor** is disabled.

The “” icon appears.

The transceiver disables QT tone or DQT code and the Optional Signaling, and the audio can be heard just by receiving the carrier.

2 Press the **Monitor** button while **Monitor** is enabled.

The “” icon disappears.

A channel where **QT/DQT Decode** is configured resumes Signaling Squelch.

● Monitor Momentary button

1 Press and hold the **Monitor Momentary** button.

The “” icon appears.

The transceiver disables QT tone or DQT code and the Optional Signaling, and the audio can be heard just by receiving the carrier.

2 Release the **Monitor Momentary** button.

The “” icon disappears.

A channel where **QT/DQT Decode** is configured resumes Signaling Squelch.

Note

- If **Retain Monitor/Squelch Off Status** is enabled, the status of **Monitor**, either enabled or disabled, is retained in the transceiver even if the transceiver is turned OFF.
- Pressing the **Monitor** button or the **Monitor Momentary** button while the Optional Signaling matches resets the matching state of the Optional Signaling.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Retain Monitor/Squelch Off Status** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > General > Power-on/off)

Unmuting the Speaker by Linking with the Microphone (Off-hook Decode)

Supported Models: Mobile

Off-hook Decode can be used to disable **QT/DQT** and **Optional Signaling** linked with a microphone on- or off-hook state, and unmute by a Carrier Squelch.

The transceiver behaves as follows according to the configuration in **Off-hook Decode**:

Table 2-4 Off-hook Decode

Configuration	Description
Enabled	The transceiver opens the squelch according to the configuration for Audio Control while the microphone is in either the on-hook state or off-hook state.
Disabled	The transceiver unmutes the speaker when the transceiver receives a carrier if the microphone is in the off-hook state. The transceiver opens squelch according to the configuration for Audio Control if the microphone is in the on-hook state.

Note

- If “Mixed” is configured in **Channel Type**, the transceiver behaves according to the type of a received signal (Analog or Digital).
- Stun can be activated regardless of the status of **Off-hook Decode** and whether the microphone is in the on-hook or off-hook state.
- The matching state of Optional Signaling will be reset by hooking the microphone on a hanger (On-hook state) after receiving a call by Optional Signaling.
- On-hook indicates the state that the microphone is hooked. Off-hook indicates the state that the microphone is not hooked.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Decode** to be enabled or disabled ( **See** Radio Configuration > Global Options > Basics > General > Control > Microphone-hook)

2.3

Waiting for Both Digital Signals and Analog Signals (Mixed Mode)

Mixed Mode can be used to wait for a call in both digital and analog modes.

The channel used in analog mode can also be used in digital mode, hence the transceiver can easily migrate from analog mode to digital mode.

Refer to each of the following Function Parts for details on the transceiver behavior in Mixed Mode:

NXDN Function Part “[Waiting for Both Digital Signals and Analog Signals \(Mixed Mode\)](#)”

DMR Function Part “[Waiting for Both Digital Signals and Analog Signals \(Mixed Mode\)](#)”

2.4 Changing the Decode/ Encode Combination of the QT/ DQT (OST)

Operator Selectable Tone (OST) can be used to change the Decode/ Encode combination of the QT/DQT signaling without changing the transmit and receive frequencies.

If there are multiple groups using the same frequency but a different QT tone or DQT code, this function can be used to allow a dispatcher to specify the target group to command.

A maximum of 40 pairs of QT tone frequencies or DQT codes for Decode/ Encode signaling for OST can be configured in the OST list by using KPG-D3/ D3N. (Refer to [OST List](#).)

Configuring the OST to be Enabled or Disabled

Pressing the **Operator Selectable Tone** button causes the OST to be enabled or disabled.

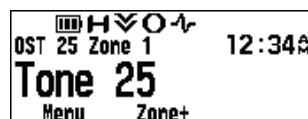
OST can also be enabled or disabled by selecting “Operator Selectable Tone” after entering Menu Mode by pressing the **Menu** button. (Refer to [Using Menu Mode](#).)

Operating the transceiver

● Enabling the OST

Press the **Operator Selectable Tone** button while OST is disabled.

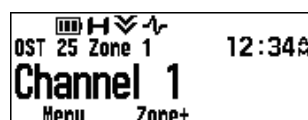
The “**O**” icon appears and then OST will be enabled. The OST name appears on the display for 2 sec.



● Disabling the OST

Press the **Operator Selectable Tone** button while OST is enabled.

The “**O**” icon disappears and OST will be disabled.



Note

- If “OST List Number” is configured for **Sub-LCD Display**, the OST list number appears on the sub-display.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Sub-LCD Display** ([See](#) Radio Configuration > Global Options > Basics > Display/Language > Display)

Selecting the Decode/ Encode Combination of the QT/DQT Signaling

If the transceiver is placed in OST List Mode, the Decode/ Encode combination of the QT/DQT signaling (OST code) can be selected from the OST list.

Pressing and holding the **Operator Selectable Tone** button causes the transceiver to enter OST List Mode.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “OST List” places the transceiver in OST List Mode. (Refer to Common Function Part [Using Menu Mode](#).)

Operating the transceiver

1 Press and hold the **Operator Selectable Tone** button.

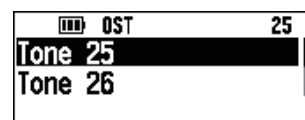
Enters OST List Mode.

The following operations are the same even if the transceiver enters OST List Mode by pressing the **Menu** button:

2 Press the [**▲**] button or [**▼**] button and then select the OST code from the OST list.

The selected OST code is configured for the transceiver.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



Note

- QT/DQT Encode and QT/DQT Decode can be disabled if “Tone Off” is selected. (Refer to [Disabling the Encode/ Decode of the QT/DQT \(Tone Off\)](#).)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver (**See** Radio Configuration > Global Options > Button Assignment)

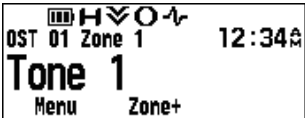
Using the Keypad to Select the OST Code

If “OST” is configured for **Keypad Operation**, an OST code can be selected using the keypad. (Refer to Common Function Part [Keypad Operation](#).)

Operating the transceiver

● When a user selects an OST code equal to or less than 9

Press and hold one of the [1] to [9] buttons.
The OST Code corresponding to the number of the pressed button is enabled.
The OST name appears on the display for 2 sec.
The previous channel name or number appears on the main display when the OST Name display disappears.



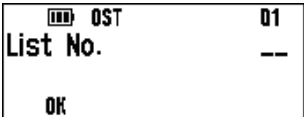
Note

- “Tone Off” can be selected by pressing and holding the [0] button. (Refer to [Disabling the Encode/ Decode of the QT/DQT \(Tone Off\)](#).)
- If “OST List Number” is configured for **Sub-LCD Display**, the OST list number appears on the sub-display.

● When a user selects an OST code equal to or more than 10

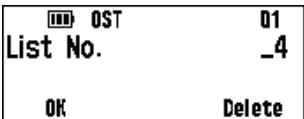
1 Press and hold the [*] button.

The transceiver enters the OST list number entry mode.

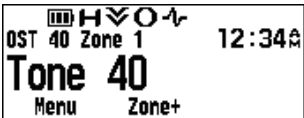


2 Enter the OST list number by using the keypad.

As an operation example, the [4] and [0] buttons are pressed in a row here.



OST list number 40 is configured and the corresponding OST Name is displayed for 2 sec.
The previous channel name or number appears on the main display when the OST Name display disappears.



Note

- If “OST List Number” is configured for **Sub-LCD Display**, the OST list number appears on the sub-display.
- Pressing and holding the **[#]** button disables OST while the channel where OST is enabled is selected.

Configuration using KPG-D3/ D3N

Configuring **Keypad Operation** ( See Radio Configuration > Global Options > Button Assignment > General > Keypad)

Retaining the OST Status and the Selected OST Code (OST Status Retention)

OST Status Retention is the function that is used to retain the OST enabled or disabled status and the selected OST code for each channel even if the channel is changed, a scan is started, or the transceiver is turned OFF.

The transceiver behaves as follows according to the configuration in **OST Status Retention**:

Table 2-5 OST Status Retention

Configuration	Description
Disable	OST is disabled if the channel is changed, a scan is started, or the transceiver is turned OFF. Pressing the Operator Selectable Tone button in this state causes “Tone Off” to appear on the display if Tone Off is enabled, or causes the OST code configured for list number 1 to appear on the display if Tone Off is disabled.
Personality	The enabled or disabled status of OST and the status of the selected OST code are retained for each Personality. This configuration is applied if a different OST code is selected and used for each Personality. The following is a usage example: 1. Select OST code 1 on channel 1 to enable OST. The information for OST code 1 is retained. 2. Select OST code 5 on channel 2 to enable OST. The information for OST code 5 is retained. 3. Select channel 1. The transceiver operates according to OST code 1. 4. Disable OST. OST is disabled on channel 1. 5. Select channel 2. OST remains enabled on channel 2.
System	The enabled or disabled status of OST and the status of the selected OST code are retained for each system. This configuration is applied if the same OST code is used in the system. The following is a usage example: 1. Select OST code 1 on channel 1 to enable OST. The information for OST code 1 is retained. 2. Select OST code 5 on channel 2 to enable OST. The information for OST code 1 is deleted and the information for OST code 5 is retained. 3. Select channel 1. The transceiver operates according to OST code 5. 4. Disable OST. OST is disabled and the information for OST code 5 is cleared. 5. Select channel 2. OST is disabled and the OST code is also not selected.

Configuration using KPG-D3/ D3N

Configuring **OST Status Retention** ( See Radio Configuration > Global Options > Basics > OST > OST (Operator Selectable Tone))

Disabling the Encode/ Decode of the QT/DQT (Tone Off)

Tone Off allows a user to select “Tone Off” on a main display by using the buttons on the transceiver.

If this function is enabled, “Tone Off” can be selected from the OST List.

QT/DQT Encode and QT/DQT Decode can be disabled if “Tone Off” is selected.

Configuration using KPG-D3/ D3N

Configuring **Tone Off** to be enabled or disabled ( See Radio Configuration > Global Options > Basics > OST > OST (Operator Selectable Tone))

OST List

The OST list is the list to configure an encode and decode pair for QT/DQT signaling used for OST. A maximum of 40 pairs can be configured. The following functions can be configured in the OST list:

Table 2-6 OST List

Configuration	Description
OST Name	A name can be assigned to the OST QT/DQT Encode and QT/DQT Decode pair. A maximum of 14 characters can be entered. “TONE 1” to “TONE 40” appears on the display if no OST Name is configured.
Decode	The QT tone or DQT code to be used to receive a call can be configured. The following QT/DQT Decode range is available: QT: 67.0 Hz to 254.1 Hz (in steps of 0.1 Hz) DQT: D000N to D777N, D000I to D777I
Encode	The QT tone or DQT code to be used to make a call can be configured. The following QT/DQT Encode range is available: QT: 67.0 Hz to 254.1 Hz (in steps of 0.1 Hz) DQT: D000N to D777N, D000I to D777I

Configuration using KPG-D3/ D3N

Configuring OST list ( See Radio Configuration > Global Options > Basics > OST > OST (Operator Selectable Tone) > No. 1~40)

2.5 Using 2-tone to Initiate a Selective Call

2-tone signaling uses a pair of 2 different tone frequencies in series for an individual call.

2-tone is a signaling system that can receive a signal with squelch disabled only when 2 tone signals in series sent from the transmitting transceiver match the tone signals preconfigured for the receiving transceiver.

2-tone consists of 2 tone signals in series with 2 different frequencies within the frequency range between 288.5 Hz and 3106.0 Hz. These 2 tone signals are sent in series with the carrier wave.

The following are the methods for sending the 2-tone code:

- 2-tone encoding list selection
- **Call** button

Note

- For the 800 MHz/ 900 MHz model, the 800 MHz model, and the 900 MHz model, the 2-tone function cannot be used.

Selecting and Sending the 2-tone Code from a List

The transceiver can send a 2-tone code by initiating transmission after selecting a 2-tone code configured in the 2-tone encoding list. (Refer to [2-tone encoding list](#).)

An encoding tone configured in the 2-tone encoding list can be selected by pressing the **2-tone** button.

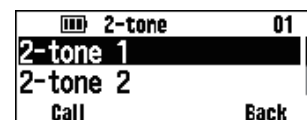
An encoding tone configured in the 2-tone encoding list can also be selected by selecting “2-tone” after entering Menu Mode by pressing the **Menu** button.

Operating the transceiver

1 Press the **2-tone** button.

The transceiver enters 2-tone Mode, and the 2-tone encoding list appears.

The following operations are the same even if the transceiver enters 2-tone Mode by pressing the **Menu** button.



Note

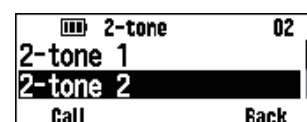
- If the transceiver enters 2-tone Mode on a channel with “Mixed” configured in **Channel Type**, the 2-tone encoding list for analog or the 2-tone encoding list for digital appears according to the configuration in **Transmit Mode**.

2 Press the **[▲]/[▼]** button and select the 2-tone code.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

Note

- A fixed text string (“List No.”) and the list number appear for a 2-tone code for which **2-tone Name** is not configured in the 2-tone encoding list.



3 Press the **PTT** switch.

The display returns to the channel display, and the selected 2-tone code is sent. Even after the 2-tone code is sent, the transmission continues while the **PTT** switch is pressed and held.

If the transceiver transmits by pressing the **Menu** ([]) or [*****] button, the transceiver reverts to receive mode immediately after transmitting a 2-tone code.

Note

- If “QT/DQT and Optional Signaling” is configured in **Audio Control**, the Optional Signaling is in the matching state if transmission is on a channel with “2-tone 1” to “2-tone 4” configured in **Optional Signaling**. In this case, the “” icon blinks and the LED flashes yellow if **Optional Signaling LED** is enabled. (Refer to [Unmuting the Speaker \(Audio Control\)](#).)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Using the Call Button to Send the 2-tone Code

Pressing one of the **Call 1** to **Call 6** buttons causes the transceiver to transmit the preconfigured tone.

Call 1 to **Call 6** can be assigned to the **PF** buttons by using KPG-D3/ D3N and the tone corresponding to each button can be configured by selecting from the 2-tone encoding list of 2-tone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring the tones corresponding to the **Call 1** to **Call 6** buttons ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call)

Using the PC Command to Send the 2-tone Code

The transceiver sends a 2-tone code when a transmission command for a 2-tone code is sent from a PC to the communication port of the transceiver.

To send a 2-tone code by using a PC command, “Data” or “Data + GPS Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common Function Part [Available Functions for COM Port](#).)

Functions Related to 2-tone Code Encoding

Functions related to 2-tone code encoding are shown below:

- Duration of 1st Tone
- Duration of 2nd Tone
- Duration of Single Tone
- Gap Time
- First Tone Delay Time
- Sidetone
- 2-tone encoding list

Duration of 1st Tone

Duration of 1st Tone is the 1st Tone Encode duration for transmitting the 2-tone code (1st Tone and 2nd Tone) configured in the 2-tone encoding list.

Duration of 1st Tone is configured using KPG-D3/ D3N. Usually, 1 sec is configured for this function.

Duration of 2nd Tone

Duration of 2nd Tone is the 2nd Tone Encode duration for transmitting the 2-tone code (1st Tone and 2nd Tone) configured in the 2-tone encoding list.

Duration of 2nd Tone is configured using KPG-D3/ D3N. Usually, 3 sec is configured for this function.

Duration of Single Tone

Duration of Single Tone is the Single Tone Encode duration for transmitting the Single Tone configured in the 2-tone encoding list.

Duration of Single Tone is configured using KPG-D3/ D3N. Usually, 5 sec is configured for this function.

Gap Time

Gap Time is the unmodulated duration between the 1st Tone and the 2nd Tone when sending the 2-tone code (1st Tone and 2nd Tone) configured in the 2-tone encoding list.

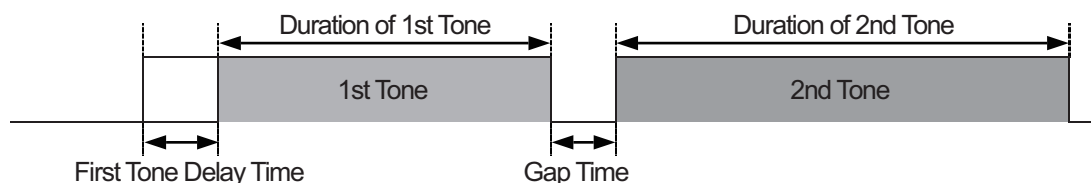
Gap Time is configured using KPG-D3/ D3N. Usually, 0 ms is configured for this function.

First Tone Delay Time

First Tone Delay Time is the length of time from when the transceiver starts transmission until the transceiver actually starts transmitting a tone when the transceiver sends a 2-tone code.

The transceiver transmits an unmodulated signal until the length of time configured in **First Tone Delay Time** elapses.

● 2-tone Encode



● Single Tone Encode

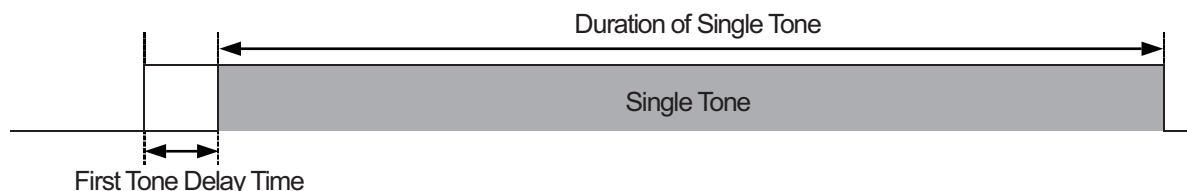


Figure 2-6 Duration of Single Tone/ Gap Time/ First Tone Delay Time

Sidetone

Sidetone is the function to emit the tone of the 2-tone code from the speaker while the transceiver transmits the 2-tone code.

2-tone encoding list

2-tone encoding list is the code list used for transmitting a 2-tone code. By selecting a code configured in this list, the transceiver can transmit a 2-tone code.

The following items can be configured in the 2-tone encoding list:

Table 2-7 2-tone Encoding List Configuration

Configuration	Description
Single Tone	Whether the code to be sent for each list number is used as a Single Tone is configured. 2nd Tone cannot be configured if the code is configured to be used as a Single Tone.
2-tone Name	2-tone Name can be used to assign a name to each list number. A maximum of 14 characters can be configured.
1st Tone	The 1st Tone frequency is configured. The frequency can be configured in the range between 288.5 Hz and 3106.0 Hz inclusive.
2nd Tone	The 2nd Tone frequency is configured. The frequency can be configured in the range between 288.5 Hz and 3106.0 Hz inclusive. 2nd Tone cannot be configured if Single Tone is configured.

Configuration using KPG-D3/ D3N

- Configuring **Duration of 1st Tone** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Encode)
- Configuring **Duration of 2nd Tone** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Encode)
- Configuring **Duration of Single Tone** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Encode)
- Configuring **Gap Time** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Encode)
- Configuring **First Tone Delay Time** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Encode)
- Configuring **Sidetone** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Encode)
- Configuring the 2-tone encoding list ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Encode > No. 1~32)

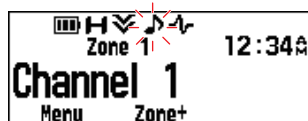
Decoding the 2-tone Code

The transceiver can wait for a 2-tone code on a channel with “2-tone 1”, “2-tone 2”, “2-tone 3”, or “2-tone 4” configured in Optional Signaling (Analog). (Refer to [Using the Optional Signaling](#).)

Operating the transceiver

The transceiver receives the 2-tone code corresponding to the **Call Format** preconfigured for the transceiver.

The “🔊” icon blinks and the transceiver emits the received audio according to the configuration in **Audio Control** if the received 2-tone code matches the 2-tone code preconfigured for the transceiver. (Refer to [Unmuting the Speaker \(Audio Control\)](#).)



Note

- If **Optional Signaling LED** is enabled, the LED flashes yellow.
- If **Busy LED** is enabled, the LED lights green. (Refer to Common Function Part [Busy LED](#).)
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving. The flashing LED color varies according to the configuration in **Alert LED of Call Format**.
- If anything other than “Off” is configured in **Alert Tone of Call Format**, an Alert Tone sounds from the transceiver. Also, if **Transpond of Call Format** is enabled, the transceiver transmits a multiplexed Transpond tone.
- After the length of time configured in **Auto Reset Timer** elapses, the matching state of the 2-tone code is reset.

Functions Related to 2-tone Code Decoding

The following functions associated with 2-tone code decoding can be configured for each of 2-tone 1, 2-tone 2, 2-tone 3, and 2-tone 4:

- Decoder 1 to Decoder 4
- A Tone/ B Tone/ C Tone/ D Tone
- Auto Reset Timer
- Clear to Transpond
- Selective Call Alert LED
- Optional Signaling LED
- 2-tone Decode Frequency Tolerance

Standby code (Decoder 1 to Decoder 4)

Four types of Decoders can be configured for 2-tone 1, 2-tone 2, 2-tone 3, and 2-tone 4 respectively. The transceiver can wait to receive the 2-tone codes configured in Decoder 1 to Decoder 4 at the same time.

The following items can be configured for each Decoder.

● Call Format

Call Format is the combination of A Tone, B Tone, C Tone, and D Tone the transceiver waits to receive. The following combinations are available.

Table 2-8 List of Call Format Combinations

Combination	Description
A and B	The transceiver waits to receive A Tone and B Tone.
A and C	The transceiver waits to receive A Tone and C Tone.
A and D	The transceiver waits to receive A Tone and D Tone.
B and A	The transceiver waits to receive B Tone and A Tone.
B and C	The transceiver waits to receive B Tone and C Tone.
B and D	The transceiver waits to receive B Tone and D Tone.
C and A	The transceiver waits to receive C Tone and A Tone.
C and B	The transceiver waits to receive C Tone and B Tone.
C and D	The transceiver waits to receive C Tone and D Tone.
D and A	The transceiver waits to receive D Tone and A Tone.
D and B	The transceiver waits to receive D Tone and B Tone.
D and C	The transceiver waits to receive D Tone and C Tone.
Long A	The transceiver waits to receive A Tone.
Long B	The transceiver waits to receive B Tone.
Long C	The transceiver waits to receive C Tone.
Long D	The transceiver waits to receive D Tone.

Note

- If anything other than “Long A”, “Long B”, “Long C”, or “Long D” is configured in **Call Format**, the transceiver waits to receive the first tone for 1 sec and the second tone for 3 sec. If “Long A”, “Long B”, “Long C”, or “Long D” is configured in **Call Format**, the transceiver waits to receive the corresponding tone for 5 or more sec.

● Transpond/ Alert Tone

Transpond and **Alert Tone** are functions that allow the transceiver to transmit a multiplexed Transpond tone, or that allow an Alert Tone to sound from the transceiver when the transceiver is called with 2-tone signaling.

Table 2-9 Transpond/ Alert

Transpond	Alert	Description
No	Off	The transceiver does not respond at all.
Yes	Off	The transceiver transmits a Transpond tone.
No	Anything other than Off	An Alert Tone sounds from the transceiver.
Yes	Anything other than Off	An Alert Tone sounds from the transceiver after transmitting a Transpond tone.

The Alert Tone to be emitted when the transceiver is called with 2-tone signaling is selected from 8 types of tones configured in **Special Alert Tone**. (Refer to Common Function Part [Configuring the Alert Tone \(Special Alert Tone\)](#).)

● Alert LED

When the 2-tone code matches, the LED flashes according the configuration in **Alert LED**.

Table 2-10 Alert LED

Configuration	Description
Off	The LED does not flash.
Red	The LED flashes red.
Blue	The LED flashes blue.
Green	The LED flashes green.
Yellow	The LED flashes yellow.
Light Blue	The LED flashes light blue.
Purple	The LED flashes purple.
White	The LED flashes white.

Frequencies for standby code (A Tone/ B Tone/ C Tone/ D Tone)

A Tone/ B Tone/ C Tone/ D Tone are the frequencies of the tone signals the receiving transceiver waits to receive. The frequency can be configured between 288.5 Hz and 3106.0 Hz inclusive.

Auto Reset Timer

Auto Reset Timer is the length of time from when the received 2-tone code matches the 2-tone code preconfigured for the transceiver until the matching state is automatically reset.

Auto Reset Timer is configured using KPG-D3/ D3N. Also, how the transceiver behaves after the length of time configured in **Auto Reset Timer** elapses can be configured.

Table 2-11 Auto Reset Timer

Configuration		Description
Auto Reset Timer	Off	Auto Reset Timer does not function.
	0 sec to 300 sec	After the configured time elapses, the matching state of the 2-tone code is automatically reset.
LED		If LED is enabled, the flashing LED for the Selective Call Alert LED turns off when the length of time configured in Auto Reset Timer elapses.
Alert Tone		If Alert Tone is enabled, the intermittently emitted Alert tone stops when the length of time configured in Auto Reset Timer elapses.
Monitor		If Monitor is enabled, the matching state of the 2-tone code is reset when the length of time configured in Auto Reset Timer elapses.

Clear to Transpond

Clear to Transpond is the function that allows the transceiver to wait to initiate the Transpond until the channel becomes available if the channel is occupied by other users when the transceiver attempts to initiate the Transpond.

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a 2-tone code.

A user can notice by the flashing LED that the transceiver is receiving a call.

Optional Signaling LED

Optional Signaling LED is the function to make the LED flash yellow when the Optional Signaling matches.

A user can notice by the LED that the transceiver is receiving a call.

If the matching state of Optional Signaling is disabled when the buttons on the transceiver are pressed, or when the time configured in **Auto Reset Timer** elapses, the LED is turned off.

However, if **Selective Call Alert LED** is enabled even if **Optional Signaling LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.



- The matching state of 2-tone code is reset on the following conditions. Also, the Transpond is reset on the following conditions. The Transpond is suspended if transmission is disabled by **Clear to Transpond**.

Table 2-12 Conditions to Reset the 2-tone Code

Conditions	Description
Pressing the button	When the following buttons are pressed • Auto Telephone button • Call 1 to Call 6 button • Channel Up button • Channel Recall button • Channel Down button • Clear button • Direct Channel 1 to Direct Channel 5 buttons • Direct Channel 1 Select to Direct Channel 5 Select buttons • Emergency button • Home Channel button • Home Channel Select button • Monitor button • Monitor Momentary button • Scan button • Scan Normal button • Scan Program button • Front Panel Programming button • Squelch Off button • Squelch Off Momentary button • Transceiver Password button • Zone Up button • Zone Down button • Zone Up/Down button • Zone Select button • Channel Up/Down button • Channel Select button
Hook (Mobile only)	When the microphone is in the on-hook state (However, the 2-tone code is not reset while the audio sounds from the transceiver.)
Expiration of the Auto Reset Timer	When the length of time configured in Auto Reset Timer elapses (This condition is only applicable to 2-tone)
Transmission	Transmission is made using the following switch or one of the ports. (This condition is only applicable to Transpond) • PTT switch • External PTT (Voice) port (Mobile only) • External PTT (Data) port (Mobile only)

Configuration using KPG-D3/ D3N

- Configuring **Call Format** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1~2-tone 4 > No. 1~4)
- Configuring **Transpond** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1~2-tone 4 > No. 1~4)
- Configuring **Alert Tone** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1~2-tone 4 > No. 1~4)
- Configuring **Alert LED Color** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1~2-tone 4 > No. 1~4)
- Configuring **A Tone/ B Tone/ C Tone/ D Tone** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1~2-tone 4)
- Configuring **Auto Reset Timer** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1~2-tone 4 > Auto Reset)
- Configuring **Clear to Transpond** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1~2-tone 4)
- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1~2-tone 4)
- Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Decode > 2-tone 1~2-tone 4)

2-tone Decode Frequency Tolerance

2-tone Decode Frequency Tolerance can be used to change the 2-tone decode response bandwidth depending on the status of the system.

If the transceiver cannot decode a frequency, a larger value must be configured. If the transceiver decodes a different frequency erroneously, a smaller value must be configured.

The transceiver can decode the frequency if the received 2-tone frequency is within the range configured for **2-tone Decode Frequency Tolerance** while the transceiver is waiting to receive A Tone, B Tone, C Tone, and D Tone frequency.

For instance, the transceiver determines that A Tone has matched if the received tone frequency does not exceed the range between 315.9094 Hz (321.7 Hz x 0.982) and 327.4906 Hz (321.7 Hz x 1.018) when 321.7 Hz is configured for the A Tone frequency and $\pm 1.8\%$ is configured for **2-tone Decode Frequency Tolerance**. However, this configuration can be used only as a guide, hence the Decode Response Bandwidth has a slight margin.

Configuration using KPG-D3/ D3N

Configuring **2-tone Decode Frequency Tolerance** ( [See](#) Radio Configuration > Protocol Options > 2-tone > Analog Parameter > Analog)

2.6 Using the Tactical Zone

Tactical Zone is the function to create a new group by registering an arbitrary channel in the Tactical Zone after selecting the channel from the Analog Conventional system channels configured for the transceiver. This function is used when the channels registered in each zone are operated in a single zone.

Note

- This function cannot be used for the 800 MHz/ 900 MHz model transceiver.

Registering a Channel in the Tactical Zone

A channel with “Analog Conventional” configured in **Protocol** can be registered in the Tactical Zone. A maximum of 250 channels can be registered in the Tactical Zone.

Pressing the **Tactical Zone** button registers the selected channel in the Tactical Zone.

Also, if the **Tactical Zone** button is pressed and held, the registrable channels of the selected zone can be collectively registered in the Tactical Zone.

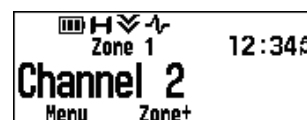
Note

- The number of the registrable channels in the Tactical Zone can be expanded up to a maximum of 512 channels by the Radio Feature License (KWD-3000CH).

Operating the transceiver

- **Registering the selected channel in the Tactical Zone**

1 Select a channel which is not registered in the Tactical Zone.



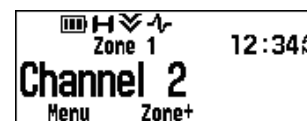
2 Press the **Tactical Zone** button.

A Button Beep A (1 beep) sounds from the transceiver, and the selected channel is registered in the Tactical Zone. At this time, the “T” icon appears for 1 sec.



● Registering channels of a zone collectively in the Tactical Zone

1 Select a zone other than the Tactical Zone.



2 Press and hold the **Tactical Zone** button.

A Rollover Tone (1 beep) sounds from the transceiver, and all registrable channels of the selected zone are registered in the Tactical Zone. At this time, the “**T**” icon appears for 1 sec.



Note

- If the number of channels to be registered in the Tactical Zone exceeds the registrable number of channels (250 or 512) when the channels are collectively registered in the Tactical Zone, the channels of the selected zone are registered in order from the smallest channel number for as many channels as available for registration.
- If the transceiver configuration data is updated by receiving OTAP data or by writing configuration data by using KPG-D3/ D3N, the channels registered in the Tactical Zone are cleared.
- If the transceiver data is copied to another transceiver by using the Clone function, the channel data registered in the Tactical Zone is not copied.
- Each channel registered in the Tactical Zone behaves according to the FPU configuration of the original zone or channel.
- Regardless of the selected zone, the **Tactical Zone** button can be operated while the scan is paused. However, the button cannot be operated during the scan.

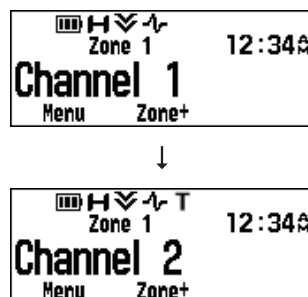
Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver (See Radio Configuration > Global Options > Button Assignment)

Migrating to the Tactical Zone

A Tactical Zone is treated as Zone 0. Zone 0 is the zone number between the highest zone number and the lowest zone number of the zones registered by using KPG-D3/ D3N.

Zone 0 (the Tactical Zone) is selected by operating the **Zone Up/ Zone Down** button or the **Selector**. The transceiver migrates to Zone 0 (the Tactical Zone) when attempting to increase the zone number while the zone having the highest number is selected. Or, the transceiver migrates to Zone 0 (the Tactical Zone) when attempting to decrease the zone number while the zone having the lowest number is selected.



If the transceiver migrates to the Tactical Zone, the “T” icon appears, and the registered channels are displayed. The “T” icon appears while the transceiver is in the Tactical Zone.

The original Zone-channel names of the registered channels appear on the standby display of Zone 0 (the Tactical Zone). Also, the original Zone-channel numbers of the registered channels appear as the Zone-channel numbers.

Changing the Channel

The channels registered in the Tactical Zone are sorted by original channel number in ascending order after sorted by original zone number in ascending order. In Zone 0 (the Tactical Zone), channels can be selected in the sorted order by operating the **Channel Up/ Channel Down** button.

Table 2-13 Registration Example of the Tactical Zone

Tactical Zone	Zone 1	Zone 2
CH1: Zone 1- Channel 1	Channel 1	Channel 1
CH2: Zone 1- Channel 3	Channel 2	Channel 2
CH3: Zone 2- Channel 2	Channel 3	Channel 3
CH4: Zone 2- Channel 4	Channel 4	Channel 4
	Channel 5	
	Channel 6	

The above table shows an example of when Channel 1 and Channel 3 of Zone 1 and Channel 2 and Channel 4 of Zone 2 are registered in the Tactical Zone. If Channel 6 of Zone 1 is registered in the Tactical Zone in this condition, the channel is also registered as CH3 of the Tactical Zone, and the subsequent channel numbers are moved down by one.

 Note

- If “End Stop” is configured in **Rollover/End Stop**, pressing the **Zone Up** button while the zone having the highest number is selected causes the transceiver to migrate to Zone 0 (the Tactical Zone), but pressing the **Zone Down** button while the zone having the lowest number is selected cannot cause the transceiver to migrate to Zone 0. This behavior is identical even if the **Selector** with “Zone Up/Down” configured is operated. Also, if “Zone Select” is configured for the **Selector**, the transceiver cannot migrate to Zone 0 (the Tactical Zone) by operating the **Selector**.
- If “Standard” is configured in **Voice Announcement Type**, “Zone 0” is announced by voice by selecting Zone 0 (the Tactical Zone). If the transceiver migrates to Zone 0 (the Tactical Zone) by operating the **Zone Up/ Zone Down** button, “Zone 0, Channel yy” is announced by voice (“yy” is the channel number of the sort order of when the channel was registered in the Tactical Zone).
If the channel is changed by operating the **Channel Up/ Channel Down** button in the Tactical Zone, the channel number of the sort order of when the channel was registered in the Tactical Zone is announced by voice.
- Pressing the **Home Channel** button in the Tactical Zone causes the transceiver to migrate to the Home Channel configured for the original zone of the selected channel. Pressing the **Home Channel** button again causes the transceiver to return to the previous channel of the Tactical Zone. Also, if the Home Channel is changed by operating the **Home Channel Select** button in the Tactical Zone, the selected channel is configured as the Home Channel for the original zone. (Refer to Common Function Part [Home Channel](#).)
- If one of the **Direct Channel 1** to **Direct Channel 5** buttons is pressed in the Tactical Zone, the transceiver migrates to the corresponding Direct Channel. If **Return** is enabled, pressing one of the **Direct Channel 1** to **Direct Channel 5** buttons causes the transceiver to return to the previous channel of the Tactical Zone. Also, if the Direct Channel is changed by operating one of the **Direct Channel 1 Select** to **Direct Channel 5 Select** buttons in the Tactical Zone, the original Zone-channel of the selected channel is configured as the Direct Channel. (Refer to Common Function Part [Direct Channel](#).)

Deregistering the Tactical Zone

The registration status of a channel registered in the Tactical Zone can be deregistered.

Operating the transceiver

● Deregistering the selected channel from the Tactical Zone

- 1 Select a channel to be deregistered in Zone 0 (the Tactical Zone).



- 2 Press the **Tactical Zone** button.

A Button Beep B (2 beeps) sounds from the transceiver, and the selected channel is deregistered from the Tactical Zone.

The transceiver migrates to the registered channel having a channel number back by one. If the deregistered channel is the channel having the lowest number in Zone 0 (the Tactical Zone), the transceiver migrates to the registered channel having the next number.



● Deregistering all channels from the Tactical Zone

- 1 Select Zone 0 (the Tactical Zone).



- 2 Press and hold the **Tactical Zone** button.

A Rollover Tone (1 beep) sounds from the transceiver, and all channels are deregistered from the Tactical Zone.

The transceiver migrates to the Zone-channel having the lowest number registered in the transceiver.



2.7 Using FleetSync to Initiate a Selective Call

On an Analog Conventional system, individual calls and group calls can be made using FleetSync and different types of messages can be transmitted.

Refer to [“USING FLEETSYNC”](#) for details on FleetSync.

2.8 Using DTMF to Initiate a Selective Call

Various functions of DTMF Encode and DTMF Decode can be used in an Analog Conventional system.

To decode a DTMF code in an Analog Conventional system, “DTMF” needs to be configured in **Optional Signaling (Analog)** to be used on the channel. (Refer to [Using the Optional Signaling](#).)

Refer to [“USING DTMF”](#) for details about DTMF.

2.9 Using MDC-1200 to Initiate a Selective Call

On an Analog Conventional system, individual calls and group calls can be made using MDC-1200.

Refer to [“USING THE MDC-1200”](#) for details about MDC-1200.

2.10 Using 5-tone to Communicate

On an Analog Conventional system, 5-tone can be used to initiate an individual call or message communications such as status messages.

Refer to [“USING 5-Tone”](#) for details about 5-tone.

2.11 Sending a PTT ID

PTT ID is an identification code unique to the transceiver. It is sent out when the **PTT** switch is operated.

There are 3 types of PTT ID formats: DTMF, FleetSync, and MDC-1200.

Refer to the following for details of each format.

- **FleetSync**

[“Transmitting/ Receiving a PTT ID”](#) in “FleetSync”

- **MDC-1200**

[“Transmitting/ Receiving a PTT ID”](#) in “MDC-1200”

- **DTMF**

[“Transmitting/ Receiving a PTT ID”](#) in “DTMF”

2.12 Improving the Sound Quality for Transmitting and Receiving (Compander)

Compander is a compound term made from “COMpressor” and “exPANDER”, and is a function designed to improve sound quality.

This function is used to improve the S/N ratio of voice communications by compressing the audio at the transmitting end of the communication path and expanding the audio at the receiving end of the path.

The transmitting party and the receiving party must have the same configuration to use this function.

Configuration using KPG-D3/ D3N

Configuring **Compander** to be enabled or disabled

( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Analog)

( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Analog)

2.13 Disabling the Transceiver Capability by Remote Control (Stun/ Kill/ Radio Inhibit)

The transceiver capability can be disabled by external remote control using the DTMF code, FleetSync status, or MDC-1200 message. This function allows a system administrator to remotely disable the transceiver, for instance, if the transceiver is lost.

The transceiver which has been disabled by this function can be enabled to be usable again by remote control from an external device using radio communication.

Refer to the following for details of the Stun/ Kill/ Radio Inhibit functions for each format:

● FleetSync

[“Disabling the Transceiver Capability by Remote Control \(Stun/ Kill\)”](#) in “FleetSync”

● DTMF

[“Disabling the Transceiver Capability by Remote Control \(Stun\)”](#) in “DTMF”

● MDC-1200

[“Disabling the Transceiver Capability by Remote Control \(Radio Inhibit/ Uninhibit\)”](#) in “MDC-1200”

2.14 Migrating Automatically to the Site Providing Better Radio Environment (Voting)

Voting is the function to migrate automatically to the site (channel) providing better radio environment if the transceiver is operated in an Analog Conventional system.

The transceiver receives a synchronization signal transmitted from the repeaters in multiple sites at regular time intervals, and detects the RSSI level. Therefore, the transceiver migrates automatically to the channel providing better radio environment.

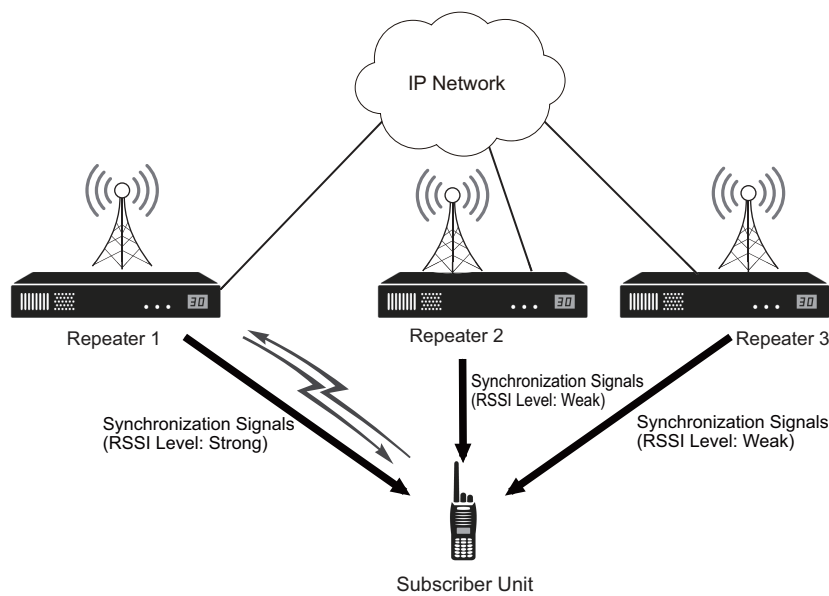
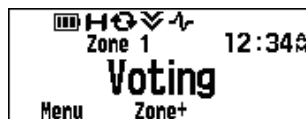


Figure 2-7 Image of Communications of Voting

This function can be used by configuring Analog Voting or Analog Voting with Signaling for each system by using KPG-D3/D3N.

Voting Behavior

If a Zone-channel in a system with “Analog Voting” or “Analog Voting with Signaling” configured is selected, Voting is automatically initiated. The “” icon blinks and “Voting” appears. If **Revert Channel Display** is enabled, Revert Channel is displayed.



If a channel to which a Personality is assigned in a system with “Analog Voting” or “Analog Voting with Signaling” configured is selected, Voting is initiated for the Personality in the same system. At this time, the Personality name appears.

When the transceiver transmits, the QT tone or DQT code configured for the Personality to be the Revert Channel is multiplexed on a signal.

The Personality the transceiver received last time is retained even if the transceiver is turned OFF. When the transceiver is turned ON and transmits next time, the Personality is used as the Revert Channel. If no Revert Channel exists, the Personality configured for the selected channel is used as the Revert Channel. While the transceiver is receiving, or if the transceiver transmits while the **Dropout Delay Time** or **Dwell Time** is counting down, the transceiver transmits using the Revert Channel. One Personality to be the Revert Channel is retained for each system.

When the transceiver receives a synchronization signal from the repeater, the transceiver basically behaves as follows.

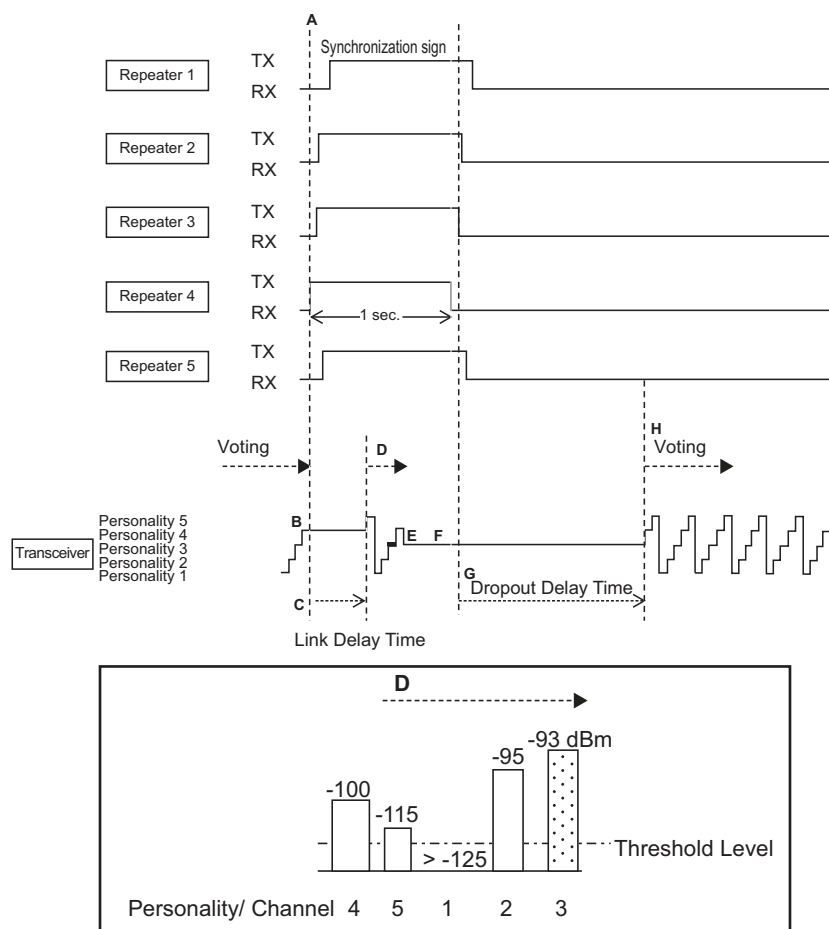


Figure 2-8 Basic Behaviors of Voting

- A:** The repeater in an Analog Conventional system transmits a synchronization signal at regular time intervals. Or, the repeater in an Analog Conventional system transmits a call signal according to a transmission request from another transceiver.
- B:** For example, the transceiver in a system with “Analog Voting” or “Analog Voting with Signaling” configured detects an adequate RSSI level on Personality 4.
- C:** The transceiver activates **Link Delay Time**.
- D:** Upon elapse of the length of time configured in **Link Delay Time**, the transceiver checks all Personalities in the same system and searches for the Personality having the strongest RSSI level.
- E:** After checking all the Personalities, the transceiver migrates to the Personality having the strongest RSSI level (for example, Personality 3) and checks whether the received the QT tone or DQT code match the QT tone or DQT code preconfigured for the Personality.
 - **If “Analog Voting” is configured in Protocol:**
 - If the QT tone or DQT code matches, the transceiver unmutes the speaker and changes the Revert Channel to Personality 3.
 - If the QT tone or DQT code does not match, the transceiver continues to mute the speaker and changes the Revert Channel to Personality 3. Then, the transceiver migrates to the Personality having the second strongest RSSI level (for example, Personality 2) and checks whether the QT tone or DQT code matches. If the QT tone or DQT code matches here, the transceiver unmutes the speaker and changes the Revert Channel to Personality 2.
 - If the QT tone or DQT code does not match in the Personality having the second strongest RSSI level or lower, the Revert Channel is not updated.
 - **If “Analog Voting with Signaling” is configured in Protocol:**
 - If the QT tone or DQT code matches, the transceiver unmutes the speaker and changes the Revert Channel to Personality 3. In a voice communication, if the ID and **Slot Selection** match, the Revert Channel is updated and the transceiver unmutes the speaker.
 - If the QT tone or DQT code does not match, the transceiver migrates to the Personality having the second strongest RSSI level (for example, Personality 2) and checks whether the QT tone or DQT code matches. If the QT tone or DQT code matches here, the transceiver unmutes the speaker and changes the Revert Channel to Personality 2.

- F:** While the QT tone or DQT code matches, the transceiver remains on the Personality and does not resume Voting.
- G:** If the received signals disappear or the QT tone or DQT code does not match, Dropout Delay Time is activated.
- H:** After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Voting.

 Note

- 2 or more and a maximum of 512 Personalities can be configured for a system with “Analog Voting” or “Analog Voting with Signaling” configured.
- The following functions cannot be configured for a Personality with “Analog Voting” or “Analog Voting with Signaling” configured:
 - Scan Add
 - Scan List Number
- A Personality with “Analog Voting” or “Analog Voting with Signaling” configured cannot be configured for the following functions:
 - Home Channel
 - Scan List Members
 - Data System-personality (Analog)
 - Data System-personality (NXDN)
 - Emergency Zone-Channel
- The transceiver does not respond at all even if the following buttons are operated on a Personality with “Analog Voting” or “Analog Voting with Signaling” configured:
 - **Home Channel** button
 - **Home Channel Select** button
 - **Scan** button

Configuration using KPG-D3/ D3N

- Configuring **Revert Channel Display** to be enabled or disabled ( **See** Radio Configuration > Global Options > Scan > General > Indicator)
- Configuring **Voting LED** ( **See** Radio Configuration > Global Options > Scan > Voting > Indicator)

Voting LED

Supported Models: Portable

Voting LED is the function to notify a user visually that the transceiver is executing Voting.

When the transceiver starts Voting, the transceiver can make the LED flash in one of the following 7 colors:

- Yellow
- Purple
- Blue
- Light Blue
- Red
- Green
- White

Configuration using KPG-D3/ D3N

Configuring **Voting LED** to be enabled or disabled ( **See** Radio Configuration > Global Options > Scan > General > Indicator)

Link Delay Time

The length of time until the repeater in each site is activated may vary depending on the site. **Link Delay Time** is the function to configure the length of time to tolerate a variation in time of when each repeater is activated by delaying the time to start searching for a signal on other channels.

If the transceiver detects a signal on a Personality after Voting is initiated, **Link Delay Time** is activated. Upon the elapse of the length of time configured in **Link Delay Time** after detecting a signal, the transceiver checks all Personalities in the same system to search for a signal. The transceiver checks all Personalities, migrates to the Personality having the strongest RSSI level, and checks whether the QT tone or DQT code matches. If the QT tone or DQT code does not match or if a QT tone or DQT code is not configured for the Personality, the transceiver migrates to the Personality having the second strongest RSSI level and checks whether the QT tone or DQT code matches.

Configuration using KPG-D3/ D3N

Configuring **Link Delay Time** ( See Radio Configuration > Global Options > Scan > Voting > Timer)

Dropout Delay Time (Voting)

If the transceiver receives a synchronization signal or call from the repeater during Voting, Voting pauses. **Dropout Delay Time** is the length of time from when the transceiver finishes receiving signals until the transceiver resumes Voting.

If the received signals disappear or the QT tone or DQT code does not match, **Dropout Delay Time** is activated. After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Voting.

Configuration using KPG-D3/ D3N

Configuring **Dropout Delay Time** ( See Radio Configuration > Global Options > Scan > Voting > Timer)

Dwell Time

When the transceiver starts transmitting by pressing the **PTT** switch during Voting, Voting pauses. **Dwell Time** is the length of time from when the transceiver terminates transmission until the transceiver resumes Voting.

After the transceiver terminates the transmission, **Dwell Time** is activated. After the length of time configured in **Dwell Time** elapses, the transceiver resumes Voting.

Configuration using KPG-D3/ D3N

Configuring **Dwell Time** ( See Radio Configuration > Global Options > Scan > Voting > Timer)

Quick Vote

Quick Vote is the function to allow Voting to behave faster when the transceiver is in an area with a strong signal.

If the transceiver receives a signal with a level higher than the value configured in **Quick Vote** during Voting, the channel becomes the Revert Channel. In this case, **Link Delay Time** becomes disabled, and if the QT tone or DQT code matches, the transceiver unmutes the speaker.

If the transceiver receives a signal with a level equal to or higher than the value configured in **Quick Vote** while **Link Delay Time** is counting down or while a Personality is being checked, the behavior is also the same.

However, if "Off" is configured in **Quick Vote** and **Standard Vote**, the transceiver initiates Voting by using the threshold value preconfigured in the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Quick Vote** ( See Radio Configuration > Global Options > Scan > Voting > Voting Level)

Standard Vote

Standard Vote is the function to allow Voting to behave faster when the transceiver is in an area with a strong signal.

The transceiver searches for a signal with a level higher than the value configured in **Standard Vote** during Voting.

Since a Personality having a signal with a level lower than the value configured in **Standard Vote** is excluded from Voting, the transceiver does not search the Personality. If the transceiver receives a signal with a level higher than the value configured in **Standard Vote** during Voting, Voting pauses and then **Link Delay Time** is activated. Then, if the QT tone or DQT code matches, the transceiver unmutes the speaker.

However, if "Off" is configured in **Quick Vote** and **Standard Vote**, the transceiver initiates Voting by using the threshold value preconfigured in the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Standard Vote** ( See Radio Configuration > Global Options > Scan > Voting > Voting Level)

Off-hook Voting

Supported Models: Mobile

Off-hook Voting is the function to initiate Voting depending on the status of microphone, either on-hook or off-hook.

The transceiver behaves as follows according to the configuration in **Off-hook Voting**:

Table 2-14 Off-hook Voting

Configuration	Description
Enabled	The transceiver can initiate Voting while the microphone is in either the on-hook state or off-hook state. Even if the microphone changes from the on-hook state to off-hook state during Voting, Voting does not pause.
Disabled	The transceiver can initiate Voting if the microphone is in the on-hook state. The transceiver cannot initiate Voting if the microphone is in the off-hook state. If the microphone changes from the on-hook state to off-hook state during Voting, Voting pauses on the Revert Channel. Even if the microphone changes from the on-hook state to off-hook state while Voting pauses, the channel is not changed. When the microphone goes to on-hook state, the transceiver resumes Voting. However, if the microphone goes to on-hook state when the audio sounds, the transceiver continues the audio output status without resuming Voting. Thereafter, the transceiver resumes Voting when the signal disappears and the time configured in Dropout Delay Time elapses. If the Auto Reset Timer is also counting down at the same time, the transceiver resumes Voting after the timer configured with the longer countdown ends.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Voting** ( See Radio Configuration > Global Options > Scan > Voting)

LTR Trunking is a communication system that uses the **LTR Trunking** protocol and the **Trunking** system consisting of **Group IDs**.

In an **LTR Trunking**, the transceiver can communicate via a repeater. The transceiver uses an available channel on a repeater to communicate.

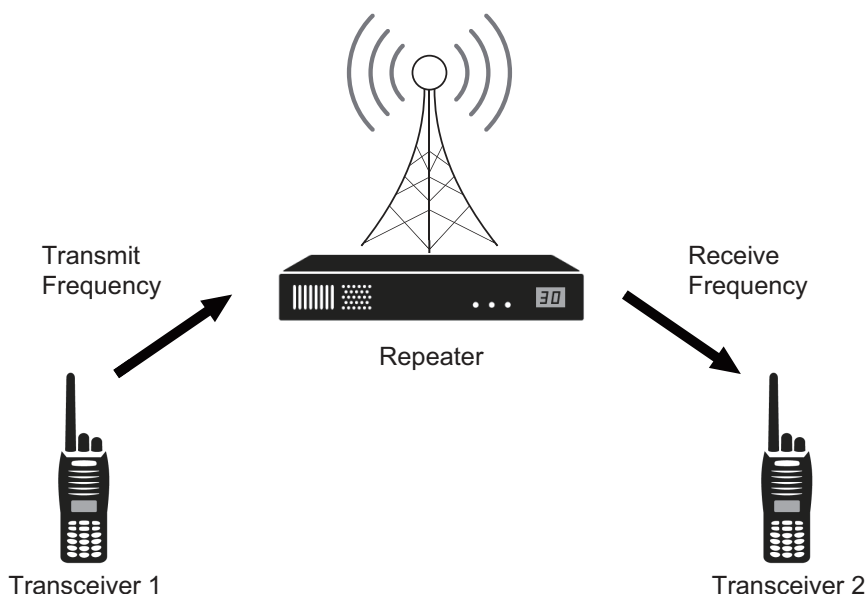


Figure 3-1 LTR Trunking System

The following data format is used to transmit and receive the LTR data between the repeater and the transceiver.

Table 3-1 LTR Data Format

Sync 9	Area 1	Go to Repeater No. 5	Home Repeater No. 5	ID 8	Free Repeater No. 5	Check bits 7
(40 bits @ 3.36 ms for 134.4 ms frame)						

The transceiver uses the LTR ID (Group ID) to initiate a call to the target transceiver. Communication will be established if Encode ID of the transmitting transceiver matches Decode ID of the receiving transceiver.

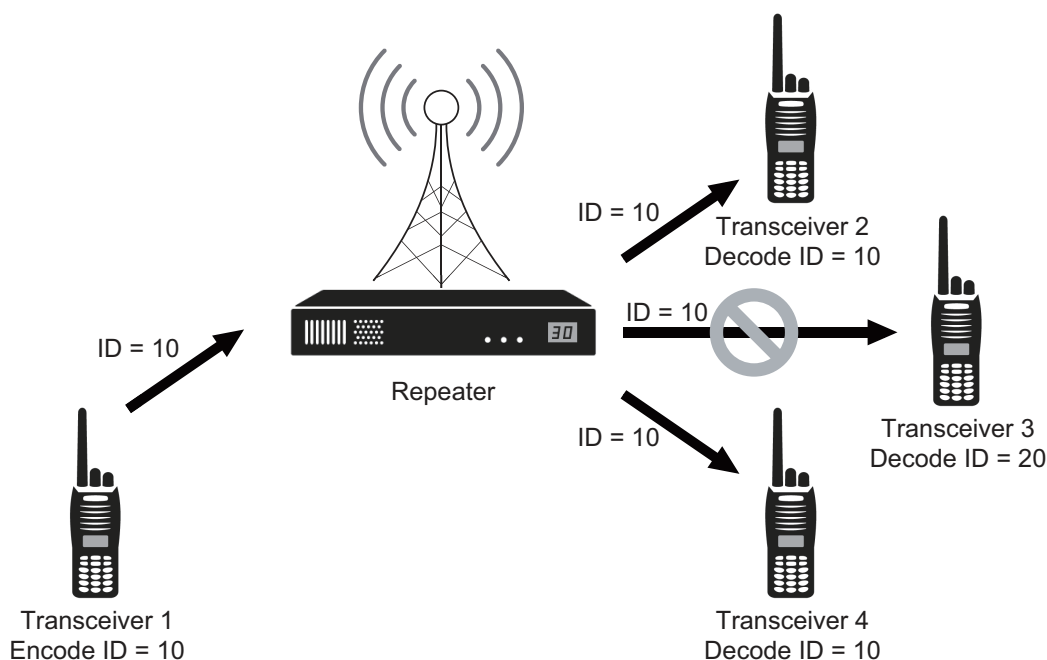


Figure 3-2 Communications in an LTR Trunking System

Encode ID is the LTR ID to be sent when the transceiver transmits.

Decode ID is the LTR ID used to unmute and to allow communications if the received LTR ID matches the LTR ID preconfigured for the transceiver.

Using the same LTR ID allows a user to communicate within a Group.

Note

- Hereinafter, the channel that is transmitting and receiving by using an LTR ID is referred to as “GID”.

Configuration using KPG-D3/ D3N

Configuring **Encode ID/ Decode ID**

( See Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > LTR Trunking > Group ID)

( See Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Table > Channel Table > LTR Trunking)

3.1 Using the LTR ID for Basic Communications

This section describes the basic methods for transmission and reception in an **LTR Trunking** system and the relevant functions.

Setting Parameters to Match the System

This section describes the basic methods for transmission and reception in an **LTR Trunking** system and the relevant functions.

- Area Code
- Home Repeater
- Encode Data Type
- Data Delay Time
- Scan Weight

Area Code

Area Code is used to prevent from interfering with adjacent systems.

A value of “0” is normally configured for Area Code. However, if any interference is expected to occur, the value of “0” must be configured for the Area Code of one system and the value of “1” must be configured for the other system.

Configuration using KPG-D3/ D3N

Configuring **Area Code** ( See Radio Configuration > System Properties > Systems > LTR Trunking > LTR > Repeater Information)

Home Repeater

Home Repeater is a repeater from which the transceiver receives various information in an LTR Trunking system. The transceiver always transmits, receives and proceeds to Trunkout via a Home Repeater.

If a repeater is available, the transceiver can transmit or receive using this repeater.

An available repeater number is provided by the repeater to the transceiver enabling it to transmit using the available repeater if the repeater is used by other users. At the same time, the receiving transceiver receives the number of the repeater which is calling the receiving transceiver and then upon receipt of a call, migrates to the Trunkout Repeater and receives.

Configuration using KPG-D3/ D3N

Configuring **Home Repeater** ( See Radio Configuration > System Properties > Systems > LTR Trunking > LTR > Repeater Information)

Encode Data Type

Encode Data Type can be used to invert the logic of the LTR Message to be sent.

This configuration must be changed depending on the system type. Ask the system administrator of the system in use for the details of Encode Data Type.

Configuration using KPG-D3/ D3N

Configuring **Encode Data Type** ( See Radio Configuration > System Properties > Systems > LTR Trunking > LTR > LTR Parameters)

Data Delay Time

Data Delay Time is the delay time from when the transceiver starts transmitting until the transceiver starts sending the LTR data. This function can be used when the transceiver is having a hard time linking with the repeater.

Configuration using KPG-D3/ D3N

Configuring **Data Delay Time** ( See Radio Configuration > System Properties > Systems > LTR Trunking > LTR > LTR Parameters)

Scan Weight

Scan Weight is the length of time to decode the LTR ID sent from a repeater while the transceiver is scanning.

The transceiver receives its own LTR ID from a repeater, and then the transceiver will unmute or proceed to Trunkout. Frequent use of the same GID as own Home Repeater number indicates that those who have the same Home Repeater number are doing Trunkout. Therefore, it may take a long time to receive the LTR ID addressed to own transceiver. Therefore, **Scan Weight** must be configured longer so as not to miss LTR Data during the scan.

1 unit of weight is approximately 500 ms.

Note

- If the duration configured for **Scan Weight** is too long, the speed of the scan behavior of the transceiver will slow down. The appropriate value for **Scan Weight** must be determined by checking the congestion of the system and noticing how frequently GIDs having the same home number are used.

Configuration using KPG-D3/ D3N

Configuring **Scan Weight** ( See Radio Configuration > System Properties > Systems > LTR Trunking > LTR > RX Options)

Receiving

Transceivers can communicate only if the received LTR ID matches the LTR ID preconfigured for the receiving transceiver. Received audio sounds from the speaker while the received LTR ID matches the LTR ID preconfigured for the transceiver.

Participating in an On-going Voice Call Midway Through the Call (Late Entry)

The transceiver can participate in an on-going voice call even if the transceiver receives this call midway through.

The transceiver in an LTR Conventional system can participate in an on-going voice call by decoding the LTR ID always sent along with audio data, even if the transceiver receives a voice call midway through the call. However, the transceiver cannot participate in an on-going call from a group call or individual call using Optional Signaling (such as DTMF and FleetSync) even if the transceiver receives a signal, since signaling is sent one-time when starting transmission.

Searching Whether the Transceiver Receives a Call (Scan)

Using the Scan function, the transceiver can check each channel in turn whether the channel has a signal. If a channel has a signal, the transceiver receives the signal on the channel.

The following scan functions can be used in an LTR Trunking system.

- Single Scan
- Multi Scan
- List Scan
- Group Scan

Refer to “[USING SCAN](#)” for details of Scan.

Transmitting

The transceiver sends the preconfigured LTR ID when the transceiver starts transmitting by a user pressing the **PTT** switch. The transceiver links to the repeater and waits to receive the echo back data from the repeater. If the data is correct, the transceiver assumes that the link is properly established and re-transmits to call to the receiving transceiver.

If the transmitted LTR ID matches the LTR ID preconfigured for the receiving transceiver, the transceivers can communicate. Releasing the **PTT** switch causes the transceiver to send the EOT data to close the speaker of the receiving transceiver.

Restricting the Continuous Transmission Duration (Time-out Timer)

Time-out Timer (TOT) is the function to restrict the duration for the transceiver to continuously transmit.

This function is used to prevent a user from occupying a repeater or frequency which is shared with other users. The transceiver automatically stops transmitting and releases the channel if it continuously transmits longer than the configured time.

Time-out Timer can be configured for each zone. **Time-out Timer**, such as **Time-out Timer (Dispatch)** and **Time-out Timer (Telephone)**, can be also configured.

Time-out Timer (Dispatch)

Time-out Timer (Dispatch) is the maximum length of time that the transceiver is allowed to transmit continuously while a user is talking using a Dispatch ID.

The transceiver stops transmitting and emits the Warning Tone A (continuous beep) if transmission time exceeds the amount of time configured for **Time-out Timer (Dispatch)**. The Warning Tone A sounds until the **PTT** switch is released.

Configuration using KPG-D3/ D3N

Configuring **Time-out Timer (Dispatch)** ( See) Radio Configuration > System Properties > Systems > LTR Trunking > LTR > TX Options > Time-out Timer)

Time-out Timer (Telephone)

Time-out Timer (Telephone) is the maximum length of time for the transceiver to transmit continuously while a user is talking using a Telephone ID.

The transceiver stops transmitting and emits the Warning Tone A (continuous beep) if transmission time exceeds the amount of time configured for **Time-out Timer (Telephone)**. The Warning Tone A sounds until the **PTT** switch is released.

Configuration using KPG-D3/ D3N

Configuring **Time-out Timer (Telephone)** ( See) Radio Configuration > System Properties > Systems > LTR Trunking > LTR > TX Options > Time-out Timer)

Communicating Without Using a Repeater (Talk Around)

Talk Around is the function allowing direct communication between transceivers without using a repeater.

If the transceiver cannot link to a repeater due to too great distance between the transceiver and the repeater, the transceiver can directly communicate with the target transceiver using Talk Around.

The transceiver with **Talk Around** enabled transmits using the transmit frequency and the Encode ID of the Home Repeater.

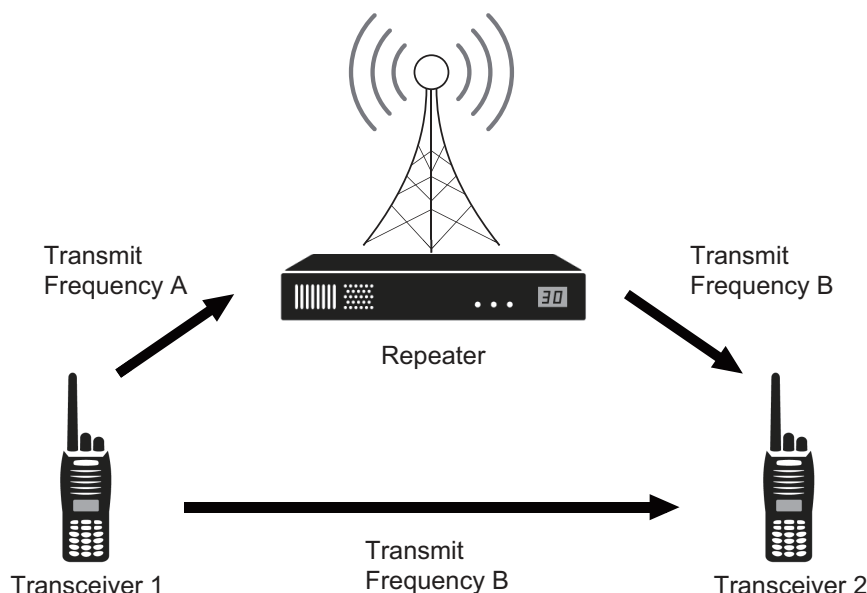


Figure 3-3 Talk Around

By using KPG-D3/ D3N, **Talk Around** can be configured for each GID to be enabled or disabled.

The “” icon appears if a GID with **Talk Around** enabled is selected. **Talk Around** cannot be disabled by pressing a button of the transceiver such as the **Talk Around** button.

If **Allow Talk Around** is enabled, **Talk Around** can be toggled between enabled and disabled by operating the transceiver.

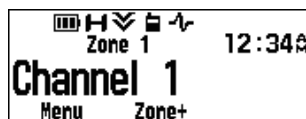
- Pressing the **Talk Around** button toggles **Talk Around** between enabled and disabled.
- Pressing the **Menu** button causes the transceiver to enter Menu Mode, and then **Talk Around** can be toggled between enabled and disabled by selecting “Talk Around”. (Refer to Common Function Part [Using Menu Mode.](#))

Operating the transceiver

● Enabling Talk Around

Press the **Talk Around** button while **Talk Around** is disabled.

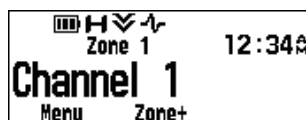
The “” icon appears and **Talk Around** will be enabled.



● Disabling Talk Around

Press the **Talk Around** button while **Talk Around** is enabled.

The “” icon disappears and **Talk Around** will be disabled.



Configuration using KPG-D3/ D3N

- Configuring **Allow Talk Around** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > LTR > TX Options)
- Configuring **Talk Around** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > General)
- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Talk Around Busy Channel Lockout

Talk Around Busy Channel Lockout automatically restricts a transmission so as not to interfere with other communications.

The transceiver directly communicates with the target transceiver using **Talk Around** if the distance to a home repeater is too great. If an attempt is made to use a channel already used by other groups at that time, the transceiver automatically restricts its own transmission.

If **Talk Around Busy Channel Lockout** is enabled and if the **PTT** switch is pressed, the transceiver cannot transmit with “Busy” appearing on the display and the Busy Tone (continuous beep) sounding at the same time. The Busy Tone sounds until the **PTT** switch is released.

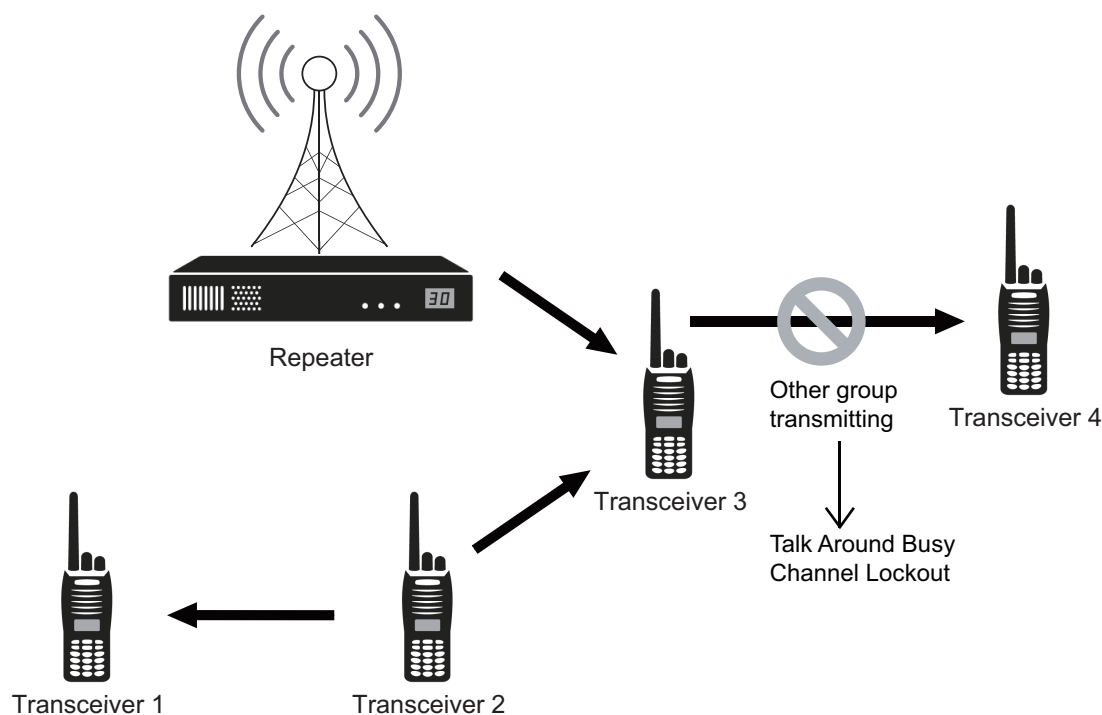


Figure 3-4 Talk Around Busy Channel Lockout

Configuration using KPG-D3/ D3N

Configuring **Talk Around Busy Channel Lockout** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > LTR > TX Options)

3.2 Using the Optional Signaling (LTR)

Optional Signaling is the signaling used to initiate a selective call. DTMF, MDC-1200, or FleetSync is the Optional Signaling which can be used in an **LTR Trunking** system. All these types of signaling make use of audio bandwidths. (Refer to [USING FLEETSYNC](#), [USING DTMF](#).)

Configuration using KPG-D3/ D3N

Configuring **Optional Signaling**

( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > LTR > LTR ID > Fix ID > 1st, 2nd)

( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > General)

Conditions to Decode the Optional Signaling

The LTR ID must match in an LTR Trunking system. Therefore, the conditions to decode the Optional Signaling in an LTR Trunking system is LTR ID Decode only.

If the received Optional Signaling matches the Optional Signaling preconfigured for the transceiver, the transceiver emits the Alert Tone or starts Transpond.

Once Optional Signaling matches, the signaling status remains matched until it is reset.

Unmuting the Speaker (Audio Control (LTR))

Audio Control is the condition which allows the transceiver to unmute the speaker by an LTR ID and Optional Signaling. Conditions for the transceiver to unmute the speaker can be configured for each LTR Trunking System.

The transceiver unmutes the speaker and emits received audio if the conditions configured for **Audio Control** are satisfied.

Conditions to unmute the speaker can be changed by a combination of the LTR ID and the Optional Signaling.

The following are the conditions to unmute the speaker:

Table 3-2 Audio Control (LTR)

Configuration	Description
LTR ID	The transceiver unmutes the speaker if the received LTR ID matches the LTR ID preconfigured for the transceiver. The conditions for unmuting the speaker do not change even if the transceiver transmits.
LTR ID and Optional Signaling	The transceiver does not unmute the speaker unless the received Optional Signaling matches the Optional Signaling preconfigured for the transceiver. The transceiver unmutes the speaker if the received Optional Signaling matches the Optional Signaling preconfigured for the transceiver and the received LTR ID matches the LTR ID preconfigured for the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Audio Control**

( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > General > MDC-1200 > Common Options)

( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > General > FleetSync > Common Options)

Temporarily Disabling the Signaling (Monitor)

Monitor is the function that temporarily disables the Optional Signaling configured for a channel on which the transceiver waits.

Monitor is used to check the availability of channels prior to transmitting in order to avoid interfering with other parties.

To use this function, the **Monitor** button or the **Monitor Momentary** button is used.

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then **Monitor** can be toggled between enabled and disabled by selecting "Monitor". (Refer to Common Function Part [Using Menu Mode.](#))

While **Monitor** is enabled, the "🔊" icon appears, and the Optional Signaling will be disabled.

Operating the transceiver

● Monitor button

1 Press the **Monitor** button while **Monitor** is disabled.

The "🔊" icon appears.

The transceiver disables Optional Signaling and the audio can be heard upon matching of the LTR ID.

2 Press the **Monitor** button while **Monitor** is enabled.

The "🔊" icon disappears.

● Monitor Momentary button

1 Press and hold the **Monitor Momentary** button.

The "🔊" icon appears.

The transceiver disables Optional Signaling and the audio can be heard upon matching of the LTR ID.

2 Release the **Monitor Momentary** button.

The "🔊" icon disappears.

Note

- If **Retain Monitor/Squelch Off Status** is enabled, the status of **Monitor**, either enabled or disabled, is retained in the transceiver even if the transceiver is turned OFF.
- Pressing the **Monitor** button or the **Monitor Momentary** button while the Optional Signaling matches resets the matching state of the Optional Signaling.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Retain Monitor/Squelch Off Status** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Basics > General > Power-on/off)

Unmuting the Speaker by Linking with the Microphone (Off-hook Decode)

Supported Models: Mobile

Off-hook Decode is the function linked with a microphone on- or off-hook state to unmute the speaker upon match of an LTR ID.

The transceiver behaves as follows according to the configuration in **Off-hook Decode**:

Table 3-3 Off-hook Decode

Configuration	Description
Enabled	The transceiver opens the squelch according to the configuration for Audio Control while the microphone is in either the on-hook state or off-hook state.
Disabled	The transceiver unmutes the speaker when the transceiver detects a frame upon matching the LTR ID if the microphone is in the off-hook state. The transceiver opens squelch according to the configuration for Audio Control if the microphone is in the on-hook state.

Note

- Stun can be activated regardless of the status of **Off-hook Decode** and whether the microphone is in the on-hook or off-hook state.
- The matching state of Optional Signaling will be reset by hooking the microphone on a hanger (On-hook state) after receiving a call by Optional Signaling.
- On-hook indicates the state that the microphone is hooked. Off-hook indicates the state that the microphone is not hooked.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Decode** to be enabled or disabled ( See Radio Configuration > Global Options > Basics > General > Control > Microphone-hook)

3.3 Priority Calling (Fix ID)

Fix ID is an ID having a higher priority level than that of Group ID.

Fix ID can be used to preferentially alternate to the **Fix ID** while the transceiver is receiving a call with another ID.

The priority order for receiving if a **Fix ID** is configured is as follows:

1st Fix ID → 2nd Fix ID → Displayed Group ID (Revert ID) → Selectable ID (Scan Add = Yes) → Decode ID

However, the transceiver cannot receive a **Fix ID** under the following conditions:

- If the transceiver receives a call from a **Fix ID** while the transceiver is communicating with a telephone.
- If the transceiver is receiving a call with Trunkout via a repeater other than the Home Repeater.
- If the transceiver receives a call from a **Fix ID** in the data group.

Note

- The **Call Indicator** function, **Optional Signaling** function and **Horn Alert** function can be used when the transceiver receives a **Fix ID**. (Refer to [Call Indicator](#), [Using the Optional Signaling \(LTR\)](#), Common Function Part [Controlling Vehicle Operation According to the State of the Horn Alert Port \(Horn Alert\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Fix ID** ( See Radio Configuration > System Properties > Systems > LTR Trunking > LTR > LTR ID > Fix ID)

Call Indicator

Call Indicator is the function used to light or blink the “” icon when the transceiver receives a call.

Call Indicator is used as the incoming call history when a user is away from the transceiver, or when a user is unaware of a call because of the usage environment.

The transceiver behavior is different when the transceiver receives a Group ID and when the transceiver receives a **Fix ID**.

Table 3-4 Call Indicator

Received ID	Description
Group ID	The “” icon blinks and notifies a user that the user received a call. The “” icon keeps blinking even if the call is finished. The blinking “” icon will light if the transceiver receives a call with a Fix ID having a high priority level. The “” icon is turned off by pressing a button.
Fix ID	The “” icon lights and notifies a user that the user received a call. The “” icon remains lit even if the call is finished. The “” icon remains lit even if the transceiver receives a call having a Group ID. The “” icon is turned off by pressing a button on the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Call Indicator (Fix ID)** ( See Radio Configuration > System Properties > Systems > LTR Trunking > LTR > LTR ID > Fix ID)
- Configuring **Call Indicator (Group ID)** (Individually) ( See Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > Individually > General)

3.4 Restricting the ID (Block ID)

Block ID can be used to restrict use of IDs.

This function can be used to respectively specify the range of the IDs used to communicate with a telephone, the range of the IDs that cannot be used immediately after the transceiver receives a call, and the range of the receive-only IDs.

ID Used When Communicating on a Telephone (Telephone ID)

Telephone ID is an ID used to communicate with a telephone. A call can be initiated from the transceiver to a telephone, and from a telephone to the transceiver.

Configuration using KPG-D3/ D3N

Configuring Telephone ID ( See Radio Configuration > System Properties > Systems > LTR Trunking > LTR > LTR ID > Block ID)

Inhibiting Response Immediately After Receiving ID (Transmit Inhibit)

Transmit Inhibit can be used to restrict a user from initiating a call using the received ID immediately after the transceiver receives a specific ID.

This can be used to restrict using an ID immediately after receiving the ID if Group ID is shared and used by multiple parties. The transceiver cannot transmit while the length of time configured for **Transmit Inhibit Time** is counting down after receiving the Transmit Inhibit ID.

Transmit Inhibit ID and **Transmit Inhibit Time** can be configured using KPG-D3/ D3N. This function can be configured for each user.

Note

- If the zone or GID is changed, the state preventing transmission is reset and transmission can resume.
- If the transceiver receives a Transmit Inhibit ID during a scan, the transceiver cannot transmit until the time configured in **Transmit Inhibit Time** is counting down after receiving the call. **Transmit Inhibit Time** is reset and a transmission can be started when the transceiver resumes scanning.
- If the transceiver receives a Transmit Inhibit ID when connected to a repeater, the transceiver cannot transmit before the length of time configured for **Transmit Inhibit Time** is counting down.

Configuration using KPG-D3/ D3N

- Configuring **Transmit Inhibit** ( See Radio Configuration > System Properties > Systems > LTR Trunking > LTR > LTR ID > Block ID)
- Configuring **Transmit Inhibit Time** ( See Radio Configuration > System Properties > Systems > LTR Trunking > LTR > LTR Parameters)

ID Dedicated for Reception (Decode ID)

Decode ID is an ID dedicated for reception by restricting a user from transmitting using the ID. If the transceiver receives a call from a **Decode ID**, the transceiver emits the audio without changing the display.

Configuration using KPG-D3/ D3N

Configuring **Decode ID** ( See Radio Configuration > System Properties > Systems > LTR Trunking > LTR > LTR ID > Block ID)

3.5

Connecting to a Public Switched Telephone Network (PSTN)
(Telephone Interconnect)

In an LTR Trunking system, the transceiver can connect to a Public Switched Telephone Network (PSTN) via the Repeater Interconnect (RIC), which is a repeater connected to a telephone line.

Calling a Telephone Number

Pressing the **PTT** switch causes the transceiver to connect to a telephone line and initiate a call by manually or automatically specifying the phone number.

Operating the transceiver

- Automatically calling a Telephone Number

1

Select the group for which a Telephone ID is configured.



2

Configure the telephone number of the target transceiver using Autodial.

Refer to “[Method of Sending the DTMF Code](#)” for operation methods.



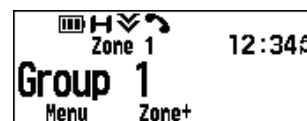
3

Press the **PTT** switch.

The transceiver automatically connects to a telephone line, and then the transceiver will call the telephone number.

● Manually calling a Telephone Number

1 Select the group for which a Telephone ID is configured.



2 Press the **PTT** switch.

The transceiver receives dial tone after the transceiver connects to a telephone line, and then the transceiver will be in the phone off-hook state (dial standby state).

3 Call the telephone number by manual keypad operation using the Manual Dialing or Keypad Auto PTT function while receiving dial tone.

Refer to “[Method of Sending the DTMF Code](#)” for operation methods.

● Disconnecting a telephone line

Press the **[#]** or **Telephone Disconnect** button during the call to terminate the call.



- Even if Optional Signaling is configured for GID with Telephone ID, Optional Signaling does not function.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( **See** Radio Configuration > Global Options > Button Assignment)

Automatically Connecting to a Telephone Line (Auto Telephone Search)

Auto Telephone Search can be used to search for and connect to an available RIC repeater to link automatically.

The transceiver automatically searches for an available telephone line to be connected to, and then initiates a call. This function can be used like the memory dial of a cellular phone, allowing a user to easily and steadily initiate a call.

The transceiver starts the Auto Telephone Search using one of the following operations:

● Auto Telephone button

Pressing the **Auto Telephone** button causes the transceiver to start the **Auto Telephone Search**.

● Menu Button

Pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the transceiver starts the **Auto Telephone Search** by a user selecting "Auto Telephone". (Refer to Common Function Part [Using Menu Mode](#).)

● Autodial Button

Pressing the **Autodial** button causes the transceiver to enter Autodial Mode, and then by pressing the **Menu** (☰) button, the transceiver starts the **Auto Telephone Search**. If the transceiver succeeds in connecting, the transceiver sends the DTMF code configured for the **Autodial List** or the entered DTMF code.

To use **Auto Telephone Search** in Autodial Mode, **Auto Telephone** must be enabled using KPG-D3/ D3N.

Zone and GID to be search target

GIDs satisfying all of the following conditions are targets to be searched: If no GID in an LTR Trunking system satisfying these conditions exists in the zone where **Auto Telephone Search** is initiated, a Deny Tone (3 beeps) sounds from the transceiver and the Auto Telephone Search will not start.

- A GID in an LTR Trunking system in which **Auto Telephone Search** is enabled
- A GID in an LTR Trunking system in which more than one repeater with **Telephone** enabled exists in the configuration of **Repeater Information**
- A GID which has a Group ID included in the Telephone ID range (If Telephone ID (**Block ID**) is configured)

Operating the transceiver

● Auto Telephone button

1 Press the **Auto Telephone** button.

"Auto Telephone" appears on the display and then the "☎" icon will blink.

The transceiver starts the **Auto Telephone Search**.

The "☎" icon appears when the transceiver establishes a link to a telephone line.

The transceiver receives dial tone and will be in the phone off-hook state (dial standby state).

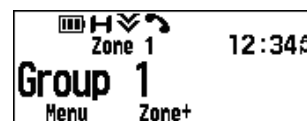


Note

- The following operations are the same even if the transceiver enters **Auto Telephone Search** by pressing the **Menu** button:
- If the transceiver cannot connect to a telephone line for 60 sec, the Deny Tone (3 beeps) sounds from the transceiver and then **Auto Telephone Search** terminates.
- Pressing the **Auto Telephone** button or **Clear** button while **Auto Telephone Search** is executed terminates **Auto Telephone Search**.

2 Call the telephone number by using **Manual Dialing** or **Keypad Auto PTT** while receiving dial tone.

Refer to “[Method of Sending the DTMF Code](#)” for operation methods.



● Autodial Button

1 Configure the telephone number of the target transceiver using Autodial.

Refer to “[Method of Sending the DTMF Code](#)” for operation methods.



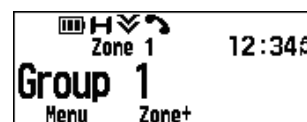
2 Press the **Menu** ([M]) button.

“Auto Telephone” appears on the display and then the “📞” icon will blink.

The transceiver starts the **Auto Telephone Search**.



The transceiver automatically connects to a telephone line, and then the transceiver will call the telephone number.



Note

- If the transceiver cannot connect to a telephone line for 60 sec, the Deny Tone (3 beeps) sounds from the transceiver and then **Auto Telephone Search** terminates.
- Pressing the **Auto Telephone** button or **Clear** button while **Auto Telephone Search** is executed terminates **Auto Telephone Search**.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Auto Telephone Search** to be enabled or disabled ([See](#) Radio Configuration > System Properties > Systems > LTR Trunking > LTR > TX Options)
- Configuring **Auto Telephone** to be enabled or disabled ([See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > LTR Trunking)

Notifying the Availability of the Repeater by a Tone (Free System Ringback)

Free System Ringback is a function that allows the transceiver to notify a user by emitting a Ringer Tone (1 beep) from the transceiver that a repeater connected to a telephone line becomes available in the case that all repeaters connected to telephone lines are all busy.

Operating the transceiver

Release the **PTT** switch while a Busy Tone (continuous beep) sounds from the transceiver.

Free System Ringback Mode Tone (1 beep) sounds from the transceiver and the transceiver will enter Free System Ringback Mode.

The Ringer Tone (1 beep) sounds from the transceiver when a repeater connected to a telephone line becomes available for communications.



- **Free System Ringback** can be used when using the telephone. In the case of a Dispatch call, Free System Ringback cannot be used.
- The transceiver stops **Free System Ringback** when a user changes the zone or GID or when receiving a call.
- The transceiver pauses scanning if the transceiver enters Free System Ringback Mode during the scan. The transceiver will resume scanning when the transceiver aborts Free System Ringback Mode.

Configuration using KPG-D3/ D3N

Configuring **Free System Ringback** to be enabled or disabled (**See** Radio Configuration > Protocol Options > LTR)

3.6 Other LTR Functions

The following calls can be used in an LTR Trunking system.

- Transpond
- System Search
- Clear to Talk
- ARQ

Sending Back the Acknowledge (Transpond)

Transpond allows the transceiver to send back an Acknowledgment upon receipt of a call. The transceiver transmits the Transpond Tone when the Acknowledge signal is transmitted.

Use of this function enables to verify whether the transceiver is within the communication area or not.

The transceiver sends back an Acknowledgment to the administrator after the transceiver is called using an LTR ID. The transceiver starts the **Transpond** when the amount of time configured for **Transpond Delay Time** elapses. (Refer to [Transpond Delay Time](#).)

Note

- If the transceiver receives a target ID for **Transpond** during the scan, the transceiver starts **Transpond** after the time configured for **Transpond Delay Time** elapses. The transceiver resumes scanning after the amount of time configured for **Dwell Time** elapses. If the **Dropout Delay Time** is shorter than the **Transpond Delay Time**, the transceiver starts **Transpond** after the amount of time configured for **Dropout Delay Time** elapses.
- **Transpond** will be canceled if the transceiver changes a zone or GID while **Transpond Delay Time** is counting down.
- While **Transmit Inhibit** is activated, the transceiver cannot start **Transpond**. (Refer to [Inhibiting Response Immediately After Receiving ID \(Transmit Inhibit\)](#).)

Transpond Delay Time

Transpond Delay Time is the amount of time from when the transceiver receives a Group ID for which **Transpond** is configured until the transceiver transmits the **Transpond**.

If the **Dropout Delay Time** is shorter than the **Transpond Delay Time**, the transceiver starts **Transpond** after the amount of time configured for **Dropout Delay Time** elapses. (Refer to [Dropout Delay Time](#).)

Configuration using KPG-D3/ D3N

Configuring **Transpond Delay Time** ( See [Radio Configuration > System Properties > Systems > LTR Trunking > LTR > LTR Parameters](#))

Automatically Searching for an Available System for Connecting (System Search)

System Search can be used to automatically search for an available system with which to link.

If the transceiver cannot communicate by a user pressing the **PTT** switch, the transceiver is deemed to be outside of the system coverage area. In this case, System Search can be used to search for an available system with which to link.

If the transceiver cannot connect to the system while the transceiver sends data, the transceiver can search for an available system with which to link using this function. In this case, the receiving base station transceiver must be in a state to receive signals transmitted by the transceiver, for instance by scanning.

There are two ways to initiate **System Search** in voice communications: **Manual** and **Auto**.

Operating the transceiver

● Manual

- 1 Press the **Menu** () button when the transceiver fails to connect to the repeater and an Intercept Tone (2 beeps) sounds from the transceiver.

The Intercept Tone (2 beeps) stops.

- 2 Release the **PTT** switch.

System Search starts from the next system following the system to which the transceiver failed to connect.

The transceiver stops searching if an available system is found.

- 3 Press the **PTT** switch.

The transceiver connects to the repeater on the system on which the system search stops and then the transceiver can initiate a voice call.

● Auto

- 1 Release the **PTT** switch when the transceiver fails to connect to the repeater and an Intercept Tone (2 beeps) sounds from the transceiver.

The Intercept Tone (2 beeps) stops.

System Search starts from the next system following the system to which the transceiver failed to connect.

The transceiver stops searching if an available system is found.

- 2 Press the **PTT** switch.

The transceiver connects to the repeater on the system on which the system search stops and then the transceiver can initiate a voice call.

Note

- For Portable (Basic Model), the transceiver cannot initiate **System Search** manually.
- To initiate **System Search** during data communication, “Auto” needs to be configured in **System Search**.
- If the transceiver cannot connect to the system, the transceiver will migrate to the next system and then continue **System Search**. In this case, a System Search Tone (1 beep) sounds from the transceiver.
- If no system is found after searching all configured LTR Trunking system zones, a System Search End Tone (3 beeps) sounds and the **System Search** ends.
- If the Home Repeater of the target system is busy, the transceiver proceeds to Trunkout and executes **System Search**.

Configuration using KPG-D3/ D3N

Configuring **System Search** ( See Radio Configuration > Protocol Options > LTR)

Notifying Difficulty by a Tone in Accessing the Repeater (Clear to Talk)

Clear to Talk can be used to emit the Delay Tone (1 beep) when the transceiver accesses a repeater 3 times or more when connecting to the repeater by pressing the **PTT** switch.

- **If Clear to Talk is disabled:**

After the **PTT** switch is pressed, a Delay Tone (1 beep) sounds from the transceiver when the transceiver attempts to connect to the repeater 3 times or more for the behavior when linking to the repeater.

If the repeater is busy when the **PTT** switch is pressed, a Busy Tone (continuous beep) sounds from the transceiver.

- **If Clear to Talk is enabled:**

After the **PTT** switch is pressed, no Delay Tone (1 beep) sounds from the transceiver when the transceiver attempts to connect to the repeater 3 times or more for the behavior when linking to the repeater.

Even if the repeater is busy when the **PTT** switch is pressed, no Busy Tone (continuous beep) sounds from the transceiver.

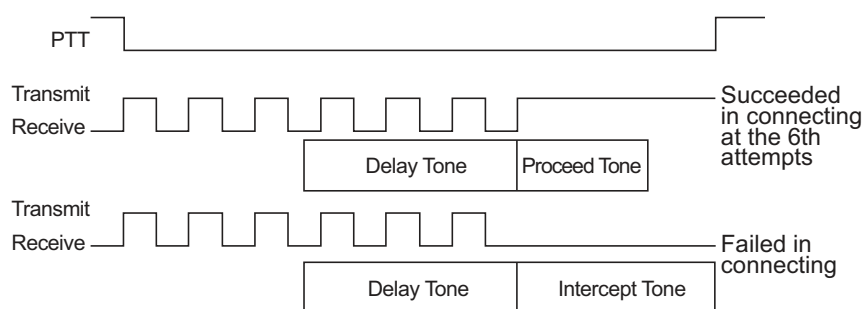


Figure 3-5 Clear to Talk

Configuration using KPG-D3/ D3N

Configuring **Clear to Talk** ( See Radio Configuration > Protocol Options > LTR)

Terminating Data Communication by a Single Link (ARQ)

ARQ is the function used to terminate data communications in an LTR Trunking system by a single link operation.

The transceiver normally needs to link to a repeater every time to send data in an LTR Trunking system. In this case, it may take a longer time to send data, or a data transmission may fail if the system is busy and there is no available channel on the repeater. **ARQ** can avoid these problems and unfaillingly complete data communications with a single link.

If **ARQ** is used, the transceiver does not send the EOT (End of Transmit) until the transceiver finishes data communications after the transceiver establishes a link to the repeater once. The transceiver will retain the linked state using the Hang Up Time configured for the repeater and then send or receive the acknowledgment during the Hang Up Time. **ARQ** can be used to send data using FleetSync. For Mobile, **ARQ** is also used for data communications by connecting to an external modem.

The transceiver behavior when the ARQ function is used in FleetSync

● Data transmitting side

ARQ is activated if data communications using FleetSync is started. The transceiver will not send the EOT when the transceiver finishes sending data. The transceiver sends the EOT and aborts ARQ when all FleetSync data communications are completed.

● Data receiving side

The TOR port level will lower if the transceiver receives a Data GID (carrier + ID) signal. **ARQ** is activated if the transceiver recognizes that data communications using FleetSync has received. The transceiver does not connect by sending back an acknowledgment, etc., but the transceiver sends data on the channel specified by a repeater. In this case, the transceiver does not send the EOT.

The transceiver behavior when the ARQ function is used by connecting an external modem (Mobile only)

● Data transmitting side

ARQ is activated if the DTC port goes low level by an operation of an external modem. Then, the transceiver transmits and receives using the Data GID. Transmission and reception during the period are controlled by the External PTT (Data) port. The transceiver will not send the EOT when the transceiver finishes sending data. If the External PTT (Data) port goes high level after the DTC port goes high level, the transceiver sends the EOT and then the transceiver will abort ARQ when the amount of time configured for **Dwell Time** elapses.

● Data receiving side

The TOR port level will lower if the transceiver receives a Data GID (carrier + ID) signal. The DTC port goes low level and **ARQ** is activated if the external modem recognizes that the transceiver has received data. If there are any signals to be applied to the External PTT (Data) port when sending back an acknowledgment, etc., the transceiver does not do the handshake, but sends data on a channel specified by the repeater. In this case, the transceiver does not send the LTR data and EOT.

Note

- If no repeater is available when the External PTT (Voice), External PTT (Data), or Data PTT port is activated, the transceiver does not transmit. In this case, the System Busy port goes low level. Even if no External PTT (Voice), External PTT (Data), or Data PTT port is activated, the System Busy port goes low level if no repeater is available while the transceiver is receiving. With this function, the transceiver can notify external devices that there is no available repeater.
- The ARQ function does not work in MDC-1200.

Configuration using KPG-D3/ D3N

Configuring **ARQ** ( See Radio Configuration > Protocol Options > LTR)

3.7 Using FleetSync to Initiate a Selective Call

Using FleetSync, the transceiver can initiate an Individual Call, a Group Call, or various message communications in an LTR Trunking system.

Refer to “[USING FLEETSYNC](#)” for details on FleetSync.

3.8 Using DTMF to Initiate a Selective Call

Various functions of DTMF Encode and DTMF Decode can be used in an LTR Trunking system.

To decode a DTMF code in an LTR Trunking system, “DTMF” needs to be configured in **Optional Signaling (LTR)** to be used on the channel. (Refer to [Using the Optional Signaling \(LTR\)](#).)

Refer to “[USING DTMF](#)” for details about DTMF.

3.9 Using MDC-1200 to Initiate a Selective Call

In an LTR Trunking system, individual calls and group calls can be made using MDC-1200.

Refer to “[USING THE MDC-1200](#)” for details about MDC-1200.

3.10 Sending a PTT ID

PTT ID is an identification code unique to the transceiver. It is sent out when the **PTT** switch is operated.

There are 3 types of PTT ID formats: DTMF, FleetSync, and MDC-1200.

Refer to the following for details of each format.

- **FleetSync**

“[Transmitting/ Receiving a PTT ID](#)” in “FleetSync”

- **MDC-1200**

“[Transmitting/ Receiving a PTT ID](#)” in “MDC-1200”

- **DTMF**

“[Transmitting/ Receiving a PTT ID](#)” in “DTMF”

3.11 Improving the Sound Quality for Transmitting and Receiving (Compander)

Compander is a compound term made from “COMpressor” and “exPANDER”, and is a function designed to improve sound quality.

This function is used to improve the S/N ratio of voice communications by compressing the audio at the transmitting end of the communication path and expanding the audio at the receiving end of the path.

The transmitting party and the receiving party must have the same configuration to use this function.

Configuration using KPG-D3/ D3N

Configuring **Compander** to be enabled or disabled ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > General)

FleetSync is a term that refers collectively to a message communication system that makes use of the MSK transmission system. It is a unique system proposed by KENWOOD. This message communication system can be used only in an Analog Conventional system and LTR Trunking system. By using FleetSync, the transceiver can identify individual transceivers, and can make text message and GPS data communications.

The transceiver can be connected to a PC or external devices since FleetSync also supports serial data communication.

4.1 Basic FleetSync Settings

This section explains the basic parameters required for the different types of communication using FleetSync.

About Own ID (Fleet/ ID)

FleetSync communication uses a 7-digit identification code (FleetSync ID) that is made up of a 3-digit Fleet (100 to 349) and a 4-digit ID (1000 to 4999).

Each transceiver is identified by its FleetSync ID. To initiate various communications using FleetSync, an own FleetSync ID (Fleet/ ID) needs to be configured for the transceiver. One Fleet/ ID can be configured for each transceiver.

Configuration using KPG-D3/ D3N

Configuring **Fleet** and **ID**

( See) Radio Configuration > System Properties > Systems > Analog Conventional > General > FleetSync > ID (Own) > FleetSync)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > FleetSync > ID (Own) > FleetSync)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > General > FleetSync > ID (Own) > FleetSync)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > General > FleetSync > ID (Own) > FleetSync)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > General > FleetSync > ID (Own) > FleetSync)

Baud Rate

Baud Rate is the data transmission speed of the MSK Modem used by FleetSync.

Baud Rate configuration for the transmitting and receiving parties must be configured for the same baud rate.

Table 4-1 Baud Rate

Configuration	Description
1200 bps	This is the recommended setting.
2400 bps	Enables more data to be transmitted within a shorter time interval compared to 1200 bps. However, errors are more likely to occur due to communication at high speed. The area for which data communication is supported is also relatively narrower compared to 1200 bps.

Configuration using KPG-D3/ D3N

Configuring **Baud Rate**

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > General > FleetSync > System > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > General > 5-tone > System > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > FleetSync > System > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > 5-tone > System > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > LTR Trunking > General > FleetSync > System > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > General > FleetSync > System > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > General > 5-tone > System > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > General > FleetSync > System > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > General > 5-tone > System > FleetSync)

FleetSync II

FleetSync II is a new FleetSync format utilizing FEC (Forward Error Correction) technology. By using this error correction method, more reliable data communication can proceed compared with the original FleetSync format.

With **FleetSync II**, additional bits are added to handle error correction. Therefore, the data length is 4 times longer than that of the original format.



- The **FleetSync II** format has no compatibility with the original FleetSync format.

Configuration using KPG-D3/ D3N

Configuring **FleetSync II**

(**See** Radio Configuration > System Properties > Systems > Analog Conventional > General > FleetSync > System > FleetSync)

(**See** Radio Configuration > System Properties > Systems > Analog Conventional > General > 5-tone > System > FleetSync)

(**See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > FleetSync > System > FleetSync)

(**See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > 5-tone > System > FleetSync)

(**See** Radio Configuration > System Properties > Systems > LTR Trunking > General > FleetSync > System > FleetSync)

(**See** Radio Configuration > System Properties > Systems > NXDN Conventional > General > FleetSync > System > FleetSync)

(**See** Radio Configuration > System Properties > Systems > NXDN Conventional > General > 5-tone > System > FleetSync)

(**See** Radio Configuration > System Properties > Systems > DMR Conventional > General > FleetSync > System > FleetSync)

(**See** Radio Configuration > System Properties > Systems > DMR Conventional > General > 5-tone > System > FleetSync)

FleetSync Burst Noise Reduction

FleetSync Burst Noise Reduction mutes the incoming data burst tones when the transceiver receives FleetSync data. When the transceiver receives an MSK data burst tone, the transceiver evaluates whether or not the tone is FleetSync data. If it is FleetSync data, the transceiver mutes until it completes receiving FleetSync data. However, since it takes a short period of time to recognize a tone as FleetSync data, the beginning of the tone may sound from the speaker for a moment.

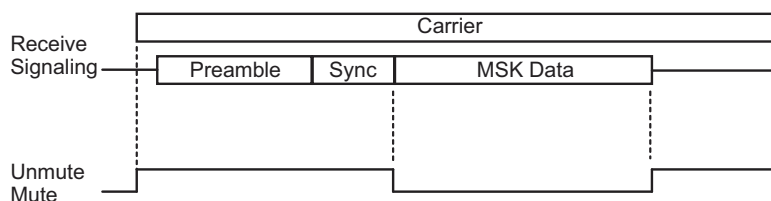


Figure 4-1 Timing to Activate the FleetSync Burst Noise Reduction

To receive the FleetSync data using BOT, the tone burst noise can be muted completely by configuring **Mute Hold Time** to function at the same time. However, since **Mute Hold Time** is valid for all communications, if the time is configured overly long, the beginning of the voice signal may also be muted on a channel that does not use the FleetSync functions. (Refer to [Muting the PTT ID Tone \(PTT ID Mute\)](#).)

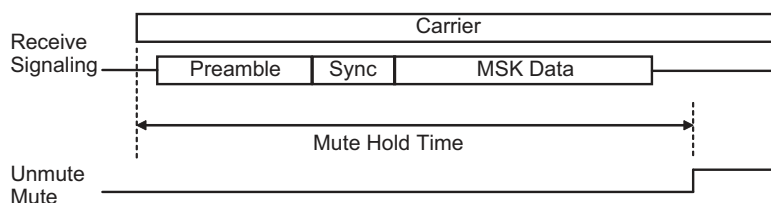


Figure 4-2 Timing to Activate Mute Hold Time

Note

- **FleetSync Burst Noise Reduction** is valid only for MSK data in FleetSync.

Configuration using KPG-D3/ D3N

Configuring **FleetSync Burst Noise Reduction** to be enabled or disabled

([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > RX Options > FleetSync)

([See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > RX Options > FleetSync)

([See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > RX Options > FleetSync)

([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > RX Options > FleetSync)

([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > RX Options > FleetSync)

4.2 Available Calls

The following calls can be made using a FleetSync ID. For transceiver operations and behaviors, refer to the instructions of each call type.

- PTT ID Communication
- Selective Call
 - Individual Call
 - Group Call
 - Fleet Call
 - Supervisor Call
 - Broadcast Call
- Status Call
- Short Data Call
- Long Data Call

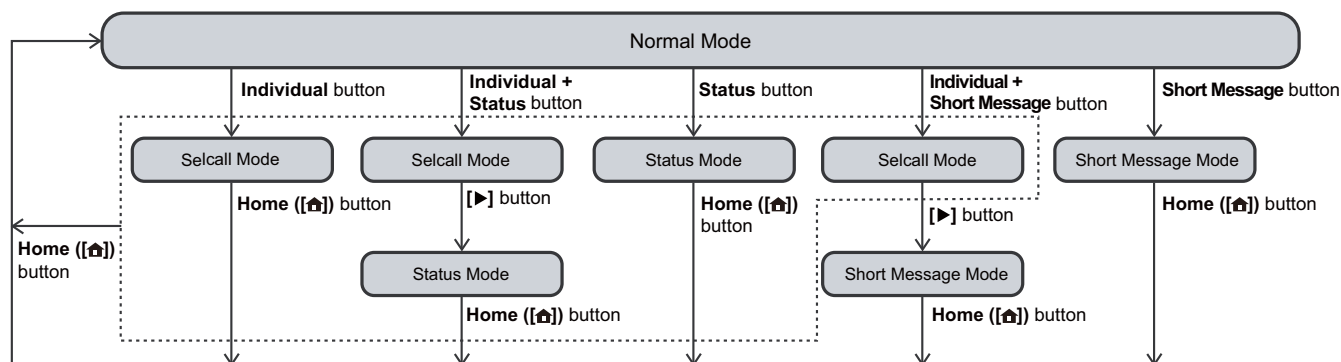
Note

- The type of selective call is determined by the Fleet and ID match pattern. (Refer to [Making a Selective Call](#).)

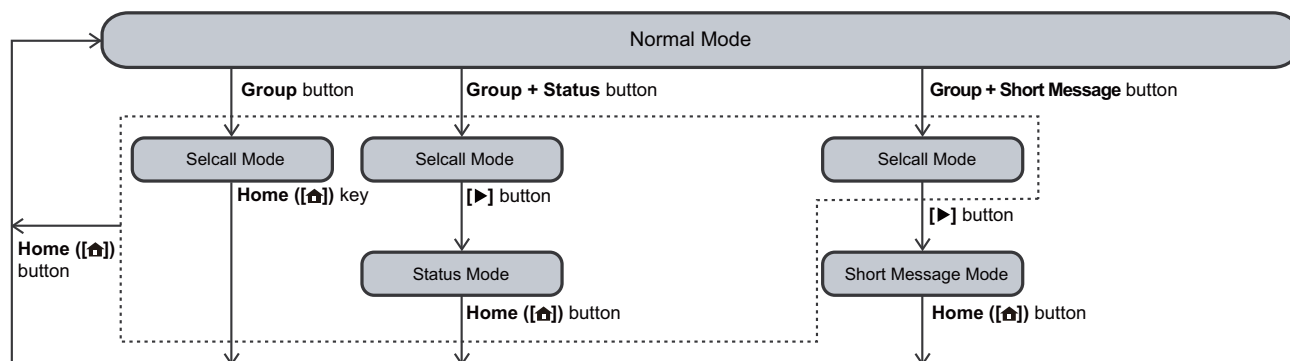
Transition for Each Mode

If a user wishes to send or receive a selective call, Status Message, or Short Message using FleetSync, the user must operate the transceiver after selecting the desired mode. The following are the transition diagrams for each mode.

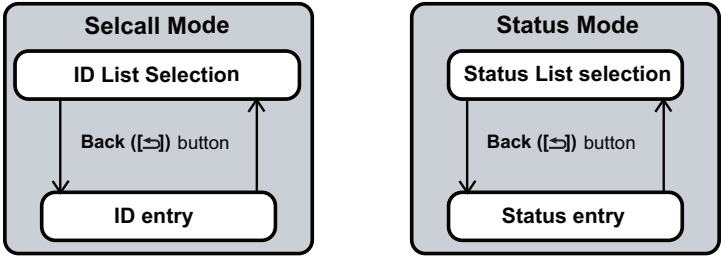
Transmission (Individual Call)



Transmission (Group Call)



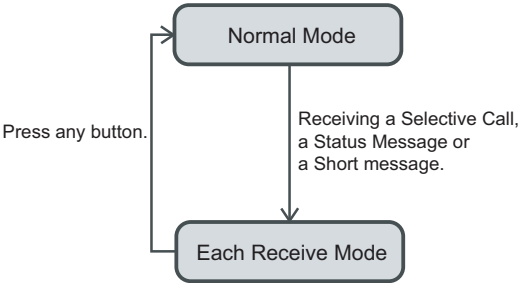
In Selcall Mode, a user can select the ID of the target transceiver from an ID List or directly enter an ID. Also, in Status Mode, a status to be sent can be selected from **Status List** or the status can directly be entered. In either mode, the entry method can be switched by pressing the **Back** (**[↵]**) button.



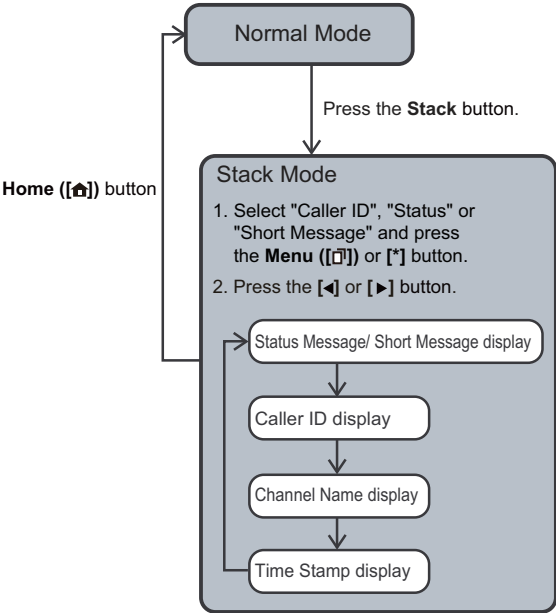
Note

- If **Manual Dialing** is enabled, an ID and status can be manually entered.

Reception



Checking a received Selective Call, Status Message, or Short Message



4.3 Transmitting/ Receiving a PTT ID

PTT ID is an identification code unique to the transceiver. It is sent out when the **PTT** switch is operated.

The caller's ID can be displayed on the main display using the received PTT ID while communicating with the caller.

The user can confirm the caller not only by voice, but also through the display. Also, the administrator can identify by a PTT ID who is using a channel without asking by voice for the caller's name.

PTT ID Type

PTT ID Type is the type of PTT ID to be sent.

To send a FleetSync ID as the PTT ID, "FleetSync" needs to be configured in **PTT ID Type** by using KPG-D3/ D3N. In addition, **Fleet** and **ID** must be configured. (Refer to [About Own ID \(Fleet/ ID\)](#).)

Configuration using KPG-D3/ D3N

Configuring **PTT ID Type**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > PTT ID)

Timing for Sending a PTT ID

A PTT ID is sent out at the following timings.

- BOT (Beginning of Transmit)

A PTT ID is added to the signal at the beginning of the transmission.

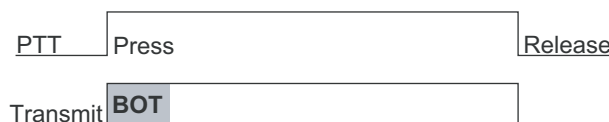


Figure 4-3 BOT

- EOT (End of Transmit)

A PTT ID is added to the signal at the end of the transmission.

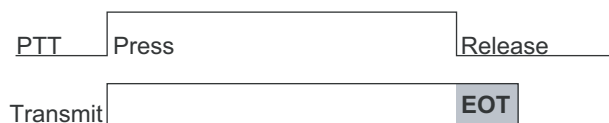


Figure 4-4 EOT

- Both (BOT and EOT)

A PTT ID is added to the signal at both the beginning and the end of the transmission.

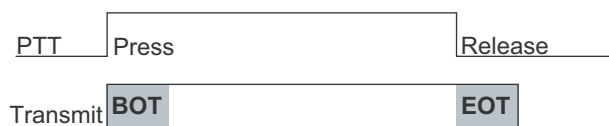


Figure 4-5 Both

The timing for sending a PTT ID can be configured for each channel using KPG-D3/ D3N.

Table 4-2 Timing for Sending a PTT ID

Configuration	Description
Off	Does not send out a PTT ID.
BOT	Sends out the transceiver's Fleet (Own) and ID (Own) as a PTT ID when the PTT switch on the transceiver at the transmitting end is pressed.
EOT	Sends out the transceiver's Fleet (Own) and ID (Own) as a PTT ID when the PTT switch on the transceiver at the transmitting end is released.
Both	Sends out the transceiver's Fleet (Own) and ID (Own) as a PTT ID at both BOT and EOT.
List	The transceiver initiates a Selcall using the FleetSync ID configured in the ID List for FleetSync by pressing the PTT switch on the transmitting transceiver. The FleetSync ID to be sent can be selected from the ID List by using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

- Configuring **PTT ID**
- Configuring **Number on ID List** the FleetSync ID to be sent (Personality)
 - (See) Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Table > Personality Table > Analog > PTT ID)
 - (See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Table > Personality Table > Analog > PTT ID)
 - (See) Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > Table > Personality Table > General > PTT ID)
 - (See) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > Table > Personality Table > Analog > PTT ID)
 - (See) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > Table > Personality Table > Analog > PTT ID)

Displaying the ID of the Communicating Caller on the LCD (Caller ID Display)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Caller ID Display is the function to display the received PTT ID in the display of the transceiver.

A user can identify the caller not only by voice, but also through the display.

When the transceiver receives a PTT ID, the received ID, ID Name, or ID List number appears in the display of the transceiver.

If the received ID is not configured for ID List in FleetSync, the ID will appear.

If the received ID is configured for ID List in FleetSync, the corresponding ID name will appear. However, if the received ID is configured for ID List in FleetSync but if the ID name is not configured, the ID List number will appear.

Upon the elapse of the time configured in **Auto Reset Timer** or by a user operating one of the buttons of the transceiver, then the transceiver restores the channel display.

PTT ID appears with muting active when a PTT ID is received even if the conditions for unmuting are not satisfied.

Note

- A user cannot reply to an ID on the transceiver while the ID appears on the main display.
- The PTT ID is displayed even if the transceiver receives either BOT or EOT.
- If the QT tone and DQT code are preconfigured for the transceiver, the Caller ID Display function will work even if the received QT tone or DQT code does not match the QT tone or DQT code preconfigured for the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Caller ID Display** to be enabled or disabled ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options)

Output of PTT ID Sending Tone (PTT ID Sidetone)

PTT ID Sidetone is the function to emit tones from the speaker while the transceiver sends a FleetSync ID.

The calling user can notice the timing to start speaking by **PTT ID Sidetone**.

If the user at the transmitting end starts communicating without being aware of whether the FleetSync ID has been sent out, the beginning part of the voice output from the transceiver at the receiving end may be interrupted. The PTT ID Sidetone is used to prevent this problem from occurring.

Configuration using KPG-D3/ D3N

Configuring **PTT ID Sidetone** to be enabled or disabled

( See Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > PTT ID > FleetSync)

( See Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > PTT ID > FleetSync)

( See Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > PTT ID > FleetSync)

( See Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > PTT ID > FleetSync)

( See Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > PTT ID > FleetSync)

Muting the PTT ID Tone (PTT ID Mute)

PTT ID Mute can be used to unmute after a certain amount of time elapses when the transceiver receives an analog signal. This feature is to mute the data sound of the PTT ID (BOT) sent out by the party at the other end of the call.

Upon receiving the analog signal and after the preset **Mute Hold Time** has elapsed while in the receiving mode, the transceiver unmutes the speaker if the condition to do so is satisfied.

Even if QT tone or DQT code or Optional Signaling is configured, the transceiver starts counting down the **Mute Hold Time** upon receipt of an analog signal. If the received signal disappears while the transceiver is counting down the **Mute Hold Time**, the timer will be reset. In this case, the timer restarts counting down from the beginning upon receipt of an analog signal again.

Configuration using KPG-D3/ D3N

- Configuring **PTT ID Mute** to be enabled or disabled (Individually)

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Individually > Analog > PTT ID)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Individually > Analog > PTT ID)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Individually > Analog > PTT ID)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > Individually > Analog > PTT ID)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > Individually > Analog > PTT ID)

- Configuring **Mute Hold Time**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > RX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > RX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > RX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > RX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > RX Options > PTT ID)

Preventing the PTT ID from Sending Repeatedly (PTT ID Pause)

PTT ID Pause is the function to keep the PTT ID from being sent when the transceiver alternates between transmit and receive in a certain period of time. This feature is to stop sending of the PTT ID repeatedly to the party at the other end of the call.

After transceiver has completed transmission and switches to the receiving mode, PTT ID will not be sent out when there is transmission within the time interval configured in **PTT ID Pause Time**. After the time interval specified in **PTT ID Pause Time** has elapsed, the transceiver will send out the PTT ID during a transmission.

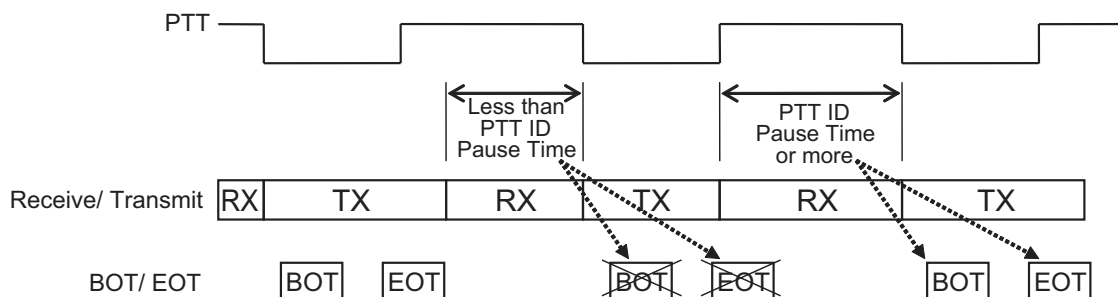


Figure 4-6 Timing for Starting PTT ID Pause

Configuration using KPG-D3/ D3N

- Configuring **PTT ID Pause** to be enabled or disabled (Individually)

([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Individually > Analog > PTT ID)

([See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Individually > Analog > PTT ID)

([See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > Individually > General > PTT ID)

([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > Individually > Analog > PTT ID)

([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > Individually > Analog > PTT ID)

- Configuring **PTT ID Pause Time**

([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > PTT ID)

([See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > PTT ID)

([See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > PTT ID)

([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > PTT ID)

([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > PTT ID)

Restricting the Transmission of the PTT ID in Talk Around (Restricted ID in Talk Around)

Restricted ID in Talk Around is a function to disable the PTT ID transmission while **Talk Around** is enabled even if the PTT switch is pressed or released. (Refer to [Communicating Without Using a Repeater \(Talk Around\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Restricted ID in Talk Around** to be enabled or disabled

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > PTT ID)

Sending the Received Unit ID from the Communication Port (Unit ID (Serial Output))

Unit ID (Serial Output) allows the transceiver to output the Fleet and ID received from the communication port of the transceiver when a PTT ID has been received.

With the **Unit ID (Serial Output)** enabled, the administrator can monitor and control in real time transceivers that are transmitting.

Note

- To use **Unit ID (Serial Output)**, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Unit ID (Serial Output)** ( **See** Radio Configuration > Protocol Options > FleetSync > General > RX Options > Serial Output)

4.4 Making a Selective Call

Different types of calls can be made using a FleetSync ID.

If the target transceiver to call is selected and the **PTT** switch is pressed, the transceiver transmits by adding the own FleetSync ID and the target transceiver's ID to the signal. After the target transceiver has received the FleetSync ID, the transceiver unmutes the speaker and outputs the receiving tone.

The caller's ID appears on the receiving transceiver. The receiving transceiver can respond to the caller by pressing the **PTT** switch while the caller's ID appears.

The different types of Selective Calls are as follows:

Table 4-3 Types of Selective Calls

Call Type	Description
Individual Call	Individual Call is used to initiate a call to a specific transceiver. When a transceiver receives a Selective Call with a Fleet and ID that matches its own ID, it is deemed to have received an Individual Call.
Group Call	Group Call is used to initiate a call to multiple transceivers within a Fleet. When a transceiver receives a Selective Call with a matching Fleet and an ID that is configured as the Group ID, it is deemed to have received a Group Call.
Fleet Call	For calling all transceivers with a FleetSync ID in the same Fleet as one's own. When a transceiver receives a Selective Call with a matching Fleet and an ID that is configured as "0 (ALL)", it is deemed to have received a Fleet Call.
Supervisor Call	When a transceiver receives a Selective Call with a matching ID and Fleet that is configured as the "0 (ALL)", it is deemed to have received a Supervisor Call. Supervisor Call is used to initiate a call to the transceiver having the same ID in the respective Fleets.
Broadcast Call	Broadcast Call is used to initiate a call to all transceivers with a FleetSync ID. When a transceiver receives a Selective Call with the ID configured as "0 (ALL)" and Fleet as "0 (ALL)", it is deemed to have received a Broadcast Call.

Initiating a Selective Call

The transmission by selecting the ID from the list and the transmission by direct entry of the ID (Manual Dialing) can be used as methods to initiate a Selective Call.

When selecting the ID from the list, a user can select a FleetSync ID configured for the ID List to initiate a Selective Call. (Refer to [ID List](#).)

When directly entering the ID, specify the FleetSync ID directly to initiate a Selective Call. The call type is determined according to the number of entered digits.

Table 4-4 Call Type by Manual Dialing

Number of Digits	Range	Call Type
7 digits ffiiii	The transceiver recognizes the entered value as the Fleet and the ID. fff: Fleet: 100 to 349 iiii: ID: 1000 to 4999	Individual Call/ Group Call
4 digits iiii	The transceiver recognizes the entered value as the ID. iiii: ID: 1000 to 4999	Individual Call/ Group Call
3 digits fff	The transceiver recognizes the entered value as the Fleet. fff: Fleet: 100 to 349	Fleet Call

Selective Call also comes with a Paging Call feature. Paging Call is the function to initiate a call to a target party. Use it when you want to call a target transceiver without communicating.

The transceiver enters Selcall Mode with one of the following operations and then will initiate a Selective Call:

● Individual/ Group button

Pressing the **Individual**, **Individual + Status**, **Individual + Short Message**, **Group**, **Group + Status**, or **Group + Short Message** button places the transceiver in Selcall Mode.

● Menu Button

The transceiver enters Selcall Mode by selecting “Individual + Status”, “Individual + Short Message”, “Group”, “Group + Status”, or “Group + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

● Keypad entry

If “Individual”, “Individual + Status”, “Individual + Short Message”, “Group”, “Group + Status” or “Group + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad places the transceiver in Selcall Mode. The transceiver enters Selcall ID Shortcut Entry Mode or will be on hold as the first digit of the Selcall ID is entered. (Refer to Common Function Part [Keypad Operation](#).)



- The transceiver can initiate a Supervisor Call and Broadcast Call by selecting a FleetSync ID from the ID List. The ID cannot be sent by using direct entry.

Operating the transceiver

● Initiating a Selective Call by the list selection

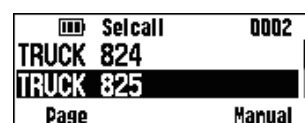
1 Press the **Individual**, **Individual + Status**, **Individual + Short Message**, **Group**, **Group + Status**, or **Group + Short Message** button.

The transceiver enters Selcall Mode and then the ID List selection display appears.

The following operations are identical even if the transceiver enters Selcall Mode by a user pressing the **Menu** button or using the keypad.

2 Press the **[▲]** or **[▼]** button and then select the target data from the Status List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for the selection methods.



3 Initiate a Selective Call.

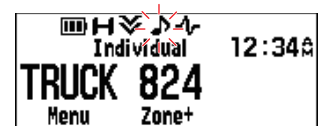
● Initiating a Voice Call

Press the **PTT** switch.

The “” icon blinks and the display changes to the following display corresponding to the call type and the display of the target transceiver’s ID name:

Individual Call: Individual

Other than Individual Call: Group



● Initiating a Paging Call

Press the **Menu** () or **[*]** button.

“Paging” appears and the display changes to the following display corresponding to the call type and the display of the target transceiver’s ID name:

Individual Call: Individual

Other than Individual Call: Group



● Initiating a Selective Call using Manual Dialing

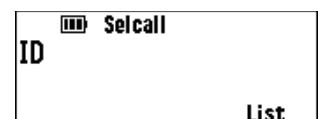
1 Press the **Individual**, **Individual + Status**, **Individual + Short Message**, **Group**, **Group + Status**, or **Group + Short Message** button.

The transceiver enters Selcall Mode and then the ID List selection display appears.

The following operations are identical even if the transceiver enters Selcall Mode by a user pressing the **Menu** button or using the keypad.

2 Press the **Back** () button.

The ID entry screen appears.



3 Enter an ID.

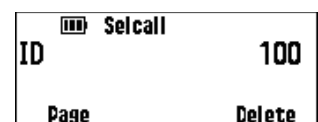
Refer to Common Function Part “[Entering or Deleting a Code](#)” for the entry method.

● Using the keypad

An ID can be entered by pressing the **[0]** to **[9]** buttons.

● Using the PF buttons

Press the **[▲]** or **[▼]** button to select the number and press the **Menu** () or **[*]** button to confirm the selected number.



4 Initiate a Selective Call.

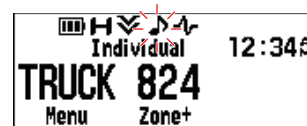
● Initiating a Voice Call

Press the **PTT** switch.

The “” icon blinks and the display changes to the following display corresponding to the call type and the display of the target transceiver’s ID name:

Individual Call: Individual

Other than Individual Call: Group



● Initiating a Paging Call

Press the **Menu** () or **[*]** button.

“Paging” appears and the display changes to the following display corresponding to the call type and the display of the target transceiver’s ID name:

Individual Call: Individual

Other than Individual Call: Group



Note

- If Selcall Mode has been entered with “Individual + Status”, “Individual + Short Message”, “Group + Status”, or “Group + Short Message”, Status Mode or Short Message Mode is entered by pressing the  button.
- If the Selcall Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode by pressing the **Individual** button. A selection screen for the ID List will appear by pressing the **Back** () button.
- If no ID is registered in the ID List, the transceiver enters Manual Dialing mode if **Manual Dialing** is enabled. In this case, the transceiver cannot enter Selcall Mode if **Manual Dialing** is disabled.
- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If **Optional Signaling LED** is enabled, the LED flashes yellow.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Manual Dialing** to be enabled or disabled
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > FleetSync)
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > FleetSync)
 - ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > FleetSync)
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > FleetSync)
 - ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > FleetSync)

Receiving a Selective Call

Below are the matching conditions for the FleetSync ID that the transceiver is waiting for.

Table 4-5 Conditions for Unmuting the Speaker

Call Type	Conditions for Unmuting the Speaker	
	Fleet	ID
	fff: 100 to 349	iiii: 1000 to 4999
Individual Call	Matching	Matching
Group Call	Matching	Group ID matches
Fleet Call	Matching	ALL ID
Supervisor Call	ALL Fleet	Matching
Broadcast Call	ALL Fleet	ALL ID

Note

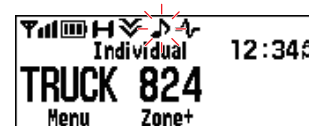
- To receive a Selective Call, "FleetSync" must be configured in **Optional Signaling** used by the channel. (Refer to [Using the Optional Signaling](#), [Using the Optional Signaling \(LTR\)](#).)

Transceiver behavior

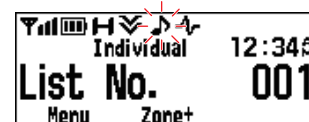
● Receiving an Individual Call

1 The transceiver receives an Individual Call.

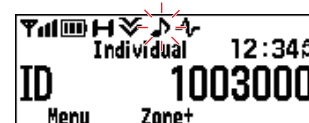
The "🔊" icon starts blinking, and "Individual" as well as the ID Name of the transmitting transceiver are displayed.



If the ID Name is not configured in the ID List, the ID List number appears.



If an ID is not configured in the ID List, the received ID appears.



2 Press the PTT switch.

The transceiver can respond to the received ID. When a button other than the **PTT** switch is pressed, the configured function will be activated.

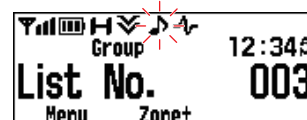
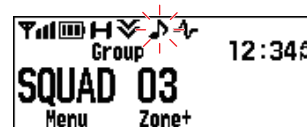
● Receiving Group Call/ Fleet Call/ Supervisor Call/ Broadcast Call

1 Receive the Group Call, Fleet Call, Supervisor Call, or Broadcast Call.

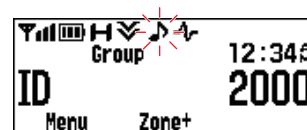
The “” icon starts blinking, and “Group” as well as the ID Name or ID of the received call are displayed.

According to the configuration of **Group Call Display Type**, any of the received Group ID, the Unit ID of the transmitting transceiver, or both appears. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)

If the ID Name is not configured in the ID List, the ID List number appears.



If an ID is not configured in the ID List, the received ID appears.



2 Press the PTT switch.

The transceiver can respond to the received ID. When a button other than the **PTT** switch is pressed, the configured function will be activated.

Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [About the transceiver behavior when receiving a Selective Call](#).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [About the transceiver behavior when receiving a Selective Call](#).)

About the transceiver behavior when receiving a Selective Call

● Alert Tone

If the received ID is configured in the ID List, an Alert Tone sounds from the transceiver according to the configuration of **Alert Tone (Selcall)** or **Alert Tone (Paging)** for the corresponding ID.

However, if “Protocol Common” is configured in **Alert Tone (Selcall)** or **Alert Tone (Paging)** of the ID List, or if the received ID is not configured in the ID List, the Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to FleetSync.

● Selective Call Alert LED

If the received ID is configured in the ID List, the LED flashes according to the configuration of **Alert LED Color (Selcall)** or **Alert LED Color (Paging)** for the corresponding ID.

However, if “Protocol Common” is configured in **Alert LED Color (Selcall)** or **Alert LED Color (Paging)** of the ID List, or if the received ID is not configured in the ID List, the LED flashes according to the configuration in **LED Color** common to FleetSync.

● Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration in **Selective Call Alert LED**.

Also, if the buttons on the transceiver are pressed while the LED flashes according to the configuration of **Selective Call Alert LED**, and if the matching state of the Optional Signaling continues, the LED flashes yellow.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > FleetSync > General > RX Options)
- Configuring **Alert Tone (Selcall)/ Alert Tone (Paging)** (FleetSync ID List) ( [See](#) Radio Configuration > System Properties > ID/Status List > ID/Status List > FleetSync ID > FleetSync ID List)
- Configuring **Alert LED Color (Selcall)/ Alert LED Color (Paging)** (FleetSync ID List) ( [See](#) Radio Configuration > System Properties > ID/Status List > ID/Status List > FleetSync ID > FleetSync ID List)
- Configuring **Tone Number** common to FleetSync ( [See](#) Radio Configuration > Protocol Options > FleetSync > General > RX Options)
- Configuring **LED Color** common to FleetSync ( [See](#) Radio Configuration > Protocol Options > FleetSync > General > RX Options)

ID List

To make Selective Calls, the desired FleetSync IDs need to be preconfigured in the transceiver by using KPG-D3/ D3N prior to use of the transceiver. A maximum of 1,500 FleetSync IDs can be configured for FleetSync ID List.

Table 4-6 ID List

Configuration	Description
Fleet	For configuring the Fleet of the FleetSync ID. Fleet can be set to "ALL" or a value between 100 and 349. "ALL" allows initiation of a call to all Fleets.
ID	For configuring the ID of the FleetSync ID. Fleet can be set to "ALL" or a value between 1000 and 4999. "ALL" allows initiation of a call to all IDs.
ID Name	The caller's ID Name is configured. A maximum of 14 characters can be configured for the ID Name. If the ID Name of the transmitting transceiver is configured in the ID List, the ID Name of the transmitting transceiver appears when the transceiver receives a Selective Call.
Type	The permission or inhibition of transmission of the receiving party can be configured. An ID for which "RX Only" is configured in Type does not appear on the ID selection display in Selcall Mode, and a user cannot select the ID in Selcall Mode. If the transceiver receives a call from an ID for which "RX Only" is configured in Type , the caller's ID Name appears. In this case, a user cannot initiate a call to the party even if the user attempts to respond by pressing the PTT switch.
Alert Tone	Selcall: The tone type sounding from the transceiver can be configured for a Selective Call from the FleetSync IDs registered in the ID List. Paging Call: The tone type sounding from the transceiver can be configured for a Paging Call from the FleetSync IDs registered in the ID List.
Alert LED Color	Selcall: The color of flashing LED can be configured for a Selective Call from the FleetSync IDs configured in the ID List. Paging Call: The color of flashing LED can be configured for a Paging Call from the FleetSync IDs configured in the Individual ID List.  Note To use Alert LED Color, Selective Call Alert LED needs to be enabled.

Configuration using KPG-D3/ D3N

Configuring **ID List** ( **See** Radio Configuration > System Properties > ID/Status List > ID/Status List > FleetSync ID > FleetSync ID List)

Group ID

Group ID is used when making a Group Call using FleetSync.

By assigning the same Group ID as the transceiver for which a group is formed, you can make a Group Call using FleetSync. It is also possible to make calls to smaller units such as a Fleet Call or a Supervisor Call. In general, it is used only within the same Fleet.

Table 4-7 Group ID Response

Call Type	Response	
	ID Configured in ID List	Not an ID Configured in ID List
Group Call	A user can respond with a Group Call.	A user can respond with a Group Call. However, a user may not be able to respond to a call, depending on the Interfleet configuration and the configuration for Encodable Unit ID Range .

You can use KPG-D3/ D3N to select whether to use the Group ID and also to configure the Group ID. A maximum of 10 Group IDs can be configured.

Configuration using KPG-D3/ D3N

- Configuring **Group ID** to be enabled or disabled
- Configuring **Group ID (1 to 10)**
 - ( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > RX Options > FleetSync)
 - ( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > RX Options > FleetSync)
 - ( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > RX Options > FleetSync)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > RX Options > FleetSync)
 - ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > RX Options > FleetSync)

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a call.

A user can notice by the LED that the transceiver is receiving a call.

Configuration using KPG-D3/ D3N

Configuring **Selective Call Alert LED** to be enabled or disabled ( **See** Radio Configuration > Protocol Options > FleetSync > General > RX Options)

Optional Signaling LED

Optional Signaling LED is the function that causes the LED to flash in yellow when the Optional Signaling received matches that of the transceiver.

A user can notice by the LED that the transceiver is receiving a call.

If the matching state of Optional Signaling is disabled when the buttons on the transceiver are pressed, or when the time configured in **Auto Reset Timer** elapses, the LED is turned off.

However, if **Selective Call Alert LED** is enabled even if **Optional Signaling LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

Configuration using KPG-D3/ D3N

Configuring **Optional Signaling LED** to be enabled or disabled ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options > Alert Tone/LED)

Display When the Transceiver Receives a Group Call (Group Call Display Type)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Group Call Display Type is the function to display the received information on the display when the transceiver receives a Group Call.

Table 4-8 Group Call Display Type

Configuration	Description
Group ID	The Group ID of the received Group Call appears.
Calling Transceiver ID	The Unit ID of the transmitting transceiver appears.
Calling Transceiver ID/Group ID	The Group ID of the received Group Call and the Unit ID of the transmitting transceiver appear for 2 sec alternately.

Configuration using KPG-D3/ D3N

Configuring **Group Call Display Type** ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options)

Restricting IDs for Which the Transceiver Can Initiate a Call (Encodable Unit ID Range)

Encodable Unit ID Range is the range of the FleetSync ID used by the transceiver to initiate a call.

A FleetSync ID with which a user is allowed to initiate a call can be restricted using KPG-D3/ D3N. A user can initiate a call to a FleetSync ID configured in the ID List even if it is outside the range of **Encodable Unit ID Range**.

The transceiver for which **Encodable Unit ID Range** is not configured can initiate a call to all transceivers.

FleetSync IDs that can initiate a call by using **Encodable Unit ID Range** are as follows:

Table 4-9 FleetSync IDs That Can Initiate a Call

Encodable Unit ID Range	Interfleet Call Configuration	
	On (Check)	Off (Uncheck)
Enabled	Encodable Unit ID Range in all Fleets	Encodable Unit ID Range in Own Fleet
Disabled	All Fleet IDs	All IDs in Own Fleet

Configuration using KPG-D3/ D3N

Configuring **Encodable Unit ID Range**

( See) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > FleetSync)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > FleetSync)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > FleetSync)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > FleetSync)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > FleetSync)

Interfleet Call

Interfleet Call can be used to initiate a call using a FleetSync ID having a different fleet number.

If **Interfleet Call** is disabled, a call to a FleetSync ID having a different fleet number can be inhibited. This function also prevents a user who does not use Interfleet IDs from initiating a call by selecting an Interfleet ID accidentally.

Note

- When making a call to the FleetSync IDs of different Fleets by using PC command and ID List, the transceiver can make the call regardless of the configuration of **Interfleet Call**.

Configuration using KPG-D3/ D3N

Configuring **Interfleet Call** to be enabled or disabled ( See) Radio Configuration > Protocol Options > FleetSync > General > TX Options)

Auto Reset Timer

Auto Reset Timer is the time interval starting from the point when the received FleetSync ID matches with the own FleetSync ID configured for the transceiver up to the point when the matching status is automatically reset. A matching status means that a user can communicate using only a QT tone or DQT code after the FleetSync ID matches.

By using KPG-D3/ D3N, **Auto Reset Timer** can be configured. Also, how the transceiver behaves after the length of time configured in **Auto Reset Timer** elapses can be configured.

Table 4-10 Auto Reset Timer

Configuration		Description
Auto Reset Timer	Off	Auto Reset Timer does not function.
	0 sec to 300 sec	After the configured time elapses, the matching state of the FleetSync ID is automatically reset.
LCD		While LCD is enabled, the transceiver restores the previous channel display if the amount of time configured for Auto Reset Timer elapses.
LED		If LED is enabled, the flashing LED for the Selective Call Alert LED turns off when the length of time configured in Auto Reset Timer elapses.
Alert Tone		If Alert is enabled, the intermittently emitted Alert tone stops when the length of time configured in Auto Reset Timer elapses.
Monitor		If Monitor is enabled, the matching state of the FleetSync ID is reset when the length of time configured in Auto Reset Timer elapses.

Configuration using KPG-D3/ D3N

Configuring **Auto Reset Timer** ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options > Auto Reset)

4.5 Common Functions for Data Communications

The following functions are used in common for data communications such as Status Call or Short Data Call, Long Data Call data transmission.

- GTC Count
- Number of Retries
- Transmit Busy Wait Time
- Maximum ACK Wait Time
- ACK Delay Time
- Transmit Delay Time (Receive Capture)
- Data Transmit Modulation Delay Time
- Data Preamble Extension Time
- Random Access (Contention)

GTC Count

GTC Count is the number of GTC message transmissions by the transmitting transceiver through a single GTC transmission. GTC (Go to Channel) refers to a message sent through the voice channel for the transmitting transceiver to guide the receiving transceiver to the data channel.

The transmitting transceiver will migrate to the data channel after transmitting the GTC if the Status, Short or Long Message on Data System-personality is configured. When the receiving transceiver receives the GTC, it automatically migrates to the data channel and stands by to receive the data.

Note

- The receiving transceiver waits to receive the Status, Short or Long Message after the receiving transceiver migrates to the data channel. The transceiver restores the voice channel if the transceiver does not receive the acknowledgment within the time configured for **Maximum ACK Wait Time**.
- The transmitting transceiver sends the Status, Short, or Long Message and waits to receive the acknowledgment after the transmitting transceiver migrates to the data channel. The transceiver restores the voice channel if the transceiver does not receive the acknowledgment within the time configured for **Maximum ACK Wait Time**.

Configuration using KPG-D3/ D3N

Configuring **GTC Count**

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Parameters)

Number of Retries

If the transceiver does not receive the acknowledgment after the transceiver sends data and the time configured for **Maximum ACK Wait Time** elapses, the transceiver resends data. **Number of Retries** is the number of times for the transceiver to resend data. A smaller number can be configured if there is good communicating conditions, and a larger number can be configured if there are inferior communicating conditions.

Configuration using KPG-D3/ D3N

Configuring **Number of Retries**

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Parameters)

Transmit Busy Wait Time

The transceiver confirms that the traffic channel is available before sending data and then starts sending data when the channel is available. **Transmit Busy Wait Time** is the duration to wait for the traffic channel to become available.

A transmission is canceled when the channel is busy and the Transmit Busy Wait Time elapses.

Configuration using KPG-D3/ D3N

Configuring **Transmit Busy Wait Time**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Parameters)

Maximum ACK Wait Time

Maximum ACK Wait Time is the length of time that the transceiver stands by to receive the acknowledgment after the transceiver sends data.

If the transceiver does not receive the acknowledgment within the time configured for **Maximum ACK Wait Time**, the transceiver resends data.

Note

- It is also used for the standby time interval in the data channel upon moving to the data channel using GTC.
- A Long Data Message transmits data divided over multiple times. The receiving transceiver stands by to receive the next data for the time configured for **Maximum ACK Wait Time** after receiving the previous data. The transceiver exits Long Data Message Receive Mode if the transceiver does not receive any data during the period.

Configuration using KPG-D3/ D3N

Configuring **Maximum ACK Wait Time**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Parameters)

ACK Delay Time

ACK Delay Time is the length of time from when the transceiver receives data until the transceiver sends the acknowledgment.

ACK Delay Time must be shorter than **Maximum ACK Wait Time** configured for the transmitting transceiver. Also, if the ARQ is used in an LTR Trunking system, **ACK Delay Time** must be configured to be shorter than the Hold Time of the repeater. (Refer to [Terminating Data Communication by a Single Link \(ARQ\)](#).)

Configuration using KPG-D3/ D3N

Configuring **ACK Delay Time**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Parameters)

Transmit Delay Time (Receive Capture)

Transmit Delay Time (Receive Capture) is the time for transmitting the unmodulated signal when the transceiver sends out the first data.

When the transmitting transceiver has sent out the unmodulated signal, the receiving transceiver pauses scanning and shifts to a state to ensure receipt of the data. It is used to ensure that the receiving party receives the data in such cases when Scan or Battery Saver is currently in use by the receiving transceiver.

Configuration using KPG-D3/ D3N

Configuring **Transmit Delay Time (Receive Capture)**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Parameters)

Data Transmit Modulation Delay Time

Data Transmit Modulation Delay Time is the time interval from the point when transmission starts up to the point when modulation of the MSK data starts during data transmission by the transceiver.

Data Transmit Modulation Delay Time is required to start modulation of the MSK Data after the transmitted signal is stabilized. However, it may be difficult to establish data communications when the transmit and receive frequencies are widely separated or the transceiver is always used in extremely cold areas. In such cases, **Data Transmit Modulation Delay Time** must be extended in order to improve the reliability of data communications.

Configuration using KPG-D3/ D3N

Configuring **Data Transmit Modulation Delay Time**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Parameters)

Data Preamble Extension Time

Refer to “[Data Preamble Extension Time](#)”.

Random Access (Contention)

Random Access (Contention) allows the transceiver to randomize the transmission start time for each transceiver to send data when the channel becomes available.

If a large number of transceivers begin transmitting immediately after the channel becomes available, transmission contention may occur. This function prevents this contention.

Note

- **Random Access (Contention)** time varies according to the configuration value in **Baud Rate**. (Refer to [Baud Rate](#).)

Configuration using KPG-D3/ D3N

Configuring **Random Access (Contention)**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications)

4.6 Sending and Receiving a Status Message (Status Call)

Status Call is a simple messaging system that allows a user to send and receive a Status (Status Message). Since the message is replaced by Status, communications can take place quickly and communication traffic can be reduced.

The following methods are available to send a Status Message.

Table 4-11 Sending Status Messages

Transmission Methods	Description
Status Mode	The transceiver enters Status Mode by a user pressing a PF button or a button on the keypad, and then the transceiver will send a Status Message. (Refer to Sending a Status Message .)
Call button	Pressing one of the “Call 1” to “Call 6” buttons allocated to the PF buttons of the transceiver causes the transceiver to send the preconfigured Status Message. For Mobile, the Status Message preconfigured in the transceiver is sent when any of the “Call 1” to “Call 6” ports allocated to the AUX Input port becomes active. “Call 1” to “Call 6” can be assigned to the PF buttons or AUX Input ports by using KPG-D3/ D3N, and the Status Message corresponding to each button can be selected from the Status List in DMR. In this case, the receiving target transceiver of the Status Message is fixed to the Target Fleet/ ID.
Turning the transceiver ON/ OFF	The transceiver sends the Status Message configured in the transceiver when the transceiver is turned ON or OFF. (Refer to Power-on Status , Power-off Status .) In this case, the receiving target transceiver of the Status Message is fixed to the Target Fleet/ ID.
AUX Input Status Message (Mobile Only)	The specified Status Message is sent when the AUX Input port goes high level to low level or goes low level to high level. (Refer to AUX Input Status Message .)
PC command	The transceiver will send a Status Message when the transceiver receives a PC command from the communication port.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port ( [See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)
- Configuring a Status Message corresponding to **Call 1** to **Call 6** ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call)

Sending a Status Message

This section describes how to send a Status Message in Status Mode.

The transceiver enters Status Mode with one of the following operations, and then the transceiver will send a Status Message.

- **Status, Individual + Status, or Group + Status button**

Pressing the **Status** button places the transceiver in Status Mode. In this case, a Status Message is addressed to a Target Fleet/ ID.

Also, pressing the **Individual + Status** or **Group + Status** button places the transceiver in Selcall Mode. Pressing the **[▶]** button after selecting the Selcall ID of the target transceiver causes Status Mode to be entered.

- **Menu Button**

Pressing the **Menu** button to enter Menu Mode and then selecting “Status” places the transceiver in Status Mode. In this case, a Status Message is addressed to a Target Fleet/ ID.

The transceiver also enters Selcall Mode by selecting “Individual + Status” or “Group + Status” after the transceiver enters Menu Mode by pressing the **Menu** button. Pressing the **[▶]** button after selecting the Selcall ID of the target transceiver causes Status Mode to be entered. (Refer to Common Function Part [Using Menu Mode.](#))

- **Keypad entry**

If “Status” is configured for **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the transceiver keypad places the transceiver in Status Mode. In this case, a Status Message is addressed to a Target Fleet/ ID.

If “Individual + Status” or “Group + Status” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad places the transceiver in Selcall Mode. Pressing the **[▶]** button after selecting the Selcall ID of the target transceiver causes Status Mode to be entered. (Refer to Common Function Part [Keypad Operation.](#))

Operating the transceiver

- **Sending a Status Message by list selection**

1 Select one of the following operations to place the transceiver in Status Mode.

- **Press the Status button.**

The transceiver enters Status Mode. In this case, a Status Message is addressed to a Target Fleet/ ID.

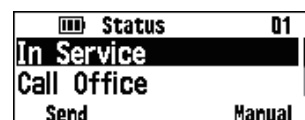
- **Press the Individual + Status button.**

Enters Selcall Mode. Pressing the **[▶]** button after selecting the Selcall ID of the target transceiver causes Status Mode to be entered.

- **Press the Group + Status button.**

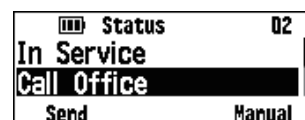
Enters Selcall Mode. Pressing the **[▶]** button after selecting the Selcall ID of the target transceiver causes Status Mode to be entered.

Or, the transceiver enters Status Mode by pressing the **Menu** button or using a keypad. In this case, the following operations are identical.



2 Press the **[▲]** or **[▼]** button and then select the target data from the Status List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **PTT** switch or the **Menu** ([]) button.

The transceiver sends the Status Message.

If the Status Message is properly sent to the target transceiver, “Complete” appears.

Note

- The selection screen for the Status List closes at the same time as pressing the **PTT** switch or the **Menu** ([]) button. If selecting an ID and sending a Status Call again, reexecute the operations from step 1.

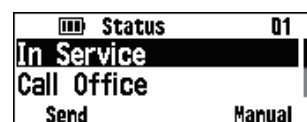


● Sending a Status Message by using Manual Dialing

To send a Status Message by using **Manual Dialing**, **Manual Dialing** must be enabled using KPG-D3/ D3N.

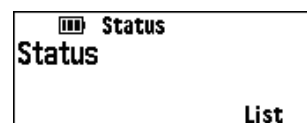
1 Select one of the following operations to place the transceiver in Status Mode.

- Press the **Status** button.
The transceiver enters Status Mode. In this case, a Status Message is addressed to a Target Fleet/ ID.
 - Press the **Individual + Status** button.
Enters Selcall Mode. Pressing the [] button after selecting the Selcall ID of the target transceiver causes Status Mode to be entered.
 - Press the **Group + Status** button.
Enters Selcall Mode. Pressing the [] button after selecting the Selcall ID of the target transceiver causes Status Mode to be entered.
- Or, the transceiver enters Status Mode by pressing the **Menu** button or using a keypad. In this case, the following operations are identical.



2 Press the **Back** ([]) button.

The status entry display appears.



3 Enter a status.

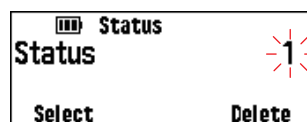
Refer to Common Function Part “[Entering or Deleting a Code](#)” for the entry method.

● Using the keypad

A status can be entered by pressing the [0] to [9] buttons.

● Using the PF buttons

Press the [] or [] button to select the number and press the **Menu** ([]) or [] button to confirm the selected number.



4 Press the **PTT** switch or the **Menu** ([]) button.

The transceiver sends the Status Message.



If the Status Message is properly sent to the target transceiver, “Complete” appears.



Note

- The entry screen for status closes at the same time as pressing the **PTT** switch or the **Menu** ([]) button. If entering status and sending a Status Call again, reexecute the operations from step 1.
- Transmission can be canceled by pressing the **Clear** button while a Status Message is being transmitted.
- “No Reply” appears on the display and transmission of a Status Message is terminated if no response is received from the target transceiver. If transmission fails because of busy status, “Busy” appears on the display and transmission of a Status Message is terminated.
- In an LTR Trunking system, “Out of Range” appears on the display and the transmission of a Status Message is terminated if the transceiver cannot connect to the repeater.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to **Keypad Operation** on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring **Manual Dialing** to be enabled or disabled
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > FleetSync)
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > FleetSync)
 - ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > FleetSync)
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > FleetSync)
 - ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > FleetSync)
- Configuring **Target Fleet** and **Target ID**
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Target)
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Target)
 - ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Target)
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Target)
 - ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Target)

Receiving a Status Message

Upon receiving a Status Message, the received Status Message appears on the display, and the transceiver can send the Status Message to an external device from the communication ports.

Note

- To use serial communications, a user needs to prepare FleetSync compatible software or external devices.
- A received Status Message can be left as a record. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Transceiver behavior

1 The transceiver starts receiving a Status Message.

“Receive Data” appears.

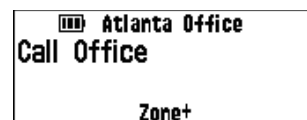


2 Receives the Status Message.

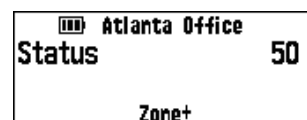
The “☑” icon blinks and “Complete” appears.



The Status Message appears.



If the status is not configured for Status List or the Status Name is not configured, a status No. appears.



If any Emergency status or Horn Alert status (Mobile only) is configured by using KPG-D3/ D3N, the display appears as below when each status is received:

Table 4-12 Status reception

Status	Display
Reception of Emergency Call Status	Emergency
Reception of Man-down Status	Man Down
Reception of Lone Worker Status	Emg Lone-Work
Reception of Stationary Status	Emg Stationary
Reception of Motion Status	Emg Motion
Reception of Horn Alert Status (Mobile only)	Horn Alert
Reception of Remote Stun Status	Stun
Reception of Remote Kill Status	Error

Note

- If the received status number is configured in the Status List, an Alert Tone sounds from the transceiver according to the configuration of the corresponding Status List. However, if “Protocol Common” is configured in **Alert Tone** of the Status List, or if the received status number is not configured in the Status List, an Alert Tone sounds according to the configuration in **Tone Number** common to FleetSync.

Configuration using KPG-D3/ D3N

- Configuring **Alert Tone** (Status List) ( See Radio Configuration > System Properties > ID/Status List > ID/Status List > FleetSync Status > FleetSync Status List)
- Configuring **Tone Number** common to FleetSync ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options)

Reserved Statuses of Status Messages

Each of the Status Messages has a pre-assigned status. Below is a list of the reserved statuses.

Table 4-13 Pre-assigned Statuses

Status	Function	Operation on a Receiving transceiver	Availability of Status Entry based on the Entry Method	
			Manual Dialing	PC Control
10 to 79	User-defined statuses	Receives statuses as usual.	Yes	Yes
80	Default status			
81 to 86	Undefined			
87	Remote Kill command	Sends out receipt confirmation. Switches the receiving transceiver to the Kill state.	Yes/ No*1	
88	Cancel Emergency command	Cancels the Emergency mode.		
89	Enable Horn Alert command	Activates Horn Alert. *2		
90	Prohibit Remote Stun transmission command	Sends out receipt confirmation. Transmission is restricted. Sets Current Status to “93”. *3		
91	Prohibit Remote Stun transmission/reception command	Sends out receipt confirmation. Transmission and reception are restricted. Sets Current Status to “94”. *3		
92	Cancel Remote Stun command	Sends out receipt confirmation. Disables the Stun. Sets Current Status to “80”.		
93	Response to Remote Stun transmission prohibition	-		
94	Response to Remote Stun transmission/reception prohibition	-		
95 to 99	Pre-assigned Emergency Statuses	Sends out receipt confirmation. Alert/ Horn/ None*4		
	95: Lone Worker Status			
	96: Motion Detection Status			
	97: Stationary Detection Status			
	98: Man-down Status			
	99: Other Emergency Status			

*1 Whether status numbers 80 to 99 can be entered for use with Manual Dialing can be enabled or disabled using KPG-D3/ D3N. (Refer to [Special Status Encode](#).)

*2 Horn Alert cannot be used for Portable.

*3 Stun Status will not be changed even if Status of the Stun status is changed in Status Mode.

*4 How the transceiver receives reserved statuses for Emergency (Status 95 to 99) can be configured using KPG-D3/ D3N. (Refer to [Emergency Status Response](#).)

Emergency

If the transceiver receives a reserved status message, an Alert Tone sounds from the transceiver based on the **Emergency Status Response** configuration.

Remote Stun

The use of the transceiver is restricted as follows when a Remote Stun status (Status 90 or 91) is received. However, the Stun state will be reset upon receipt of the Remote Revive status (Status 92) and the DTMF Stun release command.

Table 4-14 Remote Stun

Item	Transmission prohibited (Status 90)	Transmission/reception prohibited (Status 91)
Normal behavior	Transmission prohibited	Transmission/reception prohibited
PC control	Does not accept transmission request.	Does not accept transmission request.

Whether to accept the received Remote Stun status can also be configured using KPG-D3/ D3N.

Remote Kill

Upon receiving the Remote Kill status (Status 87), use of the transceiver is prohibited and all operations will be disabled. However, the configuration data can be written using KPG-D3/ D3N.

Whether to accept the received Remote Kill status can also be configured using KPG-D3/ D3N.

Status 90 - 92

These statuses are used to command or reset the Stun.

Sends out or cancels a Stun command regardless of the current Stun status of the receiving transceiver.

Status 93 - 94

This is a status number for responding the Stun status of the transceiver when an RSTM (Request Status) is received.

Configuration using KPG-D3/ D3N

Configuring **Stun/Kill Status Validation** to be enabled or disabled

( See) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > RX Options > FleetSync)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > RX Options > FleetSync)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > RX Options > FleetSync)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > RX Options > FleetSync)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > RX Options > FleetSync)

Status Message Stack

Status Message Stack is the function to store a Status Message in the stack memory. A maximum of 250 Status Messages and Caller IDs can be stored in the stack memory.

If a message is stored in the transceiver, the “✉” icon blinks as notification. In this case, a user can read the stored Status Message if the transceiver enters Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Status Message Stack** ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options > Message)

Status Message on Data System-personality

Status Message on Data System-personality is the function that allows the transceiver to automatically change the channel to the Data System-personality to send a Status Message.

The channel is automatically changed to the channel configured for **Data System-personality** to send a Status Message. When the transmission ends, the transceiver restores the Zone-channel which was used before sending the Status Message.

Status Message on Data System-personality can be used to send data using a specific dedicated channel.

Configuration using KPG-D3/ D3N

- Configuring **Status Message on Data System-personality**

( See Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Data System-personality)

( See Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Data System-personality)

( See Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Data System-personality)

( See Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Data System-personality)

( See Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Data System-personality)

- Configuring **Data System-personality**

( See Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Data System-personality)

( See Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Data System-personality)

( See Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Data System-personality)

( See Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Data System-personality)

( See Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Data System-personality)

Sending the Received Status Message from the Communication Port (Status Message (Serial Output))

Status Message (Serial Output) allows the transceiver to send the Status and the Fleet/ ID of the transmitting transceiver from its communication port when the transceiver receives a Status Message.

Using **Status Message (Serial Output)**, the administrator can monitor the received Status Message in real time.

Note

- To use **Status Message (Serial Output)**, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Status Message (Serial Output)** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > FleetSync > General > RX Options > Serial Output)
- Assigning functions to **COM port** ( [See](#) Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1, Bluetooth)

Power-on Status

Power-on Status allows the transceiver to send the selected Status Message when the transceiver is turned ON.

Using the **Power-on Status**, the base station can recognize that the transceiver has been turned ON.

The transceiver sends the message to the Target Fleet/ ID of the system to which the channel selected when the transceiver is turned ON belongs.

Note

- If **Transceiver Password** is used at the same time, a Status Message is sent when the transceiver is turned ON and the transceiver migrates from Transceiver Password Mode to user mode.

Configuration using KPG-D3/ D3N

Configuring **Power-on Status** ( [See](#) Radio Configuration > Protocol Options > FleetSync > Status)

Power-off Status

Power-off Status allows the transceiver to send the selected Status Message when the transceiver is turned OFF.

Using the **Power-off Status**, the base station can recognize that the transceiver has been turned OFF.

The transceiver sends the message to the Target Fleet/ ID of the system to which the channel selected when the transceiver is turned OFF belongs.

Configuration using KPG-D3/ D3N

Configuring **Power-off Status** ( [See](#) Radio Configuration > Protocol Options > FleetSync > Status)

Status List

Status Message must be preconfigured in the transceiver using KPG-D3/ D3N prior to the transmission. A maximum of 90 statuses can be configured in the Status List.

Table 4-15 Status List

Configuration	Description
Status	The status number can be configured. A status number can be configured in the range between 10 and 99.
Status Name	The status name can be configured. It is not easy to recognize the meaning of a status only by viewing a status number. In this case, a user can link the status number to a short message; hence, it can be easily understood. A maximum of 16 characters can be configured. If the status number is configured in the Status List, the Status Name appears when the transceiver receives a Status Message. If the transceiver receives a status that is not configured in the Status List, the status number appears on the transceiver display.
Transmit Inhibit	The permission or inhibition of transmission of status can be configured. The status for which Transmit Inhibit is enabled does not appear on the status selection display in Status Mode. In this case, a user cannot select a status for which Transmit Inhibit is enabled in Status Mode.
Alert Tone	The type of tone sounding from the transceiver can be configured for a received status number from the status numbers registered in the Status List.
Voice Announcement	Voice guidance of when the transceiver receives a status can be configured for each status. If the transceiver receives a status for which voice guidance is configured, the voice guidance is executed. If Alert Tone is enabled, voice guidance is executed after an Alert Tone is emitted. To configure voice guidance for Voice Announcement, "User Programmable" needs to be configured in Voice Announcement Type .

Configuration using KPG-D3/ D3N

- Configuring **Status List** ( See Radio Configuration > System Properties > ID/Status List > ID/Status List > FleetSync Status > FleetSync Status List)
- Configuring **Voice Announcement Type** ( See Radio Configuration > Special Settings > Customization > Voice Announcement)

Fleet (Target)/ ID (Target)

Fleet (Target) and **ID (Target)** are the target transceiver's FleetSync IDs used to send the following Status Messages and Short Messages.

- AUX Input Status Message (Mobile Only)
- Power-on Status
- Power-off Status
- A Status Message that is sent by selecting a status number or directly entering a status number after the transceiver enters Status Mode by pressing the **Status** button or the **[0]** to **[9]** buttons on the keypad
- A Status Message that is sent by selecting a status number or directly entering a status number after the transceiver enters Status Mode by a user selecting "Status" from Menu Mode
- A Status Message that is sent by pressing any of the **PF** buttons having "Call 1" to "Call 6" allocated
- A Status Message that is sent when any of the AUX Input ports having "Call 1" to "Call 6" allocated becomes active (Mobile only)
- A Short Message that is sent by entering a text string after the transceiver enters Short Message Mode by pressing the **Short Message** button or the **[0]** to **[9]** buttons on the keypad
- A Short Message that is sent by entering a text string after the transceiver enters Short Message Mode by a user selecting "Short Message" from Menu Mode

Fleet (Target) and **ID (Target)** can be configured using KPG-D3/ D3N. The FleetSync ID of the base station that manages operations is normally configured.

Configuration using KPG-D3/ D3N

Configuring **Fleet (Target)** and **ID (Target)**

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Target)

( **See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Target)

( **See**) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Target)

( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Target)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Target)

Special Status Encode

Special Status Encode is the function used to prevent a user from sending the reserved status numbers 80 to 99 erroneously.

Configuration using KPG-D3/ D3N

Configuring **Special Status Encode**

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > FleetSync)

Emergency Status Response

Emergency Status Response is the function to emit an Alert Tone when the transceiver receives an Emergency Status (Status 95, Status 96, Status 97, Status 98, or Status 99).

The transceiver behaves as follows according to the configuration using KPG-D3/ D3N.

Table 4-16 Emergency Status Response

Configuration	Description
Alert Tone	The Alert Tone configured for Tone Number sounds from the transceiver when receiving an Emergency Status.
Horn (Mobile Only)	If receiving an Emergency Status, the Alert Tone configured for Tone Number sounds from the transceiver and the Horn Alert port is activated.
Voice Announcement	If the transceiver receives an Emergency Status for which voice guidance is configured, the voice guidance is executed. If Alert Tone is enabled, voice guidance is executed after an Alert Tone is emitted. To configure voice guidance for Voice Announcement, "User Programmable" needs to be configured in Voice Announcement Type .

Configuration using KPG-D3/ D3N

- Configuring **Emergency Status Response (Alert Tone/ Horn Alert/ Voice Announcement)** ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options > Emergency Status Response)
- Configuring **Tone Number** ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options)

AUX Input Status Message

Supported Models: Mobile

AUX Input Status Message is the function that sends out a specified Status Message when the AUX Input port goes high level to low level or goes low level to high level.

A Status Message can be sent out when there is a change in the AUX Input port status by attaching a sensor to the port. The transceiver sends the message to the FleetSync ID configured for Target Fleet/ ID. (Refer to [Fleet \(Target\)/ ID \(Target\)](#).)

To use this function, **AUX Input Status Message** must be assigned to one of AUX Input ports.

Configuration using KPG-D3/ D3N

- Configuring **AUX Input Status Message** ( See Radio Configuration > Protocol Options > FleetSync > Status > AUX Port Status Function)
- Assigning functions to the AUX Input port ( See Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)

AUX Output Status Message

Supported Models: Mobile

AUX Output Status Message is the function to switch the status of the AUX Output port from high to low or from low to high when the transceiver receives the specified Status Message. This function can be used to remotely turn the external device on or off.

To use this function, **AUX Output Status Message** must be assigned to one of AUX Output ports.

Configuration using KPG-D3/ D3N

- Configuring **AUX Output Status Message** ( [See](#) Radio Configuration > Protocol Options > FleetSync > Status > AUX Port Status Function)
- Assigning functions to the AUX Output port ( [See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)

Storing the Selected or Sent Status (Status Hold)

Status Hold is the function to store in the transceiver the status selected from the Status List in Status Mode and the transmitted status.

When the transceiver receives a status request message, the status stored in the transceiver will automatically be transmitted.

Also, the status stored in the transceiver will automatically be stored in GPS data and transmitted.

Table 4-17 Status Hold

Configuration	Description
Selected	The transceiver stores the status selected from the Status List in Status Mode.
Selected + Transmit	The transceiver stores a status selected from the Status List in Status Mode and a status transmitted by one of the following method. • The status transmitted when one of the AUX Input Status Message 1 to AUX Input Status Message 3 ports change (Mobile only) • The status transmitted when the transceiver is turned ON (Power-on Status) • The status transmitted by pressing any of the PF buttons having “Call 1” to “Call 6” allocated • The status transmitted when any of the AUX Input ports having “Call 1” to “Call 6” allocated becomes active (Mobile only) • The status transmitted by using a PC command

Configuration using KPG-D3/ D3N

Configuring **Status Hold** ( [See](#) Radio Configuration > Protocol Options > FleetSync > Status)

4.7 Sending and Receiving a Short Message (Short Data Call)

Short Data Call can be used to send and receive a maximum of 48 characters (Short Message).

By using Short Message, information can reliably be sent to the target transceiver.

Sending a Short Message

The transceiver sends a Short Message by one of the following operations.

● Short Message Mode

The transceiver enters Short Message Mode and sends a Short Message by one of the following operations.

• Short Message, Individual + Short Message, or Group + Short Message button

Pressing the **Short Message** button places the transceiver in Short Message Mode. In this case, a Short Message is addressed to a Target Fleet/ ID.

Pressing the **Individual + Short Message** or **Group + Short Message** button places the transceiver in Selcall Mode.

Pressing the **[▶]** button after selecting the Selcall ID of the target transceiver causes Short Message Mode to be entered.

• Menu Button

Pressing the **Menu** button to enter Menu Mode and then selecting “Short Message” places the transceiver in Short Message Mode. In this case, a Short Message is addressed to a Target Fleet/ ID.

The transceiver enters Selcall Mode by selecting “Individual + Status” or “Group + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** button. Pressing the **[▶]** button after selecting the Selcall ID of the target transceiver causes Short Message Mode to be entered.

Refer to Common Function Part “[Using Menu Mode](#)” for operations in Menu Mode.

• Keypad entry

If “Short Message” is configured for **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the transceiver keypad places the transceiver in Short Message Mode. The transceiver will be on hold as the first digit of the Short Message is entered. In this case, a Short Message is addressed to a Target Fleet/ ID.

If “Individual + Short Message” or “Group + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad places the transceiver in Selcall Mode. Pressing the **[▶]** button after selecting the Selcall ID of the target transceiver causes Short Message Mode to be entered.

● PC command

“Data”, “Data + GPS Data Output”, or “Data + Location Data Output” is assigned to the communication port of the transceiver. The transceiver will send a Short Message when a PC sends a command to the transceiver communication port specifying to send a Short Message. (Refer to Common Function Part [Available Functions for COM Port](#).)

The following describes how to send a Short Message in Short Message Mode.

Operating the transceiver

1 Select one of the following operations to place the transceiver in Short Message Mode.

- **Press the Short Message button.**

The transceiver enters Short Message Mode. In this case, a Short Message is addressed to a Target Fleet/ ID.

- **Press the Individual + Short Message button.**

Enters Selcall Mode. Pressing the **[▶]** button after selecting the Selcall ID of the target transceiver causes Short Message Mode to be entered.

- **Press the Group + Short Message button.**

Enters Selcall Mode. Pressing the **[▶]** button after selecting the Selcall ID of the target transceiver causes Short Message Mode to be entered.

Or, the transceiver enters Short Message Mode by pressing the **Menu** button or using a keypad. In this case, the following operations are identical.



2 Enter a Short Message.

A maximum of 48 characters can be entered. Refer to Common Function Part “[Entering or Deleting Characters](#)” for the entry method.



3 Press the PTT switch or the Menu ([M]) button.

The transceiver sends the Short Message.



“Complete” appears if the Short Message is properly sent to the target transceiver.



Note

- The entry screen for messages closes at the same time as pressing the **PTT** switch or the **Menu** ([M]) button. If entering a message and sending a Short Data Call again, reexecute the operations from step 1.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [Radio Configuration > Global Options > Button Assignment](#))
- Assigning functions to **Keypad Operation** on the transceiver ( [Radio Configuration > Global Options > Button Assignment > General > Keypad](#))
- Configuring **Target Fleet** and **Target ID**
 - ( [Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Target](#))
 - ( [Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Target](#))
 - ( [Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Target](#))
 - ( [Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Target](#))
 - ( [Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Target](#))

Receiving a Short Message

Upon receiving a Short Message, the received Status Message appears on the display, and the transceiver can send the Short Message to an external device from the communication ports.

Note

- To use serial communications, a user needs to prepare FleetSync compatible software or external devices.
- A received Short Message can be left as a record. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Transceiver behavior

1 The transceiver starts receiving a Short Message.

“Receive Data” appears.



2 Receives the Short Message.

The “” icon blinks and “Complete” appears.



The initial portion (three lines) of the ID Name and Short Message of the transmitting transceiver appears for three seconds. Then, the display is scrolled line by line every two seconds until the last line is shown. After the last line is shown, the display scroll is repeated from the first line.



Note

- If **Alert Tone (Tone Number)** is configured to sound when receiving, an Alert Tone will sound.

Configuration using KPG-D3/ D3N

Configuring **Alert Tone (Tone Number)** ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options)

Short Message Stack

Short Message Stack is used to store a Short Message in the stack memory. A maximum of 128 Short Messages can be stored in the stack memory.

If a message is stored in the transceiver, the “” icon blinks as notification. In this case, a user can read the stored Short Message if the transceiver enters Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Note

- The maximum number of Short Message data that can be stored in the transceiver stack memory varies as follows depending on the configuration of **Short Message Stack** in each communication protocol.

Table 4-18 The Maximum Number of Short Messages That Can Be Stored (NXDN/ FleetSync)

Configuration of Short Message Stack		The maximum number of data that can be stored
NXDN	FleetSync	
Disabled	Disabled	0
Disabled	Enabled	128
Enabled	Disabled	128/ 48 ^{*1}
Enabled	Enabled	128/ 48 ^{*1}

^{*1} Up to 128 if **Extended Short Message** is disabled.

Up to 48 if **Extended Short Message** is enabled.

Table 4-19 The Maximum Number of Short Messages That Can Be Stored (DMR/ FleetSync)

Configuration of Short Message Stack		The maximum number of data that can be stored
DMR	FleetSync	
Disabled	Disabled	0
Disabled	Enabled	128
Enabled	Disabled	32
Enabled	Enabled	32

Configuration using KPG-D3/ D3N

Configuring **Short Message Stack** ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options > Message)

Short Message on Data System-personality

Short Message on Data System-personality is the function that allows the transceiver to automatically change the channel to the Data System-personality to send a Short Message.

The channel is automatically changed to the channel configured for **Data System-personality** to send a Short Message. When the transmission ends, the transceiver restores the Zone-channel which was used before sending the Short Message.

Short Message on Data System-personality can be used to send data using a specific dedicated channel.

Configuration using KPG-D3/ D3N

- Configuring **Short Message on Data System-personality** to be enabled or disabled
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Data System-personality)
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Data System-personality)
 - ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Data System-personality)
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Data System-personality)
 - ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Data System-personality)
- Configuring **Data System-personality**
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Data System-personality)
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Data System-personality)
 - ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Data System-personality)
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Data System-personality)
 - ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Data System-personality)

Sending the Received Short Message from the Communication Port (Short Message (Serial Output))

Short Message (Serial Output) allows the transceiver to send the Status and the Fleet/ ID of the transmitting transceiver from its communication port when the transceiver receives a Short Message.

Using **Short Message (Serial Output)**, the administrator can monitor the received Short Message in real time.

Note

- To use **Short Message (Serial Output)**, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D3/ D3N

- Configuring **Short Message (Serial Output)** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > FleetSync > General > RX Options > Serial Output)
- Assigning functions to **COM port** ( [See](#) Radio Configuration > Global Options > External Device > General > Serial Interface > COM port 0~1, Bluetooth)

4.8 Sending and Receiving a Long Message (Long Data Call)

Long Data Call can be used to send and receive a maximum of 4,096 characters (Long Message).

By using Long Message, information can reliably be sent to the target transceiver.

Note

- To send a Long Message, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common Function Part [Available Functions for COM Port.](#))

Sending a Long Message

A Long Message is sent via a PC. A Long Message cannot be sent from the transceiver.

Transceiver behavior

A PC sends the PC command to the transceiver to request transmission of a Long Message.

The transceiver starts sending the Long Message.



If the Long Message is properly sent to the receiving transceiver, “Complete” appears.



Receiving a Long Message

The received Long Message data can be transferred via a PC or external device.

Note

- To use serial communications, a user needs to prepare FleetSync compatible software or external devices.

Transceiver behavior

1 The transceiver starts receiving a Long Message.

“Receive Data” appears.



2 Receives the Long Message.

“Complete” appears for 1 sec, and the reception completes.

The received Long Message is transferred to an external device such as a PC with the serial output.



Long Message on Data System-personality

Long Message on Data System-personality is the function that allows the transceiver to automatically change the channel to the Data System-personality to send a Long Message.

The channel is automatically changed to the channel configured for **Data System-personality** to send a Long Message. When the transmission ends, the transceiver restores the Zone-channel which was used before sending the Long Message.

Long Message on Data System-personality can be used to send data using a specific dedicated channel.

Configuration using KPG-D3/ D3N

- Configuring **Long Message on Data System-personality** to be enabled or disabled
 - ( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Data System-personality)
- Configuring **Data System-personality**
 - ( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Data System-personality)

4.9 Sending GPS Data

Global Positioning System (GPS) is the system to acquire the current location information of the own transceiver by receiving signals from the Global Positioning System satellites orbiting the earth.

The transceiver of the mobile station can send the acquired own location information (GPS data) to the base station. The base station can send received GPS data to the PC as serial commands.

A GPS receiver unit compatible with the NMEA-0183 standard is required for the communication port of the mobile station transceiver to send GPS data. The transceiver has a built-in GPS receiver unit. The optional GPS receiver unit also can be connected with the transceiver.

Note

- To use the built-in GPS receiver unit, **Built-in Device Activation** must be enabled when configuring data by using KPG-D3/ D3N. In this case, the configuration for the communication port is not required.
- To use the optional GPS receiver unit, "GPS" must be assigned to the communication port to which the GPS receiver unit is connected. For Mobile, an optional third-party GPS receiver unit is usable.

Transmission Method of GPS Data

The following are the methods to send GPS data:

● Automatic GPS data transmission

- [Sending GPS Data Automatically at Certain Intervals \(GPS Report Mode\)](#)
- [Sending GPS Data According to the Request from the Base Station \(GPS Report Mode\)](#)

● Manual GPS data transmission

- [Sending GPS Data Manually by Using a Button \(Send the GPS Data\)](#)

● GPS data transmission together with operation of the PTT switch

- [Sending GPS Data Together With Operation of the PTT Switch \(GPS Combination\)](#)

● GPS data transmission together with Status Message

- [Sending GPS Data Together With Status Call \(GPS Combination\)](#)

● GPS data transmission linked with an Emergency Call

- [Sending GPS Data Together With Emergency Call \(GPS Combination\)](#)

● GPS data transmission linked with travel distance

- [Sending GPS Data Based On Travel Distance \(GPS Distance Change\)](#)

ID of the Target Transceiver (Fleet/ ID (Base Station))

Fleet (Base Station) and **ID (Base Station)** are the target FleetSync IDs to send GPS data.

The FleetSync ID of the base station which is responsible for operation and administration of system is normally configured for Base ID.

Configuration using KPG-D3/ D3N

Configuring **Fleet (Base Station)** and **ID (Base Station)**

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync > Base Station)

( **See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync > Base Station)

( **See**) Radio Configuration > System Properties > Systems > LTR Trunking > GPS > Base Station)

( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > FleetSync > Base Station)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > FleetSync > Base Station)

Sending GPS Data Automatically at Certain Intervals (GPS Report Mode)

GPS data can be sent automatically at the intervals configured in **GPS Report Interval Time**.

This function is used for controlling or monitoring vehicles on a time basis by periodically sending location information to the base station.

To use this function, "Auto" must be configured for **GPS Report Mode** by using KPG-D3/ D3N.

Note

- The transceiver sends the GPS data upon receipt of the GPS data transmission request from the base station even if "Auto" is configured for **GPS Report Mode**.
- If the transceiver is under the following conditions, the automatic transmission of GPS data at certain intervals will be canceled. The transceiver suspends transmission for the period of time configured for **Transmit Busy Wait Time**, to avoid collisions with GPS data transmissions by other transceivers. The transceiver does not suspend transmission using **Transmit Busy Wait Time**. (Refer to [Transmit Busy Wait Time](#).)
 - While the transceiver is transmitting
 - While the transceiver is in busy state
 - While the transceiver unmutes the speaker
 - While the **Public Address** function is used (Mobile only)
 - When the transmit frequency or Encode ID is not configured
 - While transmission is disabled by the **Time-out Timer**
 - While the transceiver is sending or receiving FleetSync data
 - While Auto Telephone is active
 - While System Search is active
 - While the transceiver is connected to the repeater
 - While the transceiver is waiting to send the Transpond tone
 - Transceiver Password Mode
 - Emergency Mode

Configuration using KPG-D3/ D3N

Configuring **GPS Report Mode**

( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync)

( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync)

( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > GPS)

( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > Common)

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common)

Sending GPS Data According to the Request from the Base Station (GPS Report Mode)

The transceiver can automatically send GPS data when a GPS data transmission request is received from the base station. This function is used when the base station controls the timing to require GPS data. This function is also used to avoid a data collision if there are many transceivers.

To use this function, “Poll” must be configured for **GPS Report Mode** by using KPG-D3/ D3N.

Note

- The transceiver sends the GPS data to the ID configured for **Fleet (Base Station)/ ID (Base Station)**, not to the ID that sent the data transmission request. However, if **Respond to Polling ID** is enabled, GPS data is sent to the ID that sent the data transmission request. (Refer to [Respond to Polling ID](#).)

Configuration using KPG-D3/ D3N

Configuring **GPS Report Mode**

( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync)

( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync)

( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > GPS)

( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > Common)

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common)

Sending GPS Data Manually by Using a Button (Send the GPS Data)

GPS data can be sent manually by a user pressing the **Send the GPS Data** button. Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then the GPS data can be sent manually by selecting the “Send GPS Data”. (Refer to Common Function Part [Using Menu Mode](#).)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

Sending GPS Data Together With Operation of the PTT Switch (GPS Combination)

The transceiver can send GPS data by adding the GPS data to the PTT ID (FleetSync) of the transmitting transceiver.

To use this function, **PTT ID for GPS Combination** must be enabled by using KPG-D3/ D3N.

GPS data is added to the PTT ID as follows according to the configurations for **PTT ID** and **GPS Report Timing**. (Refer to [Timing for Sending a PTT ID](#).)

Table 4-20 Timing for Adding GPS Data

GPS Report Timing	PTT ID (Analog)			
	Off	BOT	EOT	Both
BOT	-	BOT+GPS	EOT	BOT+GPS
				EOT
EOT	-	BOT	EOT+GPS	BOT
				EOT+GPS
Both (BOT)	-	BOT+GPS	EOT+GPS	BOT+GPS
				EOT
Both (EOT)	-	BOT+GPS	EOT+GPS	BOT
				EOT+GPS
Both	-	BOT+GPS	EOT+GPS	BOT+GPS
				EOT+GPS

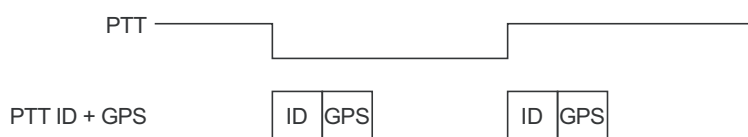


Figure 4-7 Timing for GPS Combination (PTT ID)

Configuration using KPG-D3/ D3N

- Configuring **PTT ID (GPS Combination)** to be enabled or disabled
- Configuring **GPS Report Timing**
 - ([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync > GPS Combination)
 - ([See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync > GPS Combination)
 - ([See](#) Radio Configuration > System Properties > Systems > LTR Trunking > GPS > GPS Combination)
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > FleetSync > GPS Combination)
 - ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > FleetSync > GPS Combination)

Sending GPS Data Together With Status Call (GPS Combination)

The transceiver can send GPS data by adding the GPS data to a Status Message using FleetSync.

To use this function, **Status** for **GPS Combination** must be enabled by using KPG-D3/ D3N. The range of status numbers (Combination Status Range) to which GPS data can be added can be configured.

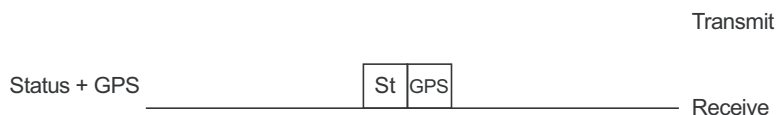


Figure 4-8 Timing to Send GPS Combination (Status)

Configuration using KPG-D3/ D3N

- Configuring **Status (GPS Combination)** to be enabled or disabled
- Configuring **Combination Status Range**
 - ([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync > GPS Combination)
 - ([See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync > GPS Combination)
 - ([See](#) Radio Configuration > System Properties > Systems > LTR Trunking > GPS > GPS Combination)
 - ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > FleetSync > GPS Combination)
 - ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > FleetSync > GPS Combination)

Sending GPS Data Together With Emergency Call (GPS Combination)

The transceiver can send GPS data by adding the GPS data to the Emergency ID (FleetSync).

To use this function, **Emergency** for **GPS Combination** must be enabled by using KPG-D3/ D3N.



Figure 4-9 Timing to Send Combination (Emergency)

Configuration using KPG-D3/ D3N

Configuring **Emergency (GPS Combination)** to be enabled or disabled

- ([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync > GPS Combination)
- ([See](#) Radio Configuration > System Properties > Systems > LTR Trunking > GPS > GPS Combination)
- ([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > FleetSync > GPS Combination)
- ([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > FleetSync > GPS Combination)

Sending GPS Data Based On Travel Distance (GPS Distance Change)

GPS data can be sent when the distance between the location of the previous GPS data transmission and the current location exceeds the value configured in **Distance**.

The transceiver calculates the distance between the position where the GPS data was sent and the current position at regular time intervals (3 sec) after the transceiver sent GPS data using the **GPS Combination** function (Voice Call, Status, or Emergency), **Send the GPS Data**, or **Send the Location Data**. The GPS data is sent if the calculated distance exceeds the value configured for **Distance**. If no GPS data is sent after the transceiver is turned ON, the transceiver regards the location information first received from the GPS unit as the previous transmission position and calculates the distance to the current position. The distance is calculated from the latitudinal and longitudinal values.

Configuration using KPG-D3/ D3N

- Configuring **GPS Distance Change** to be enabled or disabled
- Configuring **Distance**
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync)
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync)
 - ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > GPS)
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > Common)
 - ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common)

Selecting the Transmission Method of GPS Data (GPS Report Channel)

GPS Report Channel is the function to lock analog mode or digital mode (NXDN or DMR) for the transmission method of GPS data regardless of the mode used for voice communications when the transceiver automatically sends GPS data by using the **GPS Report on Data System-personality** function.

GPS Report Channel is enabled when GPS data is automatically sent by receiving a Polling request, when GPS data is automatically and periodically sent at the time configured in FPU, and when GPS data linked with the travel distance of the transceiver is automatically sent (**GPS Distance Change**).

Refer to NXDN Function Part “[Selecting the Transmission Method of GPS Data \(GPS Report Channel\)](#)” and DMR Function Part “[Selecting the Transmission Method of GPS Data \(GPS Report Channel\)](#)” for details of **GPS Report Channel**.

4.10 GPS Functions

The following functions are relevant to GPS data transmission:

- Number of Times
- GPS Report Interval Time
- GPS Time Mark
- GPS Message Type
- GPS Report on Data System-personality
- Respond to Polling ID
- GPS Data Storage
- GPS ACK Request

Number of Times

Number of Times allows the transceiver to automatically send GPS data for the configured number of times if “Poll” is configured for **GPS Report Mode**.

The transceiver sends GPS data for the number of times configured for **Number of Times** at the intervals configured for **GPS Report Interval Time**.

Configuration using KPG-D3/ D3N

Configuring **Number of Times**

( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync > Poll)

( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync > Poll)

( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > GPS > Poll)

( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > Common > Poll)

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common > Poll)

GPS Report Interval Time

GPS Report Interval Time allows the transceiver to send GPS data at the configured intervals if “Auto” is configured for **GPS Report Mode**.

GPS Report Interval Time (Portable)

GPS Report Interval Time is the interval to automatically send GPS data for Portable.

GPS Report Interval Time (Ignition On/ Ignition Off) (Mobile only)

GPS Report Interval Time (Ignition On) is the interval to send the GPS data while the vehicle’s engine is running.

GPS Report Interval Time (Ignition Off) is the interval to send the GPS data while the vehicle’s engine is stopped. Also, if the Ignition Sense function is not used (nothing is entered in the Ignition Sense port), GPS data is sent according to the configuration in **GPS Report Interval Time (Ignition Off)**. (Refer to Common Function Part [Turning the Transceiver ON or OFF According to the State of the Ignition Sense Port \(Ignition Sense\)](#).)

Note

- **GPS Report Interval Time** is used to configure the trigger cycle to start sending GPS data. The timing at which the receiving transceiver completes receiving GPS data may vary depending on the transmit conditions at the transmitting transceiver.

Configuration using KPG-D3/ D3N**Configuring GPS Report Interval Time**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync > Auto)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync > Auto)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > GPS > Auto)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > Common > Auto)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common > Auto)

GPS Time Mark

GPS Time Mark is the offset time from UTC (Coordinated Universal Time) to send GPS data.

This function is useful for avoiding a data collision if there are many transceivers that send GPS data.

Configuring a different timing for each transceiver allows each transceiver to send GPS data with different timing. Using this function can avoid a data collision.

Configuration using KPG-D3/ D3N**Configuring GPS Time Mark**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync > Auto)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync > Auto)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > GPS > Auto)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > Common > Auto)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common > Auto)

GPS Message Type

GPS Message Type allows the transceiver to change the length of the message to send GPS data.

Table 4-21 GPS Message Type

Configuration	Behavior
Full	The message to be sent is the GPS data corresponding to \$GPGGA, \$GPRMC and \$GPGLL.
Short	The message to be sent is the GPS data corresponding to \$GPGLL. When the base station receives this GPS data, a part of the data is sent as blank data even if \$GPGGA and \$GPRMC are configured for PC serial output at Base Station Setting .

Configuration using KPG-D3/ D3N

Configuring **GPS Message Type**

( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync)

( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync)

( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > GPS)

( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > Common)

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common)

GPS Report on Data System-personality

GPS Report on Data System-personality allows the transceiver to automatically change the channel to a **Data System-personality** to send GPS data.

The channel is automatically changed to the channel configured for **Data System-personality** to send GPS data. When the transmission ends, the transceiver restores the Zone-channel which was used before sending GPS data. **GPS Report on Data System-personality** can be used to send data by using a specific dedicated channel.

Configuration using KPG-D3/ D3N

• Configuring **GPS Report on Data System-personality**

( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync > Data System-personality)

( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync > Data System-personality)

( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > GPS > Data System-personality)

( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > Common > Data System-personality)

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common > Data System-personality)

• Configuring **Data System-personality**

( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Data System-personality)

( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Data System-personality)

( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Data System-personality)

( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Data System-personality)

( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Data System-personality)

Respond to Polling ID

Respond to Polling ID is the function that enables the receiving transceiver to send the GPS data to the ID of the transceiver, which sends a GPS Polling Request, upon receipt of the following GPS Polling Requests:

- GPS Data Single Polling Request
- GPS Data Multiple Polling Request

When the above-mentioned GPS Polling Request is received, the GPS data is sent to the ID of the transceiver which sends the GPS Polling Request, if this function is enabled.

If this function is disabled, the GPS data is sent to the ID configured in **Fleet (Base Station)/ ID (Base Station)** even when the above-mentioned GPS Polling Request is received.

Configuration using KPG-D3/ D3N

Configuring **Respond to Polling ID** to be enabled or disabled

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync > Poll)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync > Poll)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > GPS > Poll)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > Common > Poll)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > Common > Poll)

GPS Data Storage

GPS Data Storage is the function that allows GPS data to be stored in the internal memory.

The transceiver stores the GPS data at the intervals configured for **Interval**. The stored GPS data can be sent from the transceiver or can be read using a PC. (Refer to Common Function Part [Storing the GPS Data \(GPS Data Storage\)](#).)

Acquired GPS data is temporarily saved in the RAM in the transceiver. When the number of stored data items reaches 3, the GPS data is written on the internal memory. If the transceiver is turned OFF when the number of GPS data items temporarily saved in the RAM in the transceiver is 1 or 2, the GPS data is erased without being written on the internal memory.

The internal memory allows a maximum of 7,000 GPS data items to be written.

Configuration using KPG-D3/ D3N

- Configuring **GPS Data Storage** ( **See** Radio Configuration > Global Options > Basics > Stack/Recording > GPS Data)
- Configuring **Interval** ( **See** Radio Configuration > Global Options > Basics > Stack/Recording > GPS Data)

GPS ACK Request

GPS ACK Request is a function to place a request to send the acknowledgment with a mobile station transceiver when GPS data in the FleetSync format is sent from the base station transceiver to the mobile station transceiver.

Table 4-22 GPS ACK Request

Configuration	Description
Enabled	The base station transceiver requests the mobile station transceiver to send the acknowledgment message when a request message to send GPS data in the FleetSync format is sent by the base station transceiver. The mobile station transceiver sends an acknowledgment message and then GPS data upon receipt of a request message to send GPS data in the FleetSync format.
Disabled	The base station transceiver does not request the mobile station transceiver to send an acknowledgment message when a request message to send GPS data in the FleetSync format is placed by the base station transceiver. Upon receipt of a message which requests transmission of GPS data in the FleetSync format, the mobile station transceiver sends GPS data without sending an acknowledgment message. Disable the sending and receiving of receipt an acknowledgment message to shorten transmission times and reduce transmission traffic.

Configuration using KPG-D3/ D3N

Configuring **GPS ACK Request** to be enabled or disabled

( See) Radio Configuration > System Properties > Systems > Analog Conventional > GPS > FleetSync)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > GPS > FleetSync)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > GPS)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > NXDN)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > GPS > FleetSync > FleetSync)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > GPS > FleetSync > FleetSync)

4.11 Receiving GPS Data

The base station receiving GPS data from the mobile station transceiver can send the GPS data to a PC as serial commands. If a PC installed with a mapping application is connected to the communication port of the base station transceiver, the location information of mobile station transceivers appears on a map on the PC display. This function enables a dispatch control or traffic control system.

Also, if a mobile station transceiver connecting to a GPS receiver unit or having a built-in GPS receiver unit receives location information (GPS data) from a GPS satellite, the current location information of the own transceiver can be displayed on the LCD.

Note

- The GPS data acquired from the GPS satellite can be stored at certain intervals in the internal memory of the transceiver. (Refer to Common Function Part [Storing the GPS Data \(GPS Data Storage\)](#).)
- For a transceiver receiving GPS data, “Data + GPS Data Output” or “Data + Location Data Output” needs to be assigned to the communication port to which a PC with the mapping application installed is connected. (Refer to Common Function Part [Available Functions for COM Port](#).)

Map Header

Whether to send data to the mapping application when the base station transceiver receives the GPS data from the mobile station transceiver can be configured.

The following are the type of data that can be sent to the mapping application.

Table 4-23 Map Header

Data	Description
\$GPGGA (NMEA)	Upon receipt of the GPS data, the transceiver at the base station extracts the \$GPGGA data in the NMEA-183 format from the received GPS data and sends the extracted data from the communication port.
\$GPGLL (NMEA)	Upon receipt of the GPS data, the transceiver at the base station extracts the \$GPGLL data in the NMEA-183 format from the received GPS data and sends the extracted data from the communication port.
\$GPRMC (NMEA)	Upon receipt of the GPS data, the transceiver at the base station extracts the \$GPRMC data in the NMEA-183 format from the received GPS data and sends the extracted data from the communication port.
\$PKLDS (KW)	Upon receipt of the GPS data, the transceiver at the base station creates the \$PKLDS data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The \$PKLDS data contains the \$GPRMC data in the NMEA-0183 format, Fleet, ID, and the status information.
\$PKLID (KW)	Upon receipt of the GPS data, the transceiver at the base station creates the \$PKLID data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The transceiver at the base station extracts only Fleet, ID, and the status information from the received GPS data and sends the extracted data from the communication port. This sentence is recommended to be used along with \$GPGGA (NMEA), \$GPGLL (NMEA) or \$GPRMC (NMEA). For example, if \$GPGGA (NMEA) and \$PKLID are used simultaneously, the transceiver at the base station sends from the communication port the \$GPGGA data in addition to the Fleet, ID, and the status information extracted from the GPS data.
\$PKLSH (KW)	Upon receipt of the GPS data, the transceiver at the base station creates the \$PKLSH data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The \$PKLSH data contains the \$GPGLL data in the NMEA-0183 format, Fleet, and ID. In order to send GPS data in Emergency Mode or by pressing the PTT switch, this sentence is used.

Configuration using KPG-D3/ D3N

Configuring **Map Header** ( See Radio Configuration > Global Options > External Device > General > Serial Interface > GPS Base Station Settings)

GPS Position Display

GPS Position Display is the function to display the current location information of the own transceiver on the LCD.

Refer to Common Function Part “[USING THE GPS POSITION DISPLAY FUNCTION](#)” for details about **GPS Position Display**.

4.12 Disabling the Transceiver Capability by Remote Control (Stun/ Kill)

With the Stun/ Kill feature, the administrator can disable the use of a transceiver using the Stun/ Kill status such as when it has been stolen. (Refer to [Reserved Statuses of Status Messages](#).)

The table below shows the transceiver behavior when it receives a Remote Stun/ Kill status.

Table 4-24 Remote Stun/ Kill Statuses

Status	Description
Remote Stun	The transceiver is unable to transmit data upon receiving the Remote Stun status (Status 90). The transceiver is unable to transmit or receive data upon receiving the Remote Stun status (Status 91). The Stun state is reset when the transceiver receives the Remote Revive status (Status 92). You can configure whether to accept a Remote Stun status using KPG-D3/ D3N.
Remote Revive	The Stun state is reset when the transceiver receives the Remote Revive status (Status 92).
Remote Kill	Use of the transceiver is prohibited and all operations will be disabled upon receiving the Remote Kill status (Status 87). All configuration data of the transceiver is cleared, hence Stun state will not be reset even if the transceiver has received the Remote Revive status (Status 92). However, the configuration data can be written to the transceiver by using KPG-D3/ D3N. You can configure whether to accept a Remote Kill status using KPG-D3/ D3N.

Note

- The Stun state is identical to Stun for NXDN, DMR, and DTMF. Also, the Stun state will reset upon receiving an NXDN Remote Revive Message, DMR Remote Revive Message, or DTMF Revive Code (Stun Code + #) even if the transceiver receives the Remote Stun status and enters the Stun state.

Configuration using KPG-D3/ D3N

Configuring **Stun/Kill Status Validation** to be enabled or disabled

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > RX Options > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > RX Options > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > RX Options > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > RX Options > FleetSync)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > RX Options > FleetSync)

DTMF (Dual Tone Multi-frequency) is the signaling type that uses 2 different frequency tones simultaneously. DTMF is used for operations such as making an individual call and placing the transceiver in the Stun state by remote control.

DTMF signaling uses 2 different frequencies combined (one lower and one higher frequency) and consists of the 0 to 9, A to D, * and # tones.

Table 5-1 DTMF Tone Frequency List

DTMF Code	Frequency	
	Low Frequency	High Frequency
0	941 Hz	1336 Hz
1	697 Hz	1209 Hz
2	697 Hz	1336 Hz
3	697 Hz	1477 Hz
4	770 Hz	1209 Hz
5	770 Hz	1336 Hz
6	770 Hz	1477 Hz
7	852 Hz	1209 Hz
8	852 Hz	1336 Hz
9	852 Hz	1477 Hz
A	697 Hz	1633 Hz
B	770 Hz	1633 Hz
C	852 Hz	1633 Hz
D	941 Hz	1633 Hz
*	941 Hz	1209 Hz
#	941 Hz	1477 Hz

5.1 Method of Sending the DTMF Code

The following are the methods for sending a DTMF code:

- Manual Dialing
- Keypad Auto PTT
- Store and Send
- Autodial List selection
- **Call** button
- The Call port (AUX Input)
- Redial
- Beginning of Transmit (BOT)
- End of Transmit (EOT)
- PC command

Sending the DTMF Code While Transmitting (Manual Dialing)

The DTMF code corresponding to a particular button on the keypad can be sent when pressing the button while transmitting by pressing the **PTT** switch.

Note

- To use this function, **Manual Dialing** needs to be enabled.

Operating the transceiver

- 1 Press the **PTT** switch.
- 2 Press the button corresponding to the DTMF code to be sent.
The transceiver sends the DTMF code.
- 3 Repeat Step 2 as necessary.

Configuration using KPG-D3/ D3N

Configuring **Manual Dialing** to be enabled or disabled ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)

Sending the DTMF Code by Pressing a Button on the Keypad without Using the PTT Switch (Keypad Auto PTT)

Pressing a button on the keypad allows the transceiver to start transmitting immediately and can send the DTMF code corresponding to the button. This function can be used to send the DTMF code just by pressing the buttons on the keypad without pressing the **PTT** switch.

Note

- To use this function, **Manual Dialing** needs to be enabled. Also, “Keypad Auto PTT” needs to be assigned in **Keypad Operation**.

Operating the transceiver

- 1 Press the button corresponding to the DTMF code to be sent.
- 2 The transceiver sends the DTMF code.
Repeat Step 1 as necessary.

Configuration using KPG-D3/ D3N

- Assigning functions to the **Keypad Operation** of the transceiver ( See Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring **Manual Dialing** to be enabled or disabled ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)

Sending Entered DTMF Codes All at Once (Store and Send)

In the **Autodial Mode**, the DTMF codes to be sent can be temporarily entered beforehand using the keypad for them to be sent collectively later. A maximum of 34 digits can be transmitted in a single operation.

To use this function, **Store and Send** needs to be enabled using KPG-D3/ D3N.

The transceiver can enter Autodial Mode and the DTMF code can be entered using one of the following operations:

- **Autodial button**

Pressing the **Autodial** button places the transceiver in Autodial Mode.

- **Menu button**

Pressing the **Menu** button to enter Menu Mode and then selecting “Autodial” places the transceiver in Autodial Mode. (Refer to Common Function Part [Using Menu Mode.](#))

- **Keypad entry**

If “Autodial” is configured in **Keypad Operation**, pressing a button on the keypad causes the transceiver to enter Autodial Mode. The transceiver will be on hold as the first digit of the DTMF code is entered. (Refer to Common Function Part [Keypad Operation.](#))

Operating the transceiver

- **Using the keypad**

1 Press the [Autodial](#) button.

The transceiver enters Autodial Mode and the DTMF code entry display appears.

The following operations are identical when the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.

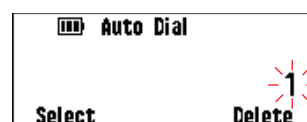


2 Enter using the keypad the DTMF code to be sent.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.



- The following operations are possible when “Function Button” is configured in *** and # Buttons**.
 - To enter the DTMF “A” code, press and hold the [*] button and then press the [2] button.
 - To enter the DTMF “B” code, press and hold the [*] button and then press the [5] button.
 - To enter the DTMF “C” code, press and hold the [*] button and then press the [8] button.
 - To enter the DTMF “D” code, press and hold the [*] button and then press the [0] button.
 - To enter the DTMF “*” code, press the [*] button and then press the [*] button.
 - To enter the DTMF “#” code, press the [*] button and then press the [#] button.
- If “Direct Button” is configured in *** and # Buttons**, pressing the [*] or [#] button directly enters the “*” or “#” tone. In this case, the above operations are unavailable.



3 Enter the DTMF code by repeating step 2.



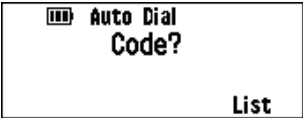
4 Press the **PTT** switch or the **Menu** ([) button.

The transceiver sends the DTMF code.

● Without using the keypad

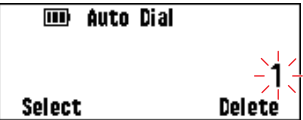
1 Press the **Autodial** button.

The transceiver enters Autodial Mode and the DTMF code entry display appears.
The following operations are identical when the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.



2 Enter the DTMF code to be sent by pressing the [] or [] button.

Characters are entered from the right end, and the character being entered blinks. Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.



3 Confirm the entered DTMF code by pressing the **Menu** ([) button.

An entered digit stops blinking and remains lighted.



4 Enter the DTMF code by repeating step 2 and 3.



5 Press the **PTT** switch or the **Menu** ([) button.

The transceiver sends the DTMF code.

Configuration using KPG-D3/ D3N

- Configuring **Store and Send** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)
- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to **Keypad Operation** of the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring *** and # Buttons** ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

Sending a DTMF Code by Selecting from a List (Autodial List)

The DTMF code configured in Autodial List can be selected and sent.

The transceiver can enter Autodial Mode and the DTMF codes can be selected using one of the following operations:

• Autodial button

Pressing the **Autodial** button places the transceiver in Autodial Mode.

• Menu button

Pressing the **Menu** button to enter Menu Mode and then selecting “Autodial” places the transceiver in Autodial Mode. (Refer to Common Function Part [Using Menu Mode.](#))

• Keypad entry

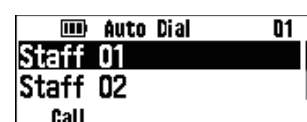
If “Autodial” is configured in **Keypad Operation**, pressing a button on the keypad causes the transceiver to enter Shortcut Entry Mode for Autodial Mode. (Refer to Common Function Part [Keypad Operation.](#))

Operating the transceiver

1 Press the **Autodial** button.

The transceiver enters Autodial Mode and then the Autodial List selection display appears.

The following operations are identical when the transceiver enters Autodial Mode by a user pressing the **Menu** button or using the keypad.

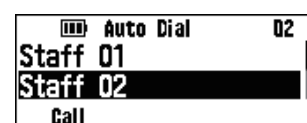


Note

- When **Store and Send** is enabled, pressing the **Back** ([) button places the transceiver in the manual input mode.

2 Press the [] or [] button to select the DTMF code to be sent from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **PTT** switch or the **Menu** ([]) button.

The transceiver sends the DTMF code.

Configuration using KPG-D3/ D3N

- Configuring **Store and Send** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)
- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to **Keypad Operation** of the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

Sending the DTMF Code with a Single Touch (Call 1 to Call 6 Buttons)

Pressing one of the **Call 1** to **Call 6** buttons causes the transceiver to send the preconfigured DTMF code.

“Call 1” to “Call 6” can be assigned to the **PF** buttons using KPG-D3/ D3N and the DTMF code corresponding to each button can be selected from the Autodial List.

Note

- For Mobile, if one of the AUX Input ports to which “Call 1” to “Call 6” are assigned becomes active, the DTMF code preconfigured for the transceiver can be sent. (Refer to Common Function Part [Available Functions for AUX Input Ports.](#))

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring DTMF code corresponding to the **Call 1** to **Call 6** buttons ( [See](#) Radio Configuration > Global Options > Button Assignment > Call/Direct Channel > Call > Call 1~Call 6)

Redialing

A previously sent DTMF code can be sent again.

Operating the transceiver

- 1 Press the **Autodial** button while the transceiver is in standby mode.

The transceiver enters the Autodial List selection screen of the Autodial Mode.

- 2 Press the **[*]** button and then press the **[0]** button.

The DTMF code last sent appears.

- 3 Press the **PTT** switch or the **Menu** (**[□]**) button.

The transceiver sends the DTMF code.

Sending the DTMF Code Configured for BOT

The DTMF code configured for **Beginning of Transmit** can be sent.

Operating the transceiver

- 1 Press the **Autodial** button while the transceiver is in standby mode.

The transceiver enters the Autodial List selection screen of the Autodial Mode.

- 2 Press the **[*]** button and then press the **[*]** button.

The DTMF code configured for **Beginning of Transmit** appears.

- 3 Press the **PTT** switch or the **Menu** (**[□]**) button.

The transceiver sends the DTMF code.

Configuration using KPG-D3/ D3N

Configuring **Beginning of Transmit**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

Sending the DTMF Code Configured for EOT

The DTMF code configured for **End of Transmit** can be sent.

Operating the transceiver

1 Press the **Autodial** button while the transceiver is in standby mode.

The transceiver enters the Autodial List selection screen of the Autodial Mode.

2 Press the **[*]** button and then press the **[#]** button.

The DTMF code configured for **End of Transmit** appears.

3 Press the **PTT** switch or the **Menu** () button.

The transceiver sends the DTMF code.

Configuration using KPG-D3/ D3N

Configuring **End of Transmit**

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( **See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( **See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( **See**) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( **See**) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

5.2 Transmitting/ Receiving a PTT ID

PTT ID is an identification code unique to the transceiver. It is sent out when the **PTT** switch is operated.

The caller's ID can be displayed on the main display using the received PTT ID while communicating with the caller.

The user can confirm the caller not only by voice, but also through the display. Also, the administrator can identify by a PTT ID who is using a channel without asking by voice for the caller's name.

PTT ID Type

PTT ID Type is the type of PTT ID to be sent.

To send a DTMF code as the PTT ID, “DTMF” must be configured for **PTT ID Type** by using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

Configuring PTT ID Type

- ( See Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > PTT ID)
- ( See Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > PTT ID)
- ( See Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > PTT ID)
- ( See Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > PTT ID)
- ( See Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > PTT ID)

Timing for Sending a PTT ID

A PTT ID is sent out at the following timings.

- BOT (Beginning of Transmit)
A PTT ID is added to the signal at the beginning of the transmission.

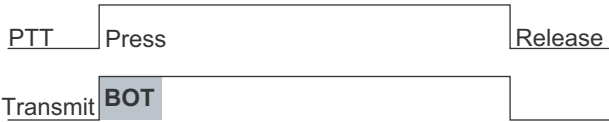


Figure 5-1 BOT

- EOT (End of Transmit)
A PTT ID is added to the signal at the end of the transmission.

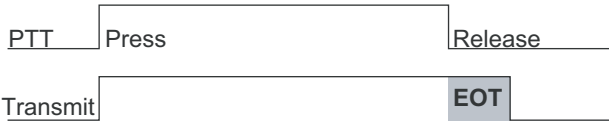


Figure 5-2 EOT

- Both (BOT and EOT)
A PTT ID is added to the signal at both the beginning and the end of the transmission.

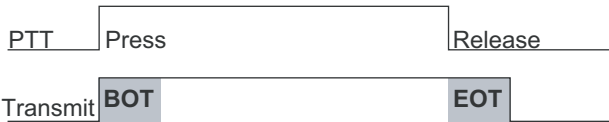


Figure 5-3 Both

The timing for sending a PTT ID can be configured for each channel using KPG-D3/ D3N.

Table 5-2 Timing for Sending a PTT ID

Configuration	Description
Off	Does not send out a PTT ID.
BOT	When the PTT switch on the transmitting transceiver is pressed, the DTMF code configured for Beginning of Transmit will be sent as the PTT ID.
EOT	When the PTT switch on the transmitting transceiver is released, the DTMF code configured for End of Transmit will be sent as the PTT ID.
Both	At both timing of BOT and EOT, the DTMF codes configured for Beginning of Transmit and End of Transmit will be sent as the PTT ID.

Configuration using KPG-D3/ D3N

• Configuring PTT ID

( See) Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Analog > PTT ID)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Analog > PTT ID)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > General > PTT ID)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > Analog > PTT ID)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > Analog > PTT ID)

• Configuring Beginning of Transmit/ End of Transmit

( See) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( See) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > TX Options > PTT ID > DTMF Code)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > PTT ID > DTMF Code)

Muting the PTT ID Tone (PTT ID Mute)

PTT ID Mute can be used to unmute after a certain amount of time elapses when the transceiver receives an analog signal. This function is to mute the data sound of the PTT ID (BOT) sent out by the party at the other end of the call.

Refer to “[Muting the PTT ID Tone \(PTT ID Mute\)](#)” for details.

Preventing the PTT ID from Sending Repeatedly (PTT ID Pause)

PTT ID Pause is the function to keep the PTT ID from being sent when the transceiver alternates between transmit and receive in a certain period of time. This function is to stop sending of the PTT ID repeatedly to the party at the other end of the call.

Refer to “[Preventing the PTT ID from Sending Repeatedly \(PTT ID Pause\)](#)” for details.

Restricting the Transmission of the PTT ID in Talk Around (Restricted ID in Talk Around)

Restricted ID in Talk Around is a function to disable the PTT ID transmission while **Talk Around** is enabled even if the **PTT** switch is pressed or released. (Refer to [Communicating Without Using a Repeater \(Talk Around\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Restricted ID in Talk Around** to be enabled or disabled

( [See](#)) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > TX Options > PTT ID)

( [See](#)) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > TX Options > PTT ID)

( [See](#)) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > TX Options > PTT ID)

( [See](#)) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > TX Options > PTT ID)

( [See](#)) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > TX Options > PTT ID)

( [See](#)) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > TX Options > PTT ID)

( [See](#)) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > TX Options > PTT ID)

( [See](#)) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > TX Options > PTT ID)

( [See](#)) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > TX Options > PTT ID)

5.3 Disabling the Transceiver Capability by Remote Control (Stun)

The transceiver capability can be disabled by wireless remote control. This function allows a system administrator to remotely disable the transceiver, for instance, if the transceiver is lost.

The transceiver which has been disabled by this function can be enabled to be usable again by remote control from an external device using radio communication.

When the transceiver receives a Stun code, the transceiver multiplexes a Stun-on Tone and initiates the Transpond. After that, the transceiver enters the Stun state according to the configuration in **Stun Code Response**.

The Stun state cannot be reset by **Auto Reset Timer** or by the user's operation. The transceiver transmits a Stun-off Tone and then resets the Stun state when the transceiver receives a Revive Code (Stun Code + "#").

Stun Code and **Stun Code Response** can be configured using KPG-D3/ D3N.

Table 5-3 Stun

Configuration	Description
Stun Code	Stun Code is a standby code for Stun.
Stun Code Response	In Stun Code Response, how the transceiver responds when the received DTMF code matches the DTMF code configured in Stun Code can be configured as below: Transmit Inhibit: Transmit capability is disabled. User operations of the transceiver are also inhibited. Automatic transmission, such as Transpond, is still available. Transceiver Inhibit: Transmit and receive capabilities are disabled. User operations of the transceiver are also inhibited.

Note

- The transceiver cannot enter Emergency Mode while the transceiver is in the Stun state.

Configuration using KPG-D3/ D3N

- Configuring **Stun Code** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode > Stun)
- Configuring **Stun Code Response** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode > Stun)

5.4 Functions Related to DTMF Code Encoding

Functions related to DTMF code encoding are shown below.

- DTMF Speed
- First Digit Delay Time
- First Digit Time
- * and # Digit Time
- DTMF Hold Time
- D Code Assignment
- Sidetone
- Auto Telephone

DTMF Speed

DTMF Speed is the speed to send out the DTMF codes. Transmission speed of the DTMF code can be configured by entering the number of digits to be sent per second. The transceiver sends the DTMF code at the configured speed. The number of digits of the DTMF code to be sent per second can be selected from 6, 8, 10, or 15 by using KPG-D3/ D3N. The following are durations for Digit Time (transmission duration) and Gap Time (silent duration) depending on the selected value.

Table 5-4 DTMF Speed

Range	Digit Time (Transmission Duration)	Gap Time (Silent Duration)
6 digits/sec	84 ms	84 ms
8 digits/sec	62 ms	62 ms
10 digits/sec	50 ms	50 ms
15 digits/sec	34 ms	34 ms

Configuration using KPG-D3/ D3N

Configuring **DTMF Speed** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

First Digit Delay Time

First Digit Delay Time is the length of time from when the transceiver starts transmitting until the transceiver starts sending the first digit of the DTMF code.

The transceiver transmits an unmodulated signal until the length of time configured in **First Digit Delay Time** elapses.

Configuration using KPG-D3/ D3N

Configuring **First Digit Delay Time** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

First Digit Time

First Digit Time is the function to extend the length of time to send the first digit of the DTMF code when the transceiver starts sending the DTMF code.

Extending the transmission time of the first digit of the DTMF code helps the receiving transceiver easily recognize the incoming DTMF code in order to avoid failure in receiving the DTMF code while the transceiver is in the battery saver mode or scanning.

The length of time to send the first digit of the DTMF code is the sum of the transmission time configured in **DTMF Speed** and the **First Digit Time**.

Transmission time for the 1st digit of DTMF = value configured in DTMF Speed (Digit Time) + value configured in First Digit Time

Example: First Digit Time: 100 ms, Encode Code: 123

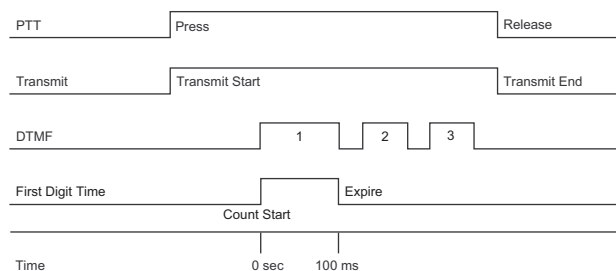


Figure 5-4 First Digit Time

Configuration using KPG-D3/ D3N

Configuring **First Digit Time** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

* and # Digit Time

*** and # Digit Time** is the function to extend the transmission time for the * tone and # tone of when the DTMF code is sent out.

Since * tone and # tone are more frequently used for special tasks than 0 to 9 tones, this function is used for the receiving transceiver to easily recognize the incoming DTMF code.

The length of time to transmit the * tone and # tone is the sum of the transmission time configured in **DTMF Speed** and the *** and # Digit Time**.

Transmission time for the * tone and # tone of DTMF = value configured in DTMF Speed (Digit Time) + value configured in * and # Digit Time

Example: * and # Digit Time: 100 ms, Encode Code: *01

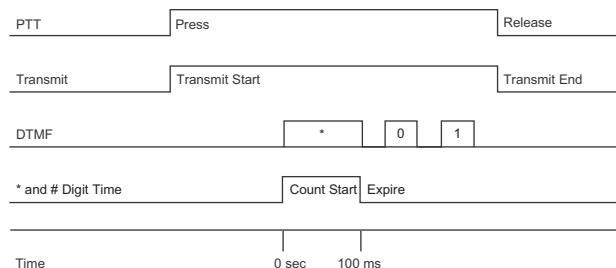


Figure 5-5 * and # Digit Time

Note

- If the first digit of the DTMF code is the * tone or # tone, the transceiver compares the extension time configured in **First Digit Time** with the extension time configured in *** and # Digit Time**, and uses the longer extension time to send the first digit.

Configuration using KPG-D3/ D3N

Configuring * and # Digit Time ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

DTMF Hold Time

DTMF Hold Time is the length of time from when the keypad is disabled until the transceiver restores the receive mode while sending the DTMF code by using **Keypad Auto PTT** or **Manual Dialing**.

The DTMF signal received until its transmission is interrupted may be treated as one string of code depending on the devices on the receiving side. Therefore, the transceiver holds the transmission not to interrupt the digit sequence when transmitting a continuous DTMF signal.

Configuration using KPG-D3/ D3N

Configuring **DTMF Hold Time** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

D Code Assignment

D Code Assignment is the function to select whether the D Code is used for the D tone of DTMF or a dialing pause (unmodulated transmission).

Configuration using KPG-D3/ D3N

Configuring **D Code Assignment** ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > Parameters)

Emitting the DTMF code tone (Sidetone)

Sidetone is the function to emit a DTMF code tone from the speaker while the transceiver transmits the DTMF code.

Note

- If “Silent” is configured in **Emergency Mode Type**, the transceiver does not emit a **DTMF Sidetone**. (Refer to [Emergency Mode Type](#).)
- If the transceiver sends the DTMF code while **PTT Proceed Tone** is enabled, the transceiver does not emit a **Proceed Tone**. (Refer to Common Function Part [Using Sound to Notify the Timing to Start Communications \(PTT Proceed Tone\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Sidetone** to be enabled or disabled ( See Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode)

Connecting to a Telephone Line (Auto Telephone)

Auto Telephone is a function allowing the transceiver to connect to a telephone line in an LTR Trunking system.

When the **Auto Telephone** button in the LTR Trunking system is pressed, the transceiver starts to search for a system that can connect to a telephone line. If the transceiver succeeds in connecting to a system that can connect to a telephone line, the transceiver sends the DTMF code. (Refer to [Automatically Connecting to a Telephone Line \(Auto Telephone Search\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Auto Telephone** to be enabled or disabled ( **See** Radio Configuration > Protocol Options > DTMF > Encode/Decode > Encode > LTR Trunking)

5.5

Functions Related to DTMF Code Decoding

Functions related to DTMF code decoding are shown below.

- Code
- Transpond
- Alert Tone
- Alert LED
- Selective Call Alert LED
- Optional Signaling LED
- Auto Reset Timer
- Clear to Transpond

Standby code

Two DTMF codes for standby can be configured for the transceiver. The transceiver can wait to receive the DTMF codes configured in **No.1** and **No.2** at the same time.

The following items can be configured in each of **No.1** and **No.2**:

Transpond/ Alert Tone

Transpond and **Alert Tone** are functions that allow the transceiver to transmit a multiplexed Transpond tone, or that allow an Alert Tone to sound from the transceiver when the transceiver is called with DTMF.

Table 5-5 Transpond/ Alert

Transpond	Alert	Description
No	Off	The transceiver does not respond at all.
Yes	Off	The transceiver transmits a Transpond tone.
No	Anything other than Off	An Alert Tone sounds from the transceiver.
Yes	Anything other than Off	An Alert Tone sounds from the transceiver after transmitting a Transpond tone.

The Alert Tone to be emitted when the transceiver is called with DTMF is selected from 8 types of tones configured in **Special Alert Tone**. (Refer to Common Function Part [Configuring the Alert Tone \(Special Alert Tone\)](#).)

Alert LED

When the DTMF code matches, the LED flashes according to the configuration in **Alert LED**.

Table 5-6 Alert LED

Configuration	Description
Off	The LED does not flash.
Red	The LED flashes red.
Blue	The LED flashes blue.
Green	The LED flashes green.
Yellow	The LED flashes yellow.
Light Blue	The LED flashes light blue.
Purple	The LED flashes purple.
White	The LED flashes white.

Configuration using KPG-D3/ D3N

- Configuring **Transpond** ( **See** Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode > No. 1~2)
- Configuring **Alert Tone** ( **See** Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode > No. 1~2)
- Configuring **Alert LED Color** ( **See** Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode > No. 1~2)

Auto Reset Timer

Auto Reset Timer is the length of time from when the received DTMF code matches the DTMF code preconfigured for the transceiver until the matching state is automatically reset.

Auto Reset Timer is configured using KPG-D3/ D3N. Also, how the transceiver behaves after the length of time configured in **Auto Reset Timer** elapses can be configured.

Table 5-7 Auto Reset Timer

Configuration	Description
Auto Reset Timer	Off
	0 sec to 300 sec
LED	If LED is enabled, the flashing LED for the Selective Call Alert LED turns off when the length of time configured in Auto Reset Timer elapses.
Alert Tone	If Alert Tone is enabled, the intermittently emitted Alert tone stops when the length of time configured in Auto Reset Timer elapses.
Monitor	If Monitor is enabled, the matching state of the DTMF code is reset when the length of time configured in Auto Reset Timer elapses.  Note For the portable transceiver (basic model), Monitor is always enabled.

Configuration using KPG-D3/ D3N

Configuring **Auto Reset Timer** ( **See** Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode > Auto Reset)

Clear to Transpond

Clear to Transpond is the function that allows the transceiver to wait to initiate the Transpond until the channel becomes available if the channel is occupied by other users when the transceiver attempts to initiate the Transpond.

Configuration using KPG-D3/ D3N

Configuring **Clear to Transpond** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode)

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a DTMF code. A user can tell from the flashing LED that the transceiver is receiving a call.

Configuration using KPG-D3/ D3N

Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode)

Optional Signaling LED

Optional Signaling LED is the function to make the LED flash yellow when the Optional Signaling matches. A user can tell from the LED that the transceiver is receiving a call.

If the matching state of Optional Signaling is disabled when the buttons on the transceiver are pressed, or when the time configured in **Auto Reset Timer** elapses, the LED is turned off.

However, if **Selective Call Alert LED** is enabled even if **Optional Signaling LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

Configuration using KPG-D3/ D3N

Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > DTMF > Encode/Decode > Decode)

Conditions to Reset the DTMF Code Matching Status

The matching state of the DTMF codes is reset on the following conditions. Also, the Transpond is reset on the following conditions. The Transpond is suspended if transmission is disabled by **Clear to Transpond**.

Table 5-8 Conditions to Reset the DTMF Code

Conditions	Description
Pressing the button	When the following buttons are pressed • Channel Up button • Channel Recall button • Channel Down button • Clear button • Direct Channel 1 to Direct Channel 5 buttons • Direct Channel 1 Select to Direct Channel 5 Select buttons • Emergency button • Home Channel button • Home Channel Select button • Monitor button • Monitor Momentary button • Scan button • Scan Normal button • Scan Program button • Front Panel Programming button • Squelch Off button • Squelch Off Momentary button • Transceiver Password button • Zone Up button • Zone Down button • Zone Up/Down button • Zone Select button • Channel Up/Down button • Channel Select button
Hook (Mobile only)	When the microphone is in the on-hook state (However, the DTMF code is not reset while the audio sounds from the transceiver.)
Expiration of the Auto Reset Timer	When the length of time configured in Auto Reset Timer elapses (This condition is the condition to reset the DTMF code.)
Receiving a code	When a "Code + #" code is received
Transmission	When transmission is made using the following (This condition is the condition to reset the Transpond.) • PTT switch • External PTT (Voice) port (Mobile only) • External PTT (Data) port (Mobile only)

5.6 Using Autodial List

The following functions relevant to Autodial can be configured using KPG-D3/ D3N:

- Autodial List
- Autodial Programming

Autodial List

Autodial List is the list in which the DTMF code used for Autodial Mode is configured.

Autodial List can be configured by using KPG-D3/ D3N.

Table 5-9 Autodial List Configuration

Configuration	Description
DTMF Name	A name can be assigned to the DTMF code. A maximum of 14 characters can be configured.
Code	The DTMF code to be sent can be configured. A maximum of 34 numeric digits can be configured.

Configuration using KPG-D3/ D3N

Configuring **Autodial List** ( See Radio Configuration > Protocol Options > DTMF > Autodial List)

Editing the Autodial List with the Transceiver (Autodial Programming)

In Autodial Programming Mode, data configured in **Autodial List** can be added, changed, or deleted by operating the transceiver.

Pressing the **Autodial Programming** button places the transceiver in Autodial Programming Mode.

Or, the transceiver enters Autodial Programming Mode if “Autodial Programming” is selected after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode](#).)

Note

- If “Direct Button” is configured in *** and # Buttons**, pressing the [*] or [#] button in the Autodial Programming Mode directly enters the “*” or “#” tone. In this case, A to D tones cannot be entered by pressing the [*] button, and the characters entered by pressing the [#] button cannot be cleared.

Operating the transceiver

● Changing or adding data in the Autodial List

1 Press the **Autodial Programming** button.

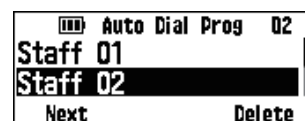
The transceiver enters Autodial Programming Mode.

The following operations are the same even if the transceiver enters Autodial Programming Mode by pressing the **Menu** button.

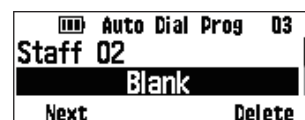
Auto Dial Prog 01	
Staff 01	
Staff 02	
Next	Delete

2 Press the **[▲]** or **[▼]** button and then select the target data from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

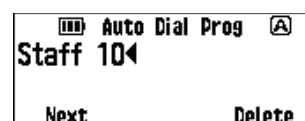


If data is newly added to the **Autodial List**, “Blank” needs to be selected. Although the following procedure describes the operation with the displays that appear when changing the existing data in the **Autodial List**, the operation is identical.



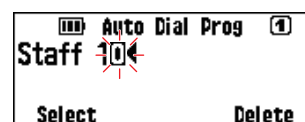
3 Press the **Menu** (**[□]**) or **[*]** button.

The DTMF name edit display for the selected data appears.



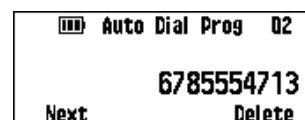
4 Enter a DTMF name.

Refer to Common Function Part “[Entering or Deleting Characters](#)” for entry method.



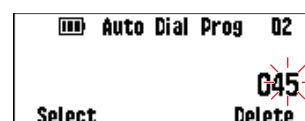
5 Press the **Menu** (**[□]**) or **[*]** button after entering the DTMF name.

The DTMF code edit display appears.



6 Enter a DTMF code.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.



7 Press the **Menu** (**[□]**) or **[*]** button after entering the DTMF code.

The writing completion message display appears.

“Over Write?” appears if the existing data in the **Autodial List** is changed.

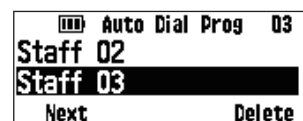


“Store?” appears if new data is added in the **Autodial List**.



8 Press the **Menu** ([) or [*****] button.

The data is written in the transceiver memory, and the **Autodial List** selection display appears.

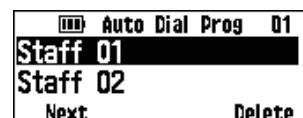


• Deleting data from the Autodial List

1 Press the **Autodial Programming** button.

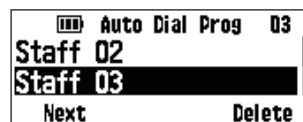
The transceiver enters Autodial Programming Mode.

The following operations are identical even if the transceiver enters Autodial Programming Mode by a user pressing the **Menu** button or using the keypad.



2 Press the [**▲**] or [**▼**] button to select the data to delete from the Autodial List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



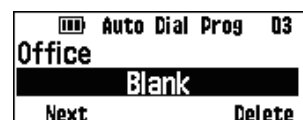
3 Press the **Back** ([) or [**#**] button.

“Delete?” appears.



4 Press the **Menu** ([) or [*****] button.

The selected data will be cleared.



Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring *** and # Buttons** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

MDC-1200 is the communication system using Audio Frequency Shift Keying (AFSK). MDC-1200 can be used in an Analog Conventional system. By using the MDC-1200, the transceiver is able to support individual identification and individual calls. In addition, a dispatcher can determine whether or not the transceiver is available, or disable the transceiver to be operated by sending a message to the transceiver.

6.1 Basic MDC-1200 Settings

This section explains the basic parameters required for the different types of communication using MDC-1200.

About Own Station ID (Unit ID/ Group ID)

Communication by MDC-1200 uses a 4-digit **Unit ID** and a 3-digit **Group ID**.

- **Unit ID**

Unit ID can be configured in the range between 0001 and DEEE ("F" cannot be configured).

- **Group ID**

Group ID can be configured in the range between 000 and EEE ("F" cannot be configured).

When **Global ID** is enabled, all systems for which "MDC-1200" is configured in **Signaling Type** will share a single **Unit ID/ Group ID**.

When **Global ID** is disabled, it is necessary to configure a different **Unit ID/ Group ID** for each system with "MDC-1200" configured in **Signaling Type**.

Configuration using KPG-D3/ D3N

- Configuring **Unit ID** and **Group ID**
 - Configuring **Global ID** to be enabled or disabled
- ( See) Radio Configuration > System Properties > Systems > Analog Conventional > General > MDC-1200 > ID (Own) > MDC-1200)
- ( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > General > MDC-1200 > ID (Own) > MDC-1200)
- ( See) Radio Configuration > System Properties > Systems > LTR Trunking > General > MDC-1200 > ID (Own) > MDC-1200)
- ( See) Radio Configuration > System Properties > Systems > NXDN Conventional > General > MDC-1200 > ID (Own) > MDC-1200)
- ( See) Radio Configuration > System Properties > Systems > DMR Conventional > General > MDC-1200 > ID (Own) > MDC-1200)

Auto Reset Timer

Auto Reset Timer is the time interval starting from the point when the received MDC-1200 ID matches with the own MDC-1200 ID configured for the transceiver up to the point when the matching status is automatically reset. A matching status means that a user can communicate using only a QT tone or DQT code after the MDC-1200 ID matches.

Auto Reset Timer can be configured by using KPG-D3/ D3N. Also, how the transceiver behaves after the length of time configured in **Auto Reset Timer** elapses can be configured.

Table 6-1 Auto Reset Timer

Configuration		Description
Auto Reset Timer	Off	Auto Reset Timer does not function.
	0 sec to 300 sec	After the configured time elapses, the matching state of the FleetSync ID is automatically reset.
LCD		When LCD is enabled, the transceiver restores the previous channel display if the time interval configured in Auto Reset Timer elapses.
LED		If LED is enabled, the flashing LED for the Selective Call Alert LED turns off when the length of time configured in Auto Reset Timer elapses.
Alert Tone		If Alert is enabled, the intermittently emitted Alert tone stops when the length of time configured in Auto Reset Timer elapses.
Monitor		If Monitor is enabled, the matching state of the MDC-1200 ID is reset when the length of time configured in Auto Reset Timer elapses.  Note For the portable transceiver (basic model), Monitor is always enabled.

Configuration using KPG-D3/ D3N

Configuring **Auto Reset Timer** ( **See** Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Auto Reset)

6.2 Available Calls

The following types of calls can be made using an MDC-1200 ID. For transceiver operations and behaviors, refer to the instructions of each call type.

- PTT ID Communication
- Selective Call/ Call Alert
 - Individual Call
 - Group Call
 - Fleet Call
 - All Call

6.3 Transmitting/ Receiving a PTT ID

PTT ID is an identification code unique to the transceiver. It is sent out when the **PTT** switch is operated.

The caller's ID can be displayed on the main display using the received PTT ID while communicating with the caller.

The user can confirm the caller not only by voice, but also through the display. Also, the administrator can identify by a PTT ID who is using a channel without asking by voice for the caller's name.

PTT ID Type

PTT ID Type is the type of PTT ID to be sent.

To send an MDC-1200 ID as the PTT ID, "MDC-1200" needs to be configured in **PTT ID Type** using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

Configuring **PTT ID Type**

( See Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > TX Options > PTT ID)

( See Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > TX Options > PTT ID)

( See Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > TX Options > PTT ID)

( See Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > TX Options > PTT ID)

( See Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > TX Options > PTT ID)

Timing for Sending a PTT ID

A PTT ID is sent out at the following timings.

- BOT (Beginning of Transmit)

A PTT ID is added to the signal at the beginning of the transmission.

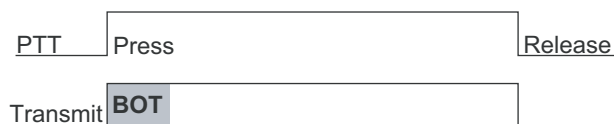


Figure 6-1 BOT

- EOT (End of Transmit)

A PTT ID is added to the signal at the end of the transmission.

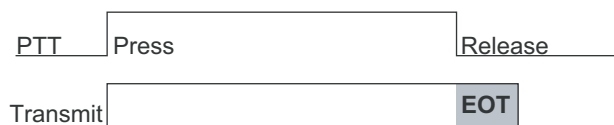


Figure 6-2 EOT

- Both (BOT and EOT)

A PTT ID is added to the signal at both the beginning and the end of the transmission.

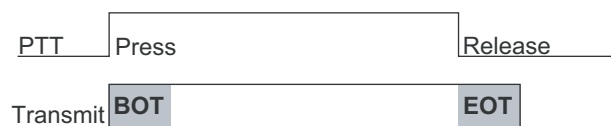


Figure 6-3 Both

The timing for sending a PTT ID can be configured for each channel using KPG-D3/ D3N.

Table 6-2 Timing for Sending a PTT ID

Configuration	Description
Off	Does not send out a PTT ID.
BOT	When the PTT switch on the transmitting transceiver is pressed, the ID (Own) of the MDC-1200 is sent as the PTT ID.
EOT	When the PTT switch on the transmitting transceiver is released, the ID (Own) of the MDC-1200 is sent as the PTT ID.
Both	At both the timing of BOT and EOT, the ID (Own) of the MDC-1200 is sent as the PTT ID.

Configuration using KPG-D3/ D3N

Configuring **PTT ID (Analog)**

(See Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Analog > PTT ID)

(See Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Analog > PTT ID)

(See Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > General > PTT ID)

(See Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > Analog > PTT ID)

(See Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > Analog > PTT ID)

Changing the Timing for Encoding QT/DQT (PTT ID with QT/DQT)

PTT ID with QT/DQT is a function that alters the timing of QT/DQT encode when sending the PTT ID of the MDC-1200.

Disabling **PTT ID with QT/DQT** stops sounding of the MSK transmission tone from the speaker of the receiving transceiver.

● When “BOT” is configured in PTT ID

When **PTT ID with QT/DQT** is disabled, QT/DQT will not be encoded until MSK transmission is complete. For this reason, an MSK transmission tone is not sounded from the speaker of the receiving transceiver.

● When “EOT” is configured in PTT ID

When **PTT ID with QT/DQT** is disabled, QT/DQT will be encoded before MSK transmission starts. For this reason, an MSK transmission tone is not sounded from the speaker of the receiving transceiver.

 Note

- When **PTT ID with QT/DQT** is enabled, QT/DQT is encoded at the same timing as the sending of MDC-1200 ID, and thus an MSK transmission tone is sounded from the speaker of the receiving transceiver.

Configuration using KPG-D3/ D3N

Configuring **PTT ID with QT/DQT** to be enabled or disabled

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > TX Options > PTT ID > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > TX Options > PTT ID > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > TX Options > PTT ID > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > TX Options > PTT ID > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > TX Options > PTT ID > MDC-1200)

Displaying the ID of the Communicating Caller on the LCD (Caller ID Display)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Caller ID Display is a function that displays the received PTT ID on the display of the transceiver.

A user can identify the caller not only by voice, but also through the display.

When the transceiver receives a PTT ID, the received ID, ID Name, or ID List number appears on the display.

If no received ID is configured for ID List in MDC-1200, the ID appears.

If the received ID is configured for ID List in MDC-1200, the corresponding ID Name appears. However, if the received ID is configured for ID List in MDC-1200 but no ID Name is configured, ID List number appears.

Upon the elapse of the time configured in **Auto Reset Timer** or by a user pressing one of the buttons of the transceiver, the main display reverts to the channel display.

PTT ID appears with muting active when a PTT ID is received even if the conditions for unmute are not satisfied.

 Note

- A user cannot reply to an ID on the transceiver while the ID appears on the main display.
- The PTT ID is displayed even if the transceiver receives either BOT or EOT.
- If the QT tone or DQT code is preconfigured for the transceiver, the Caller ID Display function will run even if the QT tone or DQT code received does not match the QT tone or DQT code preconfigured for the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Caller ID Display** to be enabled or disabled ( **See** Radio Configuration > Protocol Options > MDC-1200 > General > RX Options)

Output of PTT ID Sending Tone (PTT ID Sidetone)

PTT ID Sidetone is a function that sounds an MDC-1200 transmission tone from the speaker when the transmitting transceiver sends out an MDC-1200 ID.

A user at the transmitting end is notified by the **PTT ID Sidetone** of the timing to start communicating in a call.

If the user at the transmitting end starts communicating without being aware of whether the MDC-1200 ID has been sent out, the beginning part of the voice output from the transceiver at the receiving end may be interrupted. The PTT ID Sidetone is used to prevent this problem from occurring.

Configuration using KPG-D3/ D3N

Configuring **PTT ID Sidetone** to be enabled or disabled

( See) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > TX Options > PTT ID > MDC-1200)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > TX Options > PTT ID > MDC-1200)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > TX Options > PTT ID > MDC-1200)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > TX Options > PTT ID > MDC-1200)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > TX Options > PTT ID > MDC-1200)

Muting the PTT ID Tone (PTT ID Mute)

PTT ID Mute can be used to unmute after a certain amount of time elapses when the transceiver receives an analog signal. This function is to mute the data sound of the PTT ID (BOT) sent out by the party at the other end of the call.

Refer to “[Muting the PTT ID Tone \(PTT ID Mute\)](#)” for details.

Disabling Repeated Sending of PTT ID (PTT ID Pause (Analog))

PTT ID Pause is the function to keep the PTT ID from being sent when the transceiver alternates between transmit and receive in a certain period of time. This function is to stop sending of the PTT ID repeatedly to the party at the other end of the call.

Refer to “[Preventing the PTT ID from Sending Repeatedly \(PTT ID Pause\)](#)” for details.

Restricting the Transmission of the PTT ID in Talk Around (Restricted ID in Talk Around)

Restricted ID in Talk Around is a function to disable the PTT ID transmission while **Talk Around** is enabled even if the **PTT** switch is pressed or released. (Refer to [Communicating Without Using a Repeater \(Talk Around\)](#).)

Configuration using KPG-D3/ D3N

Configuring **Restricted ID in Talk Around** to be enabled or disabled

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > TX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > TX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > TX Options > PTT ID)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > TX Options > PTT ID)

6.4 Making a Selective Call

Different types of calls can be made using an MDC-1200 ID.

Upon selecting the target transceiver to call and pressing the **PTT** switch, you can add your own MDC-1200 ID and the ID of the target transceiver to the signal and send it out. After the target transceiver has received the MDC-1200 ID, the transceiver unmutes the speaker and outputs the receiving tone.

The caller's ID appears on the receiving transceiver. The receiving transceiver can respond to the caller by pressing the **PTT** switch while the caller's ID appears.

The different types of Selective Calls are as follows.

Table 6-3 Types of Selective Calls

Call Type	Description
Individual Call	Individual Call is a method that sends out a specific Unit ID to call a single transceiver unit that matches the specified ID.
Group Call	Group Call is a method that sends out a specific Fleet ID and Group ID to call multiple transceiver units that match the specified IDs.
Fleet Call	Fleet Call is a method that sends out a specific Fleet ID to call multiple transceiver units that match the specified ID.
All Call	All Call is a method for calling all transceiver units with an MDC-1200 ID.

Initiating a Selective Call

A Selective Call can be initiated either by selecting an ID from the list or directly entering an ID (Manual Dialing) for transmission.

When selecting an ID from the list, a Selective Call can be initiated by selecting an MDC-1200 ID configured in the ID List. (Refer to [ID List](#).)

When entering an ID directly, a Selective Call can be initiated by specifying the MDC-1200 ID directly. The call type is determined according to the number of entered digits.

Table 6-4 Call Type by Manual Dialing

Number of Digits	Range	Call Type
1 digit (#)	0 - F	Fleet Call
3 digits (###)	000 - FFF	Group Call
4 digits (####)	0001 - DFFF	Individual Call (Excludes "F")
		Group Call (Includes "F")
4 digits (####)	E000 - EFFF	Group Call
4 digits (####)	FFFF	All Call

Selective Call also comes with a Call Alert feature. Call Alert is the function to initiate a call to a target party. Use it when you want to call a target transceiver without communicating.

The transceiver enters Selcall Mode with one of the following options and then will initiate a Selective Call.

● Individual/ Group button

Pressing the **Individual**, **Individual + Status**, **Individual + Short Message**, **Group**, **Group + Status** or **Group + Short Message** button places the transceiver in the Selcall Mode.

● Menu button

Upon pressing the **Menu** button to enter the Menu Mode, selecting "Individual", "Individual + Status", "Individual + Short Message", "Group", "Group + Status" or "Group + Short Message" places the transceiver in the Selcall Mode. (Refer to Common Function Part [Using Menu Mode](#).)

● Keypad entry

When "Individual", "Individual + Status", "Individual + Short Message", "Group", "Group + Status" or "Group + Short Message" is configured in **Keypad Operation**, pressing a button from [0] to [9] on the numeric keypad places the transceiver in the Selcall Mode. The transceiver enters Selcall ID Shortcut Entry Mode or will be on hold as the first digit of the Selcall ID is entered. (Refer to Common Function Part [Keypad Operation](#).)

About the Wild Card

An ID that contains "F" (Wild Card) can be specified as the recipient ID of a Selective Call. All IDs (0 to 9, A to E) are included in the digit "F", so transmission with an ID that contains "F" allows a call to be initiated to multiple transceivers. For example, by specifying "012F" as the Individual Call ID, a call can be initiated to a total of 15 transceivers with the ID from "0120" to "012E".

Operating the transceiver

● Initiating a Selective Call by list selection

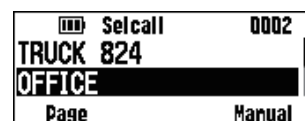
- 1 Press the **Individual**, **Individual + Status**, **Individual + Short Message**, **Group**, **Group + Status** or **Group + Short Message** button.

The transceiver enters Selcall Mode and then the ID List selection display appears.

The following operations are identical even if the transceiver enters Selcall Mode by a user pressing the **Menu** button or using the keypad.

- 2 Press the **[▲]** or **[▼]** button and then select the target data from the ID List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



- 3 Initiate a Selective Call or Call Alert.

● To initiate a Selective Call

Press the **PTT** switch.

The “” icon starts blinking, and the display switches to show the corresponding type of call (see below) as well as the recipient ID name.

Individual Call: Individual

All calls other than Individual Call: Group

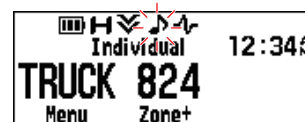
- When **PTT ID Sidetone** is enabled, the following tone is sounded from the transceiver according to the call type during Selective Call transmission.

Individual Call: Individual Call Tone (6 beeps)

Group Call: Group Call Tone (5 beeps)

Fleet Call: Fleet Call Tone (3 beeps)

All Call: Fleet Call Tone (3 beeps)



● To initiate a Call Alert

Press the **Menu** () button.

“Paging” is displayed, and the display switches to show the corresponding type of call (see below) as well as the recipient ID name.

Individual Call: Individual

All calls other than Individual Call: Group

- When **ACK Request** is enabled, the transceiver will wait for the receipt acknowledgment from the receiving transceiver. If a receipt acknowledgment cannot be received after the time interval configured in **Maximum ACK Wait Time** has elapsed, a Call Alert will be sent out for a number of times as configured in **Number of Retries**. If a receipt acknowledgment is not received even after Call Alert has been sent, a No Reply Tone (4 beeps) is sounded from the transceiver and a “No Reply” message appears on the screen, after which the transceiver returns to the previous channel display.
- When **ACK Request** is enabled, Call Alert transmission can be canceled by pressing the **Clear** button.
- In an LTR Trunking system, an “Out of Range” message appears on the display and Call Alert transmission ends if connection to the repeater cannot be established.



● Initiating a Selective Call Using Manual Dialing

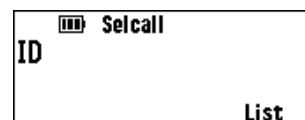
1 Press the **Individual**, **Individual + Status**, **Individual + Short Message**, **Group**, **Group + Status** or **Group + Short Message** button.

The transceiver enters Selcall Mode and then the ID List selection display appears.

The following operations are identical even if the transceiver enters Selcall Mode by a user pressing the **Menu** button or using the keypad.

2 Press the **Back** () button.

The ID entry screen appears.



3 Enter the ID.

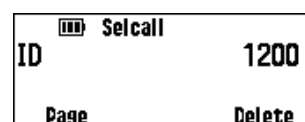
Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

● Using the keypad

An ID can be entered by pressing the **[0]** to **[9]** buttons.

● Using the PF buttons

Press the **[▲]** or **[▼]** button to select the number and press the **Menu** () or **[*]** button to confirm the selected number.



4 Initiate a Selective Call or Call Alert.

● To initiate a Selective Call

Press the **PTT** switch.

The “” icon starts blinking, and the display switches to show the corresponding type of call (see below) as well as the recipient ID name.

Individual Call: Individual

All calls other than Individual Call: Group

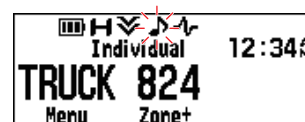
- When **PTT ID Sidetone** is enabled, the following tone is sounded from the transceiver according to the call type during Selective Call transmission.

Individual Call: Individual Call Tone (6 beeps)

Group Call: Group Call Tone (5 beeps)

Fleet Call: Fleet Call Tone (3 beeps)

All Call: Fleet Call Tone (3 beeps)



● To initiate a Call Alert

Press the **Menu** () button.

“Paging” is displayed, and the display switches to show the corresponding type of call (see below) as well as the recipient ID name.

Individual Call: Individual

All calls other than Individual Call: Group

- When **ACK Request** is enabled, the transceiver will wait for the receipt acknowledgment from the receiving transceiver. If a receipt acknowledgment cannot be received after the time interval configured in **Maximum ACK Wait Time** has elapsed, a Call Alert will be sent out for a number of times as configured in **Number of Retries**. If a receipt acknowledgment is not received even after Call Alert has been sent, a No Reply Tone (4 beeps) is sounded from the transceiver and a “No Reply” message appears on the screen, after which the transceiver returns to the previous channel display.
- When **ACK Request** is enabled, Call Alert transmission can be canceled by pressing the **Clear** button.
- In an **LTR Trunking** system, an “Out of Range” message appears on the display and Call Alert transmission ends if connection to the repeater cannot be established.



Note

- If the Selcall Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode by pressing the **Individual** button. A selection screen for the ID List will appear by pressing the **Back** () button.
- If no ID is registered in the ID List, the transceiver enters the Manual Dialing mode if **Manual Dialing** is enabled. In this case, the transceiver cannot enter Selcall Mode if **Manual Dialing** is disabled.
- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- When **Optional Signaling LED** is enabled, the LED flashes in yellow color during a Selective Call transmission.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Manual Dialing** to be enabled or disabled
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > TX Options > MDC-1200)
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > TX Options > MDC-1200)
 - ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > TX Options > MDC-1200)
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > TX Options > MDC-1200)
 - ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > TX Options > MDC-1200)

Receiving a Selective Call

The transceiver can receive a Selective Call or Call Alert if the received MDC-1200 ID matches the MDC-1200 ID preconfigured for the transceiver.

Note

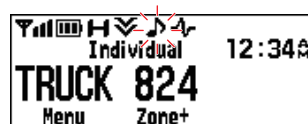
- To receive a Selective Call, "MDC-1200" must be configured for **Optional Signaling** used by the channel. (Refer to [Using the Optional Signaling](#).)
- To receive a Call Alert, "Call Alert" or "Call Alert with Voice" needs to be configured in **Call Alert Type**. (Refer to [Configuring the Action upon Receiving a Call Alert \(Call Alert Type\)](#).)

Transceiver behavior

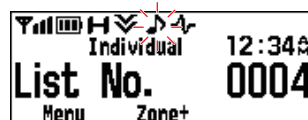
● Receiving an Individual Call or Call Alert

Receive an Individual Call or Call Alert.

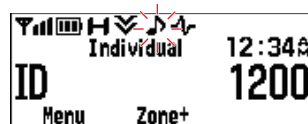
The "🔊" icon starts blinking, and "Individual" as well as the ID Name of the transmitting transceiver are displayed.



If the ID Name is not configured in the ID List, the ID List number appears.



If the ID is not configured in the ID List, the ID appears.

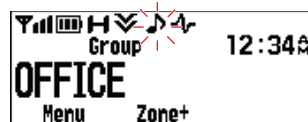


● Receiving an Individual Call or Call Alert that Uses a Wild Card

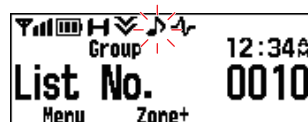
Receive an Individual Call or Call Alert that uses a Wild Card.

The "🔊" icon starts blinking, and "Group" as well as the ID Name or ID of the received call are displayed.

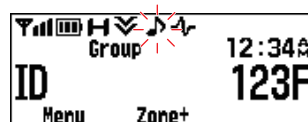
According to the configuration of **Group Call Display Type**, any of the received Group ID, the Unit ID of the transmitting transceiver, or both appears. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)



If the ID Name is not configured in the ID List, the ID List number appears.



If the ID is not configured in the ID List, the ID appears.

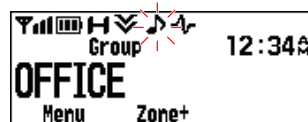


● Receiving a Group Call/ Fleet Call/ All Call

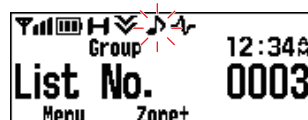
The transceiver receives a Group Call, Fleet Call, or All Call.

The “” icon starts blinking, and “Group” as well as the ID Name or ID of the received call are displayed.

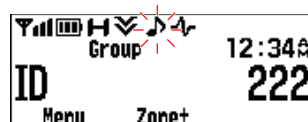
According to the configuration of **Group Call Display Type**, any of the received Group ID, the Unit ID of the transmitting transceiver, or both appears. (Refer to [Display When the Transceiver Receives a Group Call \(Group Call Display Type\)](#).)



If the ID Name is not configured in the ID List, the ID List number appears.



If the ID is not configured in the ID List, the ID appears. In the case of All Call, “All Call” is displayed.



Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common Function Part [Busy LED](#).)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to [Transceiver behavior when receiving a Selective Call/ Call Alert](#).)
- When **Selective Call Alert LED**, **Optional Signaling LED** or **Call Alert LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to [Transceiver behavior when receiving a Selective Call/ Call Alert](#).)
- A received Selective Call or Call Alert can be kept as a record. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Transceiver behavior when receiving a Selective Call/ Call Alert

● Alert Tone

If the received ID is configured in the ID List, an Alert Tone sounds from the transceiver according to the configuration of **Alert Tone (Selcall)** or **Alert Tone (Call Alert)** for the corresponding ID.

However, if "Protocol Common" is configured in **Alert Tone (Selcall)** or **Alert Tone (Call Alert)** of the ID List, or if the received ID is not configured in the ID List, the Alert Tone sounds from the transceiver according to the configuration in **Tone Number** common to MDC-1200.

● Selective Call Alert LED/ Call Alert LED

If the received ID is configured in the ID List, the LED flashes according to the configuration of **Alert LED Color (Selcall)** or **Alert LED Color (Call Alert)** for the corresponding ID.

However, if "Protocol Common" is configured in **Alert LED Color (Selcall)** or **Alert LED Color (Call Alert)** of the ID List, or if the received ID is not configured in the ID List, the LED flashes according to the configuration in **LED Color** common to MDC-1200.

● Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration in **Selective Call Alert LED**.

Also, if the buttons on the transceiver are pressed while the LED flashes according to the configuration of **Selective Call Alert LED**, and if the matching state of the Optional Signaling continues, the LED flashes yellow.

Configuration using KPG-D3/ D3N

- Configuring **Selective Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Selcall)
- Configuring **Optional Signaling LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Alert Tone/LED)
- Configuring **Call Alert LED** to be enabled or disabled ( [See](#) Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Call Alert)
- Configuring **Alert Tone (Selcall)/ Alert LED Color (Selcall)** (ID List) ( [See](#) Radio Configuration > System Properties > ID/Status List > ID/Status List > MDC-1200 ID > MDC-1200 ID List > No. 1~yyyy (ID Allocation) > Selcall)
- Configuring **Alert Tone (Call Alert)/ Alert LED Color (Call Alert)** (ID List) ( [See](#) Radio Configuration > System Properties > ID/Status List > ID/Status List > MDC-1200 ID > MDC-1200 ID List > No. 1~yyyy (ID Allocation) > Call Alert)
- Configuring **Tone Number** common to MDC-1200 ( [See](#) Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Selcall)
- Configuring **Alert LED Color (Individual Call)/ Alert LED Color (Group Call)/ Alert LED Color (Fleet Call)/ Alert LED Color (All Call)** common to MDC-1200 ( [See](#) Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Selcall)

ID List

If making Selective Calls, the desired MDC-1200 IDs need to be preconfigured in the transceiver using KPG-D3/ D3N prior to use of the transceiver. A maximum of 1,500 MDC-1200 IDs can be configured in the ID List.

Table 6-5 ID List

Configuration	Description
ID Type	The call type can be configured by selecting one of the four options: "Individual Call", "Group Call", "Fleet Call" or "All Call". The configurable IDs vary as follows depending on the ID Type configuration. Individual Call: Only ID can be configured. Group Call: Only Fleet ID and Group ID can be configured. Fleet Call: Only Fleet ID can be configured. All Call: ID, Fleet ID and Group ID cannot be configured.
ID	An ID can be configured in the range between 0001 and DFFF.
Fleet ID	A Fleet ID can be configured in the range between 0 and F.
Group ID	A Group ID can be configured in the range between 00 and FF.
ID Name	The caller's ID Name is configured. A maximum of 14 characters can be configured for the ID Name. If the ID Name of the transmitting transceiver is configured in the ID List, the ID Name of the transmitting transceiver appears when the transceiver receives a Selective Call.
ACK Request	When ACK Request is enabled, a response from the receiving transceiver can be requested when sending a Call Alert. The transceiver waits for response from the receiving transceiver after sending a Call Alert. If a response is not received from the receiving transceiver after the time interval configured in Maximum ACK Wait Time has elapsed, a Call Alert will be sent out for a number of times as configured in Number of Retries .
Alert Tone	Selcall: The type of tone to be sounded from the transceiver can be configured for a Selective Call from an MDC-1200 ID configured in the ID List. Call Alert: The type of tone to be sounded from the transceiver can be configured for a Call Alert from an MDC-1200 ID configured in the ID List.
Alert LED Color	Selcall: The color of the flashing LED can be configured for a Selective Call from an MDC-1200 ID configured in the ID List. Call Alert: The color of the flashing LED can be configured for a Call Alert from an MDC-1200 ID configured in the ID List.  Note To use Alert LED Color, Selective Call Alert LED needs to be enabled.

Configuration using KPG-D3/ D3N

Configuring **ID List** ( **See** Radio Configuration > System Properties > ID/Status List > ID/Status List > MDC-1200 ID > MDC-1200 ID List)

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a Selective Call. A user can tell from the LED that the transceiver is receiving a Selective Call.

Configuration using KPG-D3/ D3N

Configuring **Selective Call Alert LED** to be enabled or disabled ( See Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Selcall)

Optional Signaling LED

Optional Signaling LED is the function to make the LED flash yellow when the Optional Signaling matches. A user can tell from the LED that the transceiver is receiving a call.

If the matching state of Optional Signaling is disabled when the buttons on the transceiver are pressed, or when the time configured in **Auto Reset Timer** elapses, the LED is turned off.

However, if **Selective Call Alert LED** is enabled even if **Optional Signaling LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

Configuration using KPG-D3/ D3N

Configuring **Optional Signaling LED** to be enabled or disabled ( See Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Alert Tone/LED)

Call Alert LED

Call Alert LED is the function to make the LED flash when the transceiver receives a Call Alert. A user can tell from the LED that the transceiver is receiving a Call Alert.

Configuration using KPG-D3/ D3N

Configuring **Call Alert LED** to be enabled or disabled ( See Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Call Alert)

Display When the Transceiver Receives a Group Call (Group Call Display Type)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Group Call Display Type is a function that shows the received information on the display when the transceiver receives a Group Call, Fleet Call or All Call.

Table 6-6 Group Call Display Type

Configuration	Description
Group ID	The Group ID of the received Group Call appears.
Calling Transceiver ID	The Unit ID of the transmitting transceiver appears.
Calling Transceiver ID/Group ID	The Group ID of the received Group Call and the Unit ID of the transmitting transceiver appear for 2 sec alternately.

Configuration using KPG-D3/ D3N

Configuring **Group Call Display Type** to be enabled or disabled ( See Radio Configuration > Protocol Options > MDC-1200 > General > RX Options)

Sending Selcall Data Only during the First Call (Single Selcall)

Single Selcall is a function that transmits Selective Call data only when sending a Selective Call for the first time. The transceiver behaves as follows depending on the **Single Selcall** configuration.

Table 6-7 Single Selcall

Configuration	Description
Enabled	In the Selcall Mode, selecting an ID from the list or entering an ID manually followed by pressing the PTT switch transmits Selective Call data only for the first transmission. After Selective Call data has been sent and while Auto Reset Timer is counting down, Selective Call data will not be resent even when the PTT switch is pressed again.
Disabled	In the Selcall Mode, selecting an ID from the list or entering an ID manually followed by pressing the PTT switch transmits the Selective Call data. After Selective Call data has been sent and while Auto Reset Timer is counting down, Selective Call data will be resent each time the PTT switch is pressed again.

Configuration using KPG-D3/ D3N

Configuring **Single Selcall** to be enabled or disabled

( See) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > TX Options > MDC-1200)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > TX Options > MDC-1200)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > TX Options > MDC-1200)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > TX Options > MDC-1200)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > TX Options > MDC-1200)

Configuring the Action upon Receiving a Call Alert (Call Alert Type)

Call Alert Type is a function for determining the action when the transceiver receives a Call Alert.

The transceiver behaves as follows according to the configuration in **Call Alert Type**:

Table 6-8 Call Alert Type

Configuration	Description
None	No receiving action when the transceiver receives a Call Alert.
Call Alert	The transceiver executes a receiving action when a Call Alert is received. The conditions for unmuting the sound while receiving a Call Alert are the same as those prior to receiving a Call Alert.
Call Alert with Voice	The transceiver executes a receiving action when a Call Alert is received. The conditions for unmuting the sound while receiving a Call Alert are as follows: ● When Optional Signaling is not configured for the channel The conditions for unmuting the sound are the same as those prior to receiving a Call Alert. ● When Optional Signaling is configured for the channel The conditions for unmuting the sound are the same as those when Optional Signaling matches.

 Note

- Regardless of the **Optional Signaling** configuration and whether QT/DQT matches, the transceiver is able to receive a Call Alert.

Configuration using KPG-D3/ D3N

Configuring **Call Alert Type**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > RX Options > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > RX Options > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > RX Options > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > RX Options > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > RX Options > MDC-1200)

6.5

Common Functions for Data Communications

The following functions are used in common for MDC-1200 data communication:

- Number of Retries
- Maximum ACK Wait Time
- ACK Delay Time
- Data Transmit Modulation Delay Time

Number of Retries

If the transceiver does not receive the acknowledgment after the transceiver sends data and the time configured for **Maximum ACK Wait Time** elapses, the transceiver resends data. **Number of Retries** is the number of times for the transceiver to resend data. A smaller number can be configured if there is good communicating conditions, and a larger number can be configured if there are inferior communicating conditions.

Configuration using KPG-D3/ D3N

Configuring **Number of Retries**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > Data Communications > Parameters)

Maximum ACK Wait Time

Maximum ACK Wait Time is the length of time that the transceiver stands by to receive the acknowledgment after the transceiver sends data.

If the transceiver does not receive the acknowledgment within the time configured for **Maximum ACK Wait Time**, the transceiver resends data.

Configuration using KPG-D3/ D3N

Configuring **Maximum ACK Wait Time**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > Data Communications > Parameters)

ACK Delay Time

ACK Delay Time is the length of time from when the transceiver receives data until the transceiver sends the acknowledgment.

Configuration using KPG-D3/ D3N

Configuring **ACK Delay Time**

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > Data Communications > Parameters)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > Data Communications > Parameters)

Data Transmit Modulation Delay Time

Data Transmit Modulation Delay Time is the time interval from the point when transmission starts up to the point when modulation of the MSK data starts during data transmission by the transceiver.

Data Transmit Modulation Delay Time is needed to start modulation of the MSK data after the transmission radio waves have stabilized. However, it may be difficult to establish data communications when the transmit and receive frequencies are widely separated or the transceiver is always used in extremely cold areas. In such cases, **Data Transmit Modulation Delay Time** must be extended in order to improve the reliability of data communications.

Configuration using KPG-D3/ D3N

Configuring **Data Transmit Modulation Delay Time**

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > Data Communications > Parameters)

( **See**) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > Data Communications > Parameters)

6.6

Transceiver Behavior in Emergency Mode

Emergency Mode can be used to transmit and receive with the transceiver in emergencies. In such emergency situations, a user can immediately contact the base station by using this function. The transceiver can notify the base station of an occurrence of an emergency situation by sending an Emergency Alarm Request message or an Emergency ID in the MDC-1200 format.

Emergency Alarm

The transceiver can notify the base station of an occurrence of an emergency situation by sending an Emergency Alarm Request message. (Refer to [Emergency Alarm \(MDC-1200\)](#).)

Emergency ID (MDC-1200)

The transceiver can notify the base station of an occurrence of an emergency situation by sending an Emergency ID in the MDC-1200 format when the transceiver starts transmission in Emergency Mode. (Refer to [ID Type](#).)

Placing the Transceiver in Emergency Mode

Pressing the **Emergency** button places the transceiver in the Emergency Mode according to the Emergency Alarm configuration. (Refer to [Emergency Alarm \(MDC-1200\)](#).)

Notifying the Receipt of an Emergency Call (Emergency Response)

Emergency Response is a function to notify a user that the transceiver has received an Emergency Call in the MDC-1200 format.

The transceiver behaves as follows depending on the **Emergency Response** configuration.

Table 6-9 Emergency Response

Configuration	Description
LCD	“Emg Received” and the received ID (or ID Name or ID List number) appears on the display alternately if the transceiver receives an Emergency Alarm Request message or an Emergency ID in the MDC-1200 format. If no received ID is configured for ID List in MDC-1200, the ID appears. If the received ID is configured for ID List in MDC-1200, the corresponding ID Name appears. However, if the received ID is configured for ID List in MDC-1200 but no ID Name is configured, ID List number appears.
Alert Tone	The Alert Tone configured in Alert Tone Number is sounded from the transceiver if the transceiver receives an Emergency Alarm Request message in the MDC-1200 format. Pressing any button on the transceiver stops the Alert Tone from sounding. An Alert Tone does not sound from the transceiver even if the transceiver receives an Emergency ID in the MDC-1200 format.
Horn Alert (Mobile only)	The Horn Alert port is activated when the transceiver receives an Emergency Alarm Request message in the MDC-1200 format. The Horn Alert port is not activated even if the transceiver receives an Emergency ID in the MDC-1200 format.

Note

- There will be no Emergency Response action when the transceiver receives an Emergency Call while in the Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Response** ( [See](#) Radio Configuration > Protocol Options > MDC-1200 > General > RX Options > Emergency Response)

6.7 Alternating the Status of the AUX Output ID Port (AUX Output ID)

Supported Models: Mobile

AUX Output ID is a function that toggles the AUX Output ID port to high level or low level when the button on the transceiver is operated or when a Selective Call is received. This function can be used for remote control of an external device.

Toggling the AUX Output ID Port Status Using Buttons on the Transceiver

The status of the AUX Output ID port can be toggled by operating the **AUX Output ID 1 to AUX Output ID 3** buttons.

The transceiver behaves as follows according to the configuration in **State Hold Timer (Active Low)**:

- **If “Off” is configured in State Hold Timer (Active Low)**

Each time one of the **AUX Output ID 1 to AUX Output ID 3** buttons is pressed, the corresponding AUX Output ID port will be toggled from high level to low level or from low level to high level.

Upon toggling from high to low level, a Button Beep A (1 beep) is sounded from the transceiver and the ID Name will appear on the display for 2 seconds.

Upon toggling from low to high level, a Button Beep B (2 beeps) is sounded from the transceiver and the ID Name will appear on the display for 2 seconds.

- **If anything other than “Off” is configured in State Hold Timer (Active Low)**

Pressing the **AUX Output ID 1 to AUX Output ID 3** buttons toggles the AUX Output ID 1 to AUX Output ID 3 ports to low level.

Upon toggling from high to low level, a Button Beep A (1 beep) is sounded from the transceiver and the ID Name will appear on the display for 2 seconds.

When the AUX Output ID port toggles to low level, the **State Hold Timer (Active Low)** starts to count down. After the timer interval has elapsed, the AUX Output ID port is restored to high level.



Note

- While the AUX Output ID port toggles to low level, it continues to stay at low level even when the corresponding **AUX Output ID 1 to AUX Output ID 3** button is pressed again. However, the **State Hold Timer (Active Low)** will be reset and countdown will restart from the beginning.

Toggling the AUX Output ID Port Status when Receiving a Selective Call

The status of the AUX Output ID port can be toggled when a Selective Call is received.

When the AUX Output ID 1 to AUX Output ID 3 ports receive any of the following calls that are directed to an ID which is configured to high level or low level, the AUX Output ID 1 to AUX Output ID 3 ports switch to high or low level according to the ID received.

- Selective Call
- Call Alert
- Radio Check
- Radio Inhibit
- Radio Uninhibit

In this case, the ID Name of the received ID will appear on the display for 2 seconds.

Also, the transceiver behaves as follows according to the configuration in **State Hold Timer (Active Low)**:

- **If “Off” is configured in State Hold Timer (Active Low)**

The status of the AUX Output ID port after toggling will be maintained until the transceiver is turned off.

- **If anything other than “Off” is configured in State Hold Timer (Active Low)**

When the AUX Output ID port toggles to low level, the **State Hold Timer (Active Low)** starts to count down. After the timer interval has elapsed, the AUX Output ID port is restored to high level.

However, if a call directed to an ID that is configured to high level is received during countdown of the **State Hold Timer (Active Low)**, the AUX Output ID port toggles to high level. In this case, the **State Hold Timer (Active Low)** stops running.



Note

- To make use of the AUX Output ID function, one of the AUX Output ID 1 to AUX Output ID 3 ports needs to be configured.
- The AUX Output ID 1 to AUX Output ID 3 ports (high level or low level) can be configured only to a value between 0000 and DEEE (excludes “F”).
- If **Retain AUX Output Status** is enabled, the status of the AUX Output ID port after toggling will be maintained even when the transceiver is turned off and on again. If **Retain AUX Output Status** is disabled, the status of the AUX Output ID port after toggling will be reset when the transceiver is turned off and on again.
- When the own ID is configured in one of the AUX Output ID 1 to AUX Output ID 3 ports, the AUX Output ID port toggles to high level or low level upon receiving an Individual Call addressed to the own transceiver but the ID Name configured in the AUX Output ID port will not be displayed. In this case, the display remains the same as when an Individual Call is received.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver (**See** Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Output port (**See** Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)
- Configuring **State Hold Timer (Active Low)** (**See** Radio Configuration > Global Options > External Device > Mobile AUX > AUX Output)
- Configuring **Retain AUX Output Status** to be enabled or disabled (**See** Radio Configuration > Global Options > External Device > Mobile AUX > AUX Output)

6.8

Confirming Whether the Transceiver Is Available for Communications (Radio Check)

Radio Check is the function that is used to confirm whether the transceiver is available for communications.

The transceiver sends an acknowledgment to the system if the transceiver receives a Radio Check Packet in the MDC-1200 format sent from the system and the received ID matches the ID preconfigured for the transceiver. The system can determine whether or not the transceiver is available for communications by receiving this acknowledgment.

Sending a Radio Check Packet

Radio Check Packet can be sent in the Radio Check Mode.

Pressing the **Menu** button places the transceiver in Menu Mode, and then selecting “Radio Check” places the transceiver in Radio Check Mode. (Refer to Common Function Part [Using Menu Mode.](#))

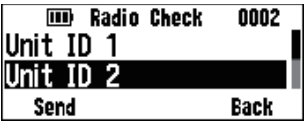
Operating the transceiver

- 1 Press the **Menu** button to enter Menu Mode and then select “Radio Check”.

The transceiver enters Radio Check Mode and then the ID List selection display appears.

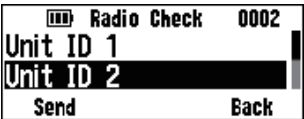
- 2 Press the **[▲]** or **[▼]** button and then select the target data from the ID List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



- 3 Press the **PTT** switch, **Menu** (**[□]**) button, or **[*]** button.

Starts transmission of the Radio Check Packet.



Upon receiving a receipt acknowledgment from the receiving transceiver, a Complete Tone (5 beeps) is sounded from the transceiver and a “Complete” message appears on the display for 1 second, after which transmission will complete.



Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED](#).)
- If a receipt acknowledgment is not received after the time interval configured in **Maximum ACK Wait Time** has elapsed, the Radio Check Packet will be resent for a number of times as configured in Number of Retries. If a receipt acknowledgment is not received even after attempts have been made to resend the Radio Check Packet, a No Reply Tone (4 beeps) is sounded from the transceiver and a “No Reply” message appears on the screen, after which the transceiver returns to the previous channel display.
- Transmission of the Radio Check Packet can be canceled by pressing the **Clear** button.
- In an LTR Trunking system, an “Out of Range” message appears on the display and Radio Check Packet transmission ends if connection to the repeater cannot be established.

Receiving a Radio Check Packet

Radio Check Packet can be received by the transceiver.

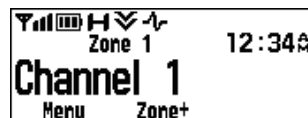
Note

- To do so, **Radio Check** needs to be enabled.

Transceiver behavior

The transceiver receives a Radio Check Packet.

The transceiver sends an acknowledgment if the received ID matches the ID preconfigured for the transceiver.

**Note**

- Upon elapse of the time configured in **ACK Delay Time** after the transceiver receives a Radio Check Packet in the MDC-1200 format, the transceiver sends an acknowledgment.
- The transceiver does not send an acknowledgment if the received ID does not match the ID preconfigured for the transceiver.
- If **Radio Check** is disabled, the transceiver does not send out a receipt acknowledgment.

Configuration using KPG-D3/ D3N

Configuring **Radio Check** to be enabled or disabled

([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > RX Options > MDC-1200 > Remote Control)

([See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > RX Options > MDC-1200 > Remote Control)

([See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > RX Options > MDC-1200 > Remote Control)

([See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > RX Options > MDC-1200 > Remote Control)

([See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > RX Options > MDC-1200 > Remote Control)

6.9 Disabling the Transceiver Capability by Remote Control (Radio Inhibit/ Uninhibit)

Radio Inhibit is the function that is used to disable the transceiver capability by remote control. This function allows a system administrator to remotely disable the transceiver, for instance, if the transceiver is lost.

The transceiver which has been disabled by this function can be enabled to be usable again by remote control from an external device using radio communication.

Placing the Transceiver in the Radio Inhibit State

The transceiver sends an acknowledgment to the system if the transceiver receives a Radio Inhibit Packet in the MDC-1200 format sent from the system and the received ID matches the ID preconfigured for the transceiver. Then, the transceiver enters the Radio Inhibit state and cannot be used.

If the transceiver enters the Radio Inhibit state, the transceiver is in the status as same as that when the transceiver is turned OFF: all LCD and LED are turned Off and no button is usable.

Resetting the Radio Inhibit State of the Transceiver

While the transceiver is in the Radio Inhibit state, the transceiver sends an acknowledgment to the system if the transceiver receives a Radio Uninhibit Packet in the MDC-1200 format sent from the system and the received ID matches the ID preconfigured for the transceiver. Then, the Radio Inhibit state is reset and the transceiver can be used again.

Note

- To receive Radio Inhibit Packet, **Radio Check** needs to be enabled.

Configuration using KPG-D3/ D3N

Configuring **Radio Inhibit** to be enabled or disabled

( See) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > RX Options > MDC-1200 > Remote Control)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > RX Options > MDC-1200 > Remote Control)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > RX Options > MDC-1200 > Remote Control)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > RX Options > MDC-1200 > Remote Control)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > RX Options > MDC-1200 > Remote Control)

Sending a Radio Inhibit Packet

Radio Inhibit Packet can be sent in the Radio Inhibit Mode.

Pressing the **Menu** button places the transceiver in Menu Mode, and then selecting “Inhibit” places the transceiver in Radio Inhibit Mode. (Refer to Common Function Part [Using Menu Mode.](#))

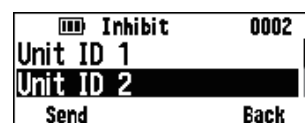
Operating the transceiver

1 Press the **Menu** button to enter Menu Mode and then select “Inhibit”.

The transceiver enters Radio Inhibit Mode and then the ID List selection display appears.

2 Press the [**▲**] or [**▼**] button and then select the target data from the ID List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **PTT** switch, **Menu** ([**□**]) button, or [*****] button.

Starts transmission of the Radio Inhibit Packet.



Upon receiving a receipt acknowledgment from the receiving transceiver, a Complete Tone (5 beeps) is sounded from the transceiver and a “Complete” message appears on the display for 1 second, after which transmission will complete.



Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED.](#))
- If a receipt acknowledgment is not received after the time interval configured in **Maximum ACK Wait Time** has elapsed, the Radio Inhibit Packet will be resent for a number of times as configured in **Number of Retries**. If a receipt acknowledgment is not received even after attempts have been made to resend the Radio Inhibit Packet, a No Reply Tone (4 beeps) is sounded from the transceiver and a “No Reply” message appears on the screen, after which the transceiver returns to the previous channel display.
- Transmission of the Radio Inhibit Packet can be canceled by pressing the **Clear** button.
- In an LTR Trunking system, an “Out of Range” message appears on the display and Radio Inhibit Packet transmission ends if connection to the repeater cannot be established.

Sending a Radio Uninhibit Packet

Radio Uninhibit Packet can be sent in the Radio Uninhibit Mode.

Pressing the **Menu** button places the transceiver in Menu Mode, and then selecting “Uninhibit” places the transceiver in Radio Uninhibit Mode. (Refer to Common Function Part [Using Menu Mode.](#))

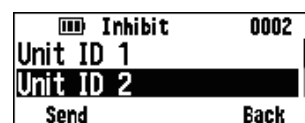
Operating the transceiver

1 Press the **Menu** button to enter Menu Mode and then select “Uninhibit”.

The transceiver enters Radio Uninhibit Mode and then the ID List selection display appears.

2 Press the [**▲**] or [**▼**] button and then select the target data from the ID List.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **PTT** switch, **Menu** ([**□**]) button, or [*****] button.

Starts transmission of the Radio Uninhibit Packet.



Upon receiving a receipt acknowledgment from the receiving transceiver, a Complete Tone (5 beeps) is sounded from the transceiver and a “Complete” message appears on the display for 1 second, after which transmission will complete.



Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common Function Part [Transmit LED.](#))
- If a receipt acknowledgment is not received after the time interval configured in **Maximum ACK Wait Time** has elapsed, the Radio Uninhibit Packet will be resent for a number of times as configured in **Number of Retries**. If a receipt acknowledgment is not received even after attempts have been made to resend the Radio Uninhibit Packet, a No Reply Tone (4 beeps) is output from the transceiver and a “No Reply” message appears on the screen, after which the transceiver returns to the previous channel display.
- Transmission of the Radio Uninhibit Packet can be canceled by pressing the **Clear** button.
- In an LTR Trunking system, an “Out of Range” message appears on the display and Radio Uninhibit Packet transmission ends if connection to the repeater cannot be established.

The transceiver can initiate various communications using 5-tone signaling.

7.1 5-tone Outline

5-tone is the signaling mainly used in Europe. The transceiver can make a Selcall, Group Call, and Status Call by using the consecutive 5 single tones.

Note

- For the 800 MHz/ 900 MHz model, the 800 MHz model, and the 900 MHz model, the 5-tone function cannot be used.

Available Communication Functions

The transceiver can make the following types of communication using 5-tone signaling:

Individual Call

Individual Call is used to initiate a call to the specified transceiver. If the received 5-tone code matches the 5-tone code preconfigured for the transceiver, the transceiver determines that the transceiver received an Individual Call.

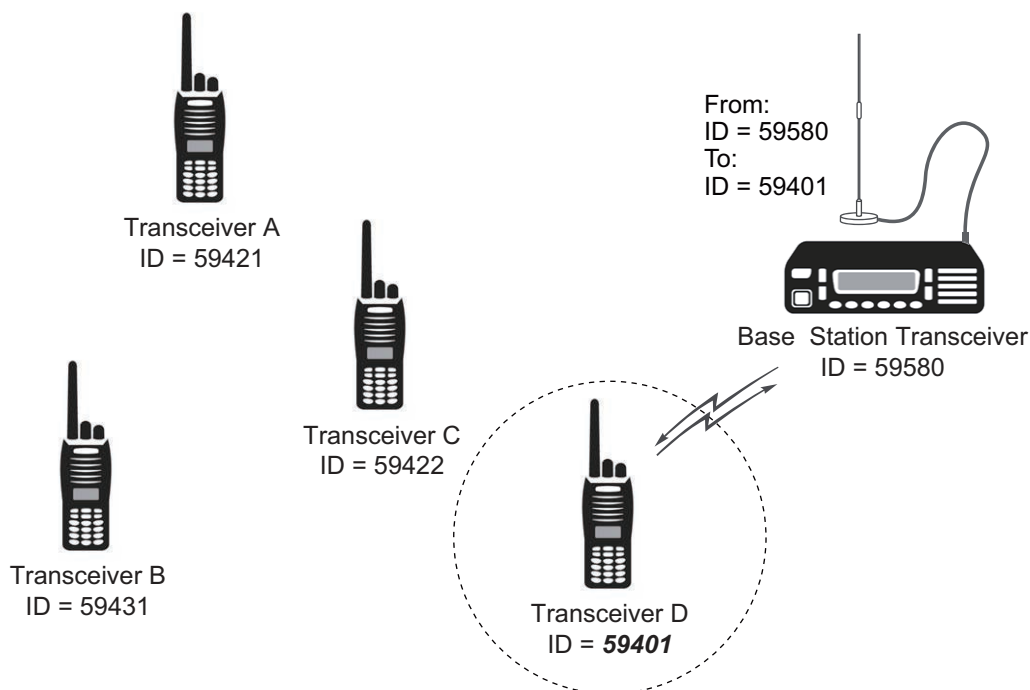


Figure 7-1 Image of Communications Using 5-tone (Individual Call)

Group Call

Group Call is used to initiate a call to several transceivers in a group at the same time. In Group Call, the transceiver can initiate a Group Call by including a **Group Tone** in a 5-tone code. When the transceiver receives a 5-tone code containing a **Group Tone** that matches the 5-tone code preconfigured for the transceiver, the transceiver determines that the transceiver received a Group Call.

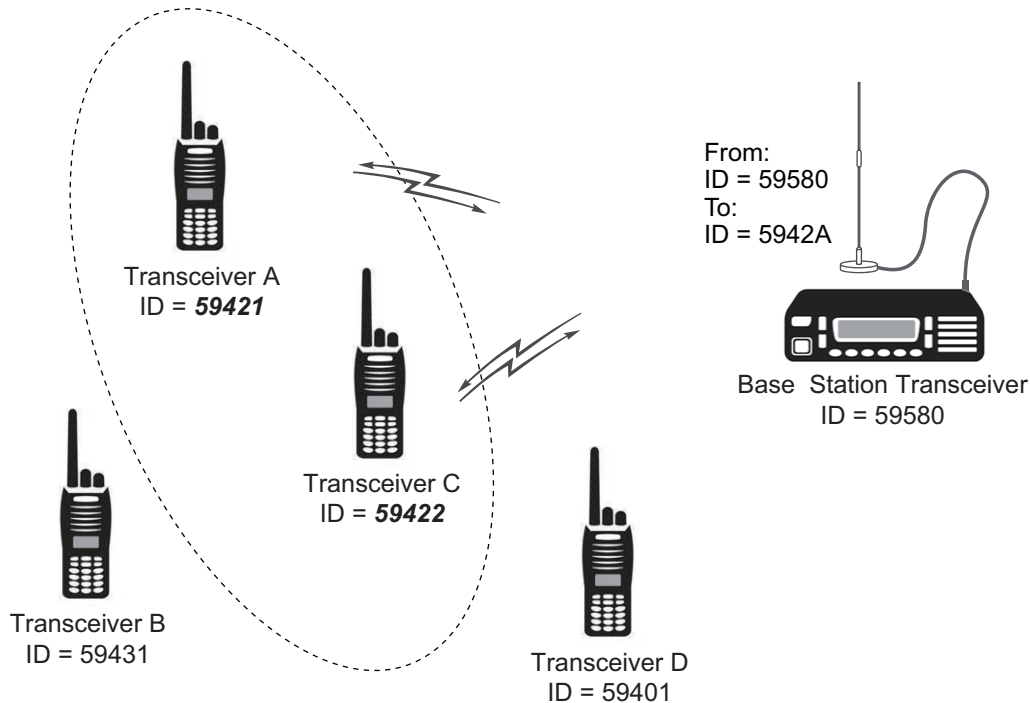


Figure 7-2 Image of Communications Using 5-tone (Group Call)

Status Message

By sending and receiving a status number by using 5-tone signaling, the transceiver can send and receive the message corresponding to the status number.

Short Message

The transceiver can send and receive a message consisting of a maximum of 48 characters by using the combination of the FleetSync Short Message function and a 5-tone code.

Others

- The transceiver can receive a Long Message. The transceiver can send the received Long Message to an external device such as a PC via a communication port.
- By receiving a command sent from the base station transceiver, the transceiver executes the operation corresponding to the command.
- By receiving the Remote Stun or Remote Kill command, the transceiver can be prevented from being used. Besides, the transceiver in an unusable state can be usable by receiving the Remote Revive command.

About 5-tone Code

5-tone signaling uses single tones from 300 Hz to 3000 Hz. 5 consecutive single tones are stored as a 5-tone code in a frame and sent and received as a frame. When carrying out various types of communication via a repeater, a maximum of 3 frames can be used to send and receive 5-tone codes. A 5-tone code can be represented using numbers and alphabets from A to E.

Example 1:

The 5-tone code is sent and received in order from 0 to 4.
Frame: 01234

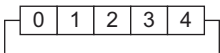


Figure 7-3 5-tone Code

Example 2:

The 5-tone codes are sent and received in order from Frame 1 to Frame 2. The sending and receiving order of the 5-tone code of each frame is the same as Example 1.
Frame 1: 01234
Frame 2: 56789

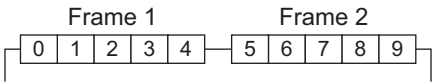


Figure 7-4 5-tone Code

Example 3:

The 5-tone codes are sent and received in order from Frame 1 to Frame 3. The sending and receiving order of the 5-tone code of each frame is the same as Example 1.
Frame 1: 01234
Frame 2: 56789
Frame 3: 98765

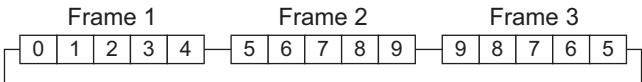


Figure 7-5 5-tone Code

Generally, tones from 0 to 9 are used as a code representing a transceiver individual number. Tones from A to E are used as a code with which the transceiver can behave in a particular way, such as a **Group Tone** or **Repeat Tone**.

Tone Period

Tone Period is the length of each single tone from 0 to 9 and from A to E.

For example, each single tone is sent with the 70-ms tone length if the transceiver is configured as follows:

5-tone Standard: EEA

Tone Period: 70 ms

Single Tone: 1 (1124 Hz), 2 (1197 Hz), 3 (1275 Hz), 4 (1358 Hz), 5 (1446 Hz)

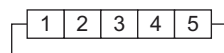


Figure 7-6 Tone Period

Configuration using KPG-D3/ D3N

Configuring **Tone Period** (See Radio Configuration > Protocol Options > 5-tone > Profiles > General)

Receive Gap Period

Receive Gap Period is the length of time for the transceiver to detect a received 5-tone code as consecutive codes in one frame.

If the transceiver receives a subsequent 5-tone code after the length of time configured for **Receive Gap Period** elapses, the 5-tone code is recognized as the 5-tone code of the next frame. The 5-tone codes received before the length of time configured for **Receive Gap Period** elapses are recognized as consecutive 5-tone codes.

The recommended value for **Receive Gap Period** is 1.5 times the value of **Tone Period**.

Configuration using KPG-D3/ D3N

Configuring **Receive Gap Period** (See Radio Configuration > Protocol Options > 5-tone > Profiles > General)

Repeat Tone

Repeat Tone is the function that substitutes a tone with a different tone and sends the tone if a 5-tone code to be sent contains a series of the same tone.

For example, when the transceiver sends the 5-tone code 12335, “3E” substitutes for the series of the same tone “33” and is sent if “E” is configured in **Repeat Tone**. In other words, 123E5 is actually sent in this case.

If the receiving transceiver receives the 5-tone code 123E5, the transceiver recognizes that the tone in the digit preceding “E” is consecutively received. In other words, the transceiver recognizes that 12335 is received in this case.

Table 7-1 Usage Example of Repeat Tone

Encode Code	Decode Code	Code Recognized by the Receiving Transceiver
12335	123E5	12335
12333	123E3	12333
11111	1E1E1	11111
E2345	E2345	E2345

 Note

- Generally, E is used as the **Repeat Tone**.
- Tones from A to E are usually used as special tones and they are not used for a transceiver individual ID. Therefore, the **Repeat Tone** is not generally sent as the first tone in a frame. If E2345 is sent as in the example above, “E” is not recognized as the **Repeat Tone**.

Configuration using KPG-D3/ D3N

Configuring **Repeat Tone** ( **See** Radio Configuration > Protocol Options > 5-tone > Profiles > General)

Frequency (Decode Single Tone)

Frequency (Decode Single Tone) is the frequency of the single tone which the transceiver waits to receive.

If the transceiver receives a tone on the frequency configured for **Frequency (Decode Single Tone)** consecutively for the length of time configured for **Duration (Decode Single Tone)**, the transceiver can receive the tone as a single tone.

The transceiver can behave similar to when the transceiver receives a 5-tone code, such as opening or closing the monitor, turning the LED on or off, or flashing the LED. Generally, this function is used for closing the monitor of the transceiver by receiving a single tone. (Refer to [CMP ^TONE](#).)

Configuration using KPG-D3/ D3N

Configuring **Frequency (Decode Single Tone)** ( **See** Radio Configuration > Protocol Options > 5-tone > Profiles > General > Decode Single Tone)

Duration (Decode Single Tone)

Duration (Decode Single Tone) is the length of time for the transceiver to receive a single tone consecutively.

If the transceiver receives a tone on the frequency configured for **Frequency (Decode Single Tone)** consecutively for the length of time configured for **Duration (Decode Single Tone)**, the transceiver can receive the tone as a single tone.

The transceiver can behave similar to when the transceiver receives a 5-tone code, such as opening or closing the monitor, turning the LED on or off, or flashing the LED. (Refer to [CMP ^TONE](#).)

Configuration using KPG-D3/ D3N

Configuring **Duration (Decode Single Tone)** ( **See** Radio Configuration > Protocol Options > 5-tone > Profiles > General > Decode Single Tone)

About 5-tone Signaling Formats (5-tone Standard)

12 types of signaling formats exist for single tones used for 5-tone signaling. The 5-tone signaling format is determined by country and region. More than one signaling format may be used for a region, such as CCIR and ZVEI.

In the 12 types of signaling formats, the frequency for each single tone from 0 to 9 and A to E is determined. One of the signaling formats can be used according to the system in use. If no signaling format is appropriate for the system in use, use **Kenwood Tone**.

In **Kenwood Tone**, the frequency of each single tone from 0 to 9 and A to E can be configured as desired.

The signaling format to be used can be configured for **5-tone Standard** by using KPG-D3/ D3N.

Table 7-2 5-tone Signaling Format 1

Tone	5-tone Signaling Format			
	ZVEI	CCIR	EEA	PZVEI
0	2400 Hz	1981 Hz	1981 Hz	2400 Hz
1	1060 Hz	1124 Hz	1124 Hz	1060 Hz
2	1160 Hz	1197 Hz	1197 Hz	1160 Hz
3	1270 Hz	1275 Hz	1275 Hz	1270 Hz
4	1400 Hz	1358 Hz	1358 Hz	1400 Hz
5	1530 Hz	1446 Hz	1446 Hz	1530 Hz
6	1670 Hz	1540 Hz	1540 Hz	1670 Hz
7	1830 Hz	1640 Hz	1640 Hz	1830 Hz
8	2000 Hz	1747 Hz	1747 Hz	2000 Hz
9	2200 Hz	1860 Hz	1860 Hz	2200 Hz
A	2800 Hz	2400 Hz	1055 Hz	970 Hz
B	810 Hz	930 Hz	930 Hz	810 Hz
C	970 Hz	2247 Hz	2247 Hz	2800 Hz
D	886 Hz	991 Hz	991 Hz	886 Hz
E	2600 Hz	2110 Hz	2110 Hz	2600 Hz
Tone Period	70 ms	100 ms	40 ms	70 ms

Table 7-3 5-tone Signaling Format 2

Tone	5-tone Signaling Format			
	DZVEI	PCCIR	PDZVEI	ZVEI-2
0	2200 Hz	1981 Hz	2200 Hz	2400 Hz
1	970 Hz	1124 Hz	970 Hz	1060 Hz
2	1060 Hz	1197 Hz	1060 Hz	1160 Hz
3	1160 Hz	1275 Hz	1160 Hz	1270 Hz
4	1270 Hz	1358 Hz	1270 Hz	1400 Hz
5	1400 Hz	1446 Hz	1400 Hz	1530 Hz
6	1530 Hz	1540 Hz	1530 Hz	1670 Hz
7	1670 Hz	1640 Hz	1670 Hz	1830 Hz
8	1830 Hz	1747 Hz	1830 Hz	2000 Hz
9	2000 Hz	1860 Hz	2000 Hz	2200 Hz
A	2600 Hz	1055 Hz	825 Hz	886 Hz
B	2800 Hz	930 Hz	886 Hz	810 Hz
C	886 Hz	2400 Hz	2600 Hz	2600 Hz
D	810 Hz	991 Hz	2800 Hz	2800 Hz
E	2400 Hz	2110 Hz	2400 Hz	970 Hz
Tone Period	70 ms	100 ms	70 ms	70 ms

Table 7-4 5-tone Signaling Format 3

Tone	5-tone Signaling Format			
	EIA	Natel	AP-369	Kenwood
0	600 Hz	1633 Hz	980 Hz	815 Hz
1	741 Hz	631 Hz	1190 Hz	882 Hz
2	882 Hz	697 Hz	1380 Hz	954 Hz
3	1023 Hz	770 Hz	1600 Hz	1032 Hz
4	1164 Hz	852 Hz	1800 Hz	1117 Hz
5	1305 Hz	941 Hz	2010 Hz	1209 Hz
6	1446 Hz	1040 Hz	2220 Hz	1308 Hz
7	1587 Hz	1209 Hz	2410 Hz	1415 Hz
8	1728 Hz	1336 Hz	2590 Hz	1531 Hz
9	1869 Hz	1477 Hz	2820 Hz	1657 Hz
A	2151 Hz	1633 Hz	770 Hz	1939 Hz
B	2433 Hz	600 Hz	740 Hz	2270 Hz
C	2010 Hz	1995 Hz	-	2098 Hz
D	2292 Hz	2205 Hz	-	2457 Hz
E	459 Hz	1805 Hz	2960 Hz	1792 Hz
Tone Period	33 ms	70 ms	70 ms	70 ms

Configuration using KPG-D3/ D3N

- Configuring **5-tone Standard** ( See Radio Configuration > Protocol Options > 5-tone > Profiles > General)
- Configuring **Kenwood Tone** ( See Radio Configuration > Protocol Options > 5-tone > Other Options > Kenwood Tone)

7.2 About Configuration Using KPG-D3/ D3N

The following configurations using KPG-D3/ D3N are required to initiate various communications using 5-tone signaling.

● Configuring a channel for 5-tone signaling

An analog system channel for transmission and reception using 5-tone signaling needs to be configured.

● Configuring the My ID

A transceiver ID used for transmission and reception using 5-tone signaling is configured. **My ID** is the transceiver unique code. A different ID needs to be configured for each of all the transceivers operated in a system using 5-tone signaling.

● Configuring the System Parameter

The parameters for various functions to determine the transceiver behavior for transmission and reception using 5-tone signaling are configured. A maximum of 16 System Parameters can be configured and one of the System Parameters can be assigned to each channel. The transceiver can send and receive a 5-tone code according to the configuration for System Parameter.

● Configuring the Encode Format and Decode Format

Encode Format and **Decode Format** are scripts used to send and receive a 5-tone code. The script that determines the timing to send or receive a 5-tone code or the transceiver behavior when a 5-tone code is sent or received is created using various commands and configured for the transceiver.

● Configuring how to send and receive a 5-tone code

To send a 5-tone code, assign **Encode Format** to various functions to act as triggers (**Pressing PTT** and **Call** button, etc.). In addition, to receive a 5-tone code, assign **Decode Format** to each System Parameter.

My ID

My ID is the unique transceiver code used to send and receive a 5-tone code. **My ID** consists of a maximum of 8 alphanumeric characters.

My ID can be configured for each transceiver by using KPG-D3/ D3N. In addition, the following functions relevant to **My ID** can be configured using KPG-D3/ D3N:

- My ID Digits
- Power-on My ID Edit

Configuration using KPG-D3/ D3N

Configuring **My ID** ( See [Radio Configuration > Protocol Options > 5-tone > Other Options > My ID](#))

My ID Digits

My ID Digits is the function to specify the number of digits for **My ID** which can be configured for the transceiver.

My ID can be configured with the number of digits specified in **My ID Digits** when configuring **My ID** for the transceiver by using KPG-D3/ D3N or when changing the **My ID** configured for the transceiver by operating a transceiver button.

Configuration using KPG-D3/ D3N

Configuring **My ID Digits** ( See Radio Configuration > Protocol Options > 5-tone > Other Options > My ID)

Power-on My ID Edit

Power-on My ID Edit is the function to change the **My ID** configured for the transceiver by operating a transceiver button when the transceiver is turned on.

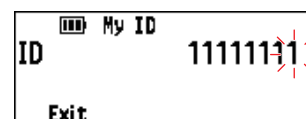
Operating the transceiver

To use this function, **Power-on My ID Edit** needs to be enabled.

1 Turn the transceiver on.

The transceiver enters My ID Mode and the **My ID** configured for the transceiver appears on the display.

The display example on the right shows when the number of digits specified in **My ID Digits** is 8.



2 Enter a 5-tone code.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

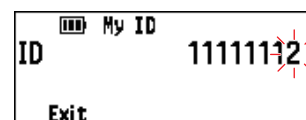
- **Using the keypad**

A 5-tone code can be entered by pressing the [0] to [9] buttons.

- **Using the PF buttons**

A 5-tone code can be selected by pressing the [▲] or [▼] button.

A 5-tone code can be selected by pressing the [◀] or [▶] button.



3 Press the **Menu** ([□]) or **[*]** button after entering the 5-tone code.

The entered code is confirmed and the transceiver exits My ID Mode.



Configuration using KPG-D3/ D3N

Configuring **Power-on My ID Edit** to be enabled or disabled ( See Radio Configuration > Protocol Options > 5-tone > Other Options > My ID)

TX Address/ RX Address

TX Address is the address of the target transceiver for sending a 5-tone code. **RX Address** is the own address of the transceiver for receiving a 5-tone code.

TX Address and **RX Address** can be configured for each channel by using KPG-D3/ D3N.

● TX Address

TX Address is generally used as the target transceiver's ID to which a call is initiated.

TX Address is described as “^TX” in Encode/ Decode Format. (Refer to [CMP ^RX1 to CMP ^RX8](#), [SEND ^TX1 to SEND ^TX8](#).)

● RX Address

RX Address is generally used as the own ID which the transceiver waits to receive on a channel. **RX Address** is used when sending or receiving a 5-tone code. Also, **RX Address** is used such as when changing the own ID for each channel.

RX Address is described as “^RX” in Encode/ Decode Format. (Refer to [CMP ^RX1 to CMP ^RX8](#), [SEND ^TX1 to SEND ^TX8](#).)

Configuration using KPG-D3/ D3N

Configuring TX Address/ RX Address

( [See](#)) Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Analog > 5-tone)

( [See](#)) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Analog > 5-tone)

( [See](#)) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > Analog > 5-tone)

( [See](#)) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > Analog > 5-tone)

Copy from Default TX/RX Address

Copy from Default TX/RX Address is the function to substitute **TX Address** configured for the selected channel for the Selcall code or Status code retained in the transceiver when a zone or channel is changed. Copy from Default TX/RX Address is also the function to substitute **RX Address** configured for the selected channel for the Receive code retained in the transceiver when a zone or channel is changed.

Example:

When configured as follows, 59400111 substitutes for the Selcall code or Status code retained in the transceiver.

TX Address: 59400

Status Digits: 1, 2, 3, 4, 5, 6, 7, 8

Or

Selcall Digits: 1, 2, 3, 4, 5, 6, 7, 8

Note

- If “Overwrite” is configured for **Digit Entry Method** and if **Copy from Default TX/RX Address** is enabled, the configuration for **Digit Entry Method** is applied if the zone or channel is not changed. The configuration for **Copy from Default TX/RX Address** is applied if the zone or channel is changed. (Refer to [Digit Entry Method](#).)

Configuration using KPG-D3/ D3N

Configuring **Copy from Default TX/RX Address** to be enabled or disabled ( See Radio Configuration > Protocol Options > 5-tone > Profiles > General > Selectable Digits)

Auto Reset Timer

Auto Reset Timer is the length of time from when the received 5-tone code matches the 5-tone code preconfigured for the transceiver until the matching state is automatically reset. The matching state means that communications using only QT/DQT are available after the 5-tone code matches.

Auto Reset Timer can be configured by using KPG-D3/ D3N. Also, how the transceiver behaves after the amount of time configured for **Auto Reset Timer** elapses can be configured.

Table 7-5 Auto Reset Timer

Configuration		Description
Auto Reset Timer	Off	Auto Reset Timer will not be activated.
	0 sec to 300 sec	After the configured time elapses, the matching state of the 5-tone code is automatically reset.
LCD		Auto Reset Timer will not be activated.
LED		The LED turns off when the amount of time configured for Auto Reset Timer elapses.
Alert Tone		The Alert Tone stops sounding when the amount of time configured for Auto Reset Timer elapses.
Monitor		The matching state of 5-tone is reset when the amount of time configured for Auto Reset Timer elapses.  Note For the portable transceiver (basic model), Monitor is always enabled.

Note

- Auto Reset Timer** is not activated while the Transpond is suspended by the CTPP command. (Refer to [CTTP](#).)

Configuration using KPG-D3/ D3N

Configuring **Auto Reset Timer** ( See Radio Configuration > Protocol Options > 5-tone > Profiles > General > Auto Reset)

Sidetone

Sidetone is the function to emit the tone of the 5-tone code from the speaker of the transceiver while the transceiver transmits the 5-tone code.

Note

- If “Silent” is configured for **Emergency Mode Type**, the tone of the 5-tone code in Emergency Mode does not sound from the speaker of the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Sidetone** to be enabled or disabled ( See Radio Configuration > Protocol Options > 5-tone > Other Options > Encode)

7.3 Making a Selective Call

Selective Call is the function to initiate an individual call using 5-tone signaling.

Selective Call initiated by 5-tone signaling is generally used as a function to recognize the unique number of a transceiver or repeater. A 5-tone code to be sent in a Selective Call can be configured using KPG-D3/ D3N. In addition, the 5-tone code to be sent in Selective Call can be changed using the transceiver button.

The 5-tone code to be sent in a Selective Call is referred to as “Selcall code”. A received 5-tone code is referred to as “Receive code”.

To initiate a Selective Call using 5-tone signaling, a script for Selective Call must be created in **Encode Format** and **Decode Format** in advance and configured for the transceiver.

- **If sending a 5-tone code in a Selective Call:**

The transceiver sends a Selcall code according to the script created in **Encode Format**. (Refer to [Encode Format](#).)

- **If receiving a 5-tone code in a Selective Call:**

The transceiver receives a Selcall code according to the script created in **Decode Format**. (Refer to [Decode Format](#).)

Sending a Selective Call

A Selcall code can be sent using one of the following functions. However, **Encode Format** to send a Selcall code needs to be configured for each function.

Table 7-6 Encode Function

Function	Behavior
Pressing PTT	Encode Format is executed when the PTT switch is pressed.
Releasing PTT	Encode Format is executed when the PTT switch is released.
Call 1 to Call 6	Encode Format is executed when the Call 1 to Call 6 button is pressed.
On-hook/ Off-hook (Mobile only)	Encode Format is executed when the microphone switches to the on-hook or off-hook state.
Channel Select	Encode Format is executed when the channel is changed.
Power-on/ Power-off	Encode Format is executed when the transceiver is turned on or off.
Auto Transmit	Encode Format is executed when GPS data is automatically sent.
Emergency Button	Encode Format is executed when the transceiver enters Emergency Mode by pressing the Emergency button.
Man-down	Encode Format is executed when the transceiver enters Emergency Mode by the Man-down function.
Stationary	Encode Format is executed when the transceiver enters Emergency Mode by the Stationary function.
Motion	Encode Format is executed when the transceiver enters Emergency Mode by the Motion function.
Lone Worker	Encode Format is executed when the transceiver enters Emergency Mode by the Lone Worker function.

A Selcall code can also be sent by specifying a Selcall code in Selcall Mode and executing any of the operations above. (Refer to [Changing the Selcall Code](#).)

Note

- If **Sidetone** is enabled, the tone of a Selcall code can be emitted from the speaker of the transceiver when the transceiver sends the Selcall code. (Refer to [Sidetone](#).)

Configuration using KPG-D3/ D3N

Configuring **Encode Format** to be executed when sending ([See](#) Radio Configuration > Protocol Options > 5-tone > Encode/Decode Format > Encode)

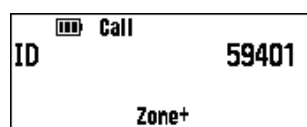
Receiving a Selective Call

The transceiver behavior varies depending on whether the transceiver stores the received Selcall code or not.

Transceiver behavior

• If the transceiver does not store the received Selcall code:

This is the example of when **Decode Format** to display the received Selcall code on the display is configured. The transceiver executes **Decode Format** when the transceiver receives a Selcall code.



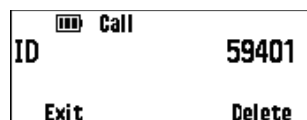
Note

- The code configured as a **Group Tone** appears as "G".
- The transceiver display status, LED status, and Alert Tone status are cleared if any transceiver button is pressed or the length of time configured for **Auto Reset Timer** elapses.
- If the received Selcall code matches the Selcall code configured in **Selcall List** of the transceiver, the corresponding Selcall Name appears on the display.

• If the transceiver stores the received Selcall code:

This is the example of when **Decode Format** to store the received Selcall code in the transceiver stack memory and display the received Selcall code on the display is configured.

The transceiver executes **Decode Format** when the transceiver receives a Selcall code. The transceiver enters Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)



Note

- The code configured as a **Group Tone** appears as "G".

Configuration using KPG-D3/ D3N

Configuring **Decode Format** to be executed when receiving ([See](#) Radio Configuration > Protocol Options > 5-tone > Encode/Decode Format > Decode)

Changing the Selcall Code

In Selcall Mode, the Selcall code having the number of digits (from 1 to 8) specified by **Selcall Digits** can be changed by selecting the Selcall code configured in **Selcall List** or directly entering the Selcall code. (Refer to [Selcall List](#).)

The transceiver can enter Selcall Mode and the Selcall code can be changed using one of the following operations:

● PF button

Pressing one of the following buttons places the transceiver in Selcall Mode:

- **Individual** button
- **Individual + Status** button
- **Individual + Short Message** button
- **Group** button
- **Group + Status** button
- **Group + Short Message** button

● Menu button

Pressing the **Menu** button to enter Menu Mode, and then selecting one of the following configurations places the transceiver in Selcall Mode.

(Refer to Common Function Part [Using Menu Mode](#).)

- Individual
- Individual + Status
- Individual + Short Message
- Group
- Group + Status
- Group + Short Message

● Keypad entry

If one of the following is configured for **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad places the transceiver in Selcall Mode.

- Individual
- Individual + Status
- Individual + Short Message
- Group
- Group + Status
- Group + Short Message

The transceiver enters the Selcall code shortcut entry mode or goes into the same state as when the first digit of the Selcall code is entered. (Refer to Common Function Part [Keypad Operation](#).)

● SELC (Encode Format Command)

The transceiver enters Selcall Mode by executing the SELC command of **Encode Format**. The transceiver behavior in Selcall Mode is the same as when the **Individual** or **Group** button is pressed. (Refer to [SELC](#).)

● SELMC (Encode Format Command)

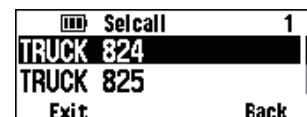
The transceiver enters Selcall Mode by executing the SELMC command of **Encode Format**. The transceiver behavior in Selcall Mode is the same as when the **Individual + Status** or **Group + Status** button is pressed. (Refer to [SELMC](#).)

Operating the transceiver

● Changing the Selcall code by selecting from the Selcall List

1 Press one of the following buttons:

- **Individual** button
- **Individual + Status** button
- **Individual + Short Message** button
- **Group** button
- **Group + Status** button
- **Group + Short Message** button



The transceiver enters Selcall Mode and then the **Selcall List** appears.

The Selcall Name corresponding to the Selcall codes having the same number of digits as the number of digits specified by **Selcall Digits** appear. The following displays are the Selcall Name display examples. (Refer to [Selcall Digits](#).)

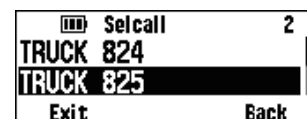
The following operations are identical even if the transceiver enters Selcall Mode by a user pressing the **Menu** button, with keypad entry, or with command operation.

Note

- If a name corresponding to a Selcall code is not configured in **Selcall List**, the Selcall code appears.

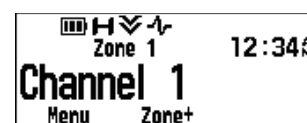
2 Select a Selcall code from the **Selcall List** by pressing the [**▲**] or [**▼**] button.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **Menu** ([**□**]) or [*****] button.

The selected Selcall code is confirmed and the transceiver exits Selcall Mode.



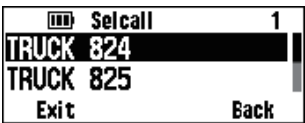
Note

- If Selcall Mode is entered by pressing one of the following buttons, Status Mode or Short Message Mode is entered by pressing the [**▶**] button:
 - **Individual + Status** button
 - **Individual + Short Message** button
 - **Group + Status** button
 - **Group + Short Message** button

● Changing the Selcall code by directly entering a Selcall code

1 Press one of the following buttons:

- Individual button
- Individual + Status button
- Individual + Short Message button
- Group button
- Group + Status button
- Group + Short Message button



The transceiver enters Selcall Mode and then the Selcall List appears.

The Selcall Name corresponding to the Selcall codes having the same number of digits as the number of digits specified by **Selcall Digits** appear. The following displays are the Selcall Name display examples. (Refer to [Selcall Digits](#).)

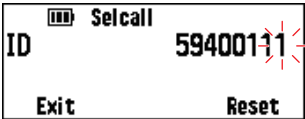
The following operations are identical even if the transceiver enters Selcall Mode by a user pressing the **Menu** button, with keypad entry, or with command operation.

Note

- If a name corresponding to a Selcall code is not configured in **Selcall List**, the Selcall code appears.

2 Press and hold the **Menu** ([]) button.

A Selcall code can be entered.



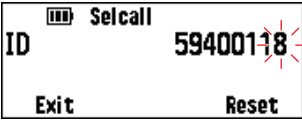
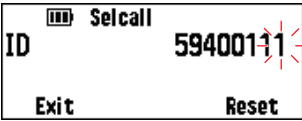
3 Enter a Selcall code.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

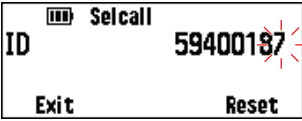
● If entering a Selcall code by using the keypad:

A Selcall code can be entered by pressing a button on the keypad. The entered Selcall code appears in the rightmost digit as below:

Press the [8] button.



Press the [7] button.



● If entering a Selcall code after specifying the digit:

A Selcall code can be entered by pressing the [▲] or [▼] button.

Pressing the [◀] button shifts the cursor to the left.

Pressing the [▶] button shifts the cursor to the right.

Note

- If “Replace” is configured for **Digit Entry Method**, a Selcall code can be entered after the **TX Address** configured for the selected channel substitutes for the Selcall code. If no **TX Address** is configured for the selected channel, a Selcall code can be entered after “11111111” substitutes for the Selcall code. (Refer to [Digit Entry Method](#).)

4 Press the **Menu** ([) or [*****] button.

The entered Selcall code is confirmed and the transceiver exits Selcall Mode.



Note

- If Selcall Mode is entered by pressing one of the following buttons, Status Mode or Short Message Mode is entered by pressing the [**▶**] button while the **Selcall List** is displayed:
 - **Individual + Status** button
 - **Individual + Short Message** button
 - **Group + Status** button
 - **Group + Short Message** button
- If **Selectable Group Tone** is enabled, a **Group Tone** can be entered by pressing and holding the [**0**] button. (Refer to [Selectable Group Tone](#).)
- If the **Group Tone** is entered, "G" appears on the display; however, the tone configured for **Group Tone** is actually transmitted. (Refer to [Group Tone](#).)
- If no digit is specified as a changeable digit for **Selcall Digits**, the transceiver cannot enter Selcall Mode.
- Pressing the **Back** ([) or [**#**] button restores the value of the Selcall code before the change.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the **Keypad Operation** of the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

Changing the Receive Code

In Receive Entry Mode, the Receive code having the number of digits (from 1 to 8) specified by **Selcall Digits** can be changed by directly entering the Receive code.

The transceiver can enter Receive Entry Mode and the Receive code can be changed using one of the following operations:

- **Receive Entry button**

Pressing the **Receive Entry** button places the transceiver in Receive Entry Mode.

- **Menu button**

Pressing the **Menu** button places the transceiver in Menu Mode, and then selecting “Receive Entry” places the transceiver in Receive Entry Mode. (Refer to Common Function Part [Using Menu Mode.](#))

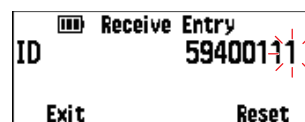
Operating the transceiver

1 Press the **Receive Entry** button.

The transceiver enters Receive Entry Mode and the Receive code retained in the transceiver appears.

The display example on the right shows when the number of digits specified by **Receive Digits** is 8.

The following operations are identical if the transceiver enters Receive Entry Mode by a user pressing the **Menu** button.



Note

- If no Receive code is retained in the transceiver, “11111111” appears. However, if the channel is changed before the transceiver enters Receive Entry Mode, the displayed Receive code varies according to the configuration for **Copy from Default TX/RX Address**. (Refer to [Copy from Default TX/RX Address.](#))

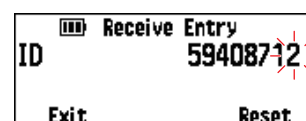
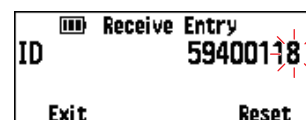
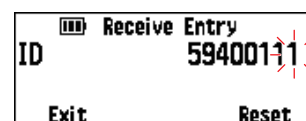
2 Enter a Receive code.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

- **If entering a Receive code by using the keypad:**

A Receive code can be entered by pressing a button on the keypad. The entered Receive code appears in the rightmost digit as below:

Press the **[8]** button.



Press the **[7]**, **[1]**, and **[2]** buttons in order.

- **If entering a Receive code after specifying the digit:**

A Selcall code can be entered by pressing the **[▲]** or **[▼]** button.

Pressing the **[◀]** button shifts the cursor to the left.

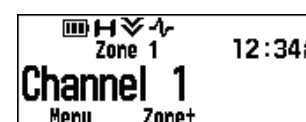
Pressing the **[▶]** button shifts the cursor to the right.

Note

- If “Replace” is configured for **Digit Entry Method**, a Receive code can be entered after the **TX Address** configured for the selected channel substitutes for the Receive code. If no **TX Address** is configured for the selected channel, a Receive code can be entered after “11111111” substitutes for the Receive code. (Refer to [Digit Entry Method](#).)

3 Press the **Menu** (**[☐]**) or **[*]** button.

The entered Receive code is confirmed and the transceiver exits Receive Entry Mode.



Note

- If no digit is specified as a changeable digit for **Receive Digits**, the transceiver cannot enter Receive Entry Mode.
- Pressing the **Back** (**[↵]**) or **[#]** button restores the value of the Receive code before the change.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)

Receive Digits

Receive Digits is the number of digits for a Receive code that can be changed by directly entering a code in Receive Entry Mode. The Receive code having the number of digits (from 1 to 8) specified by **Receive Digits** can be changed.

Example:

When configured as follows, the codes "5", "4", and "9" for the first, third, and seventh digits can be changed.

(Refer to [Changing the Receive Code.](#))

Receive code: 59400593

Receive Digits: 1, 3, 7

Configuration using KPG-D3/ D3N

Configuring **Receive Digits** ( See Radio Configuration > Protocol Options > 5-tone > Profiles > General > Selectable Digits)

Selcall Digit Display

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Selcall Digit Display is the function to display the Selcall code instead of the channel name on the display when the transceiver is in the standby state.

If this function is enabled, the Selcall code can be displayed on the display when the transceiver is in the standby state.

Operating the transceiver

The following is the operation example of when the transceiver is configured as below:

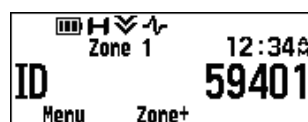
TX Address of channel 1: 59401

TX Address of channel 2: 59402

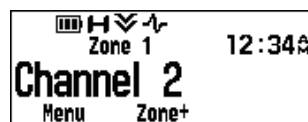
Copy from Default TX/RX Address: Check

Selcall Digits: 1, 2, 3, 4, 5

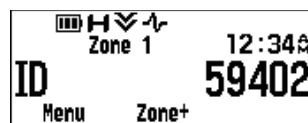
The Selcall code (**TX Address**) of channel 1 is displayed.



If channel 1 is changed to channel 2, the channel name of channel 2 is displayed.



The Selcall code (**TX Address**) of channel 2 is displayed if 2 sec elapses after the channel name is displayed.



Configuration using KPG-D3/ D3N

Configuring **Selcall Digit Display** to be enabled or disabled ( See Radio Configuration > Protocol Options > 5-tone > Profiles > General > Selectable Digits)

Changing the Selcall Code with the Digit Specified

Pressing the **Digit 1x Up**, **Digit 1x Down**, **Digit 10x Up**, or **Digit 10x Down** button changes the Selcall code with the digit specified.

Table 7-7 Digit Up/ Digit Down

Button	Description
Digit 1x Up	Pressing the Digit 1x Up button increases the code in the last digit of the Selcall code by one.
Digit 1x Down	Pressing the Digit 1x Down button decreases the code in the last digit of the Selcall code by one.
Digit 10x Up	Pressing the Digit 10x Up button increases the code in the 2nd digit from the last digit of the Selcall code by one.
Digit 10x Down	Pressing the Digit 10x Down button decreases the code in the 2nd digit from the last digit of the Selcall code by one.

Operating the transceiver

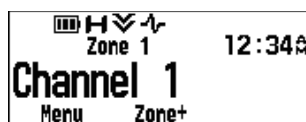
● Digit 1x Up/ Digit 1x Down

The following is the operation example of when the transceiver is configured as below:

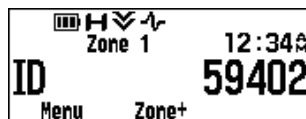
TX Address: 59401

Selcall Digits: 1, 2, 3, 4, 5

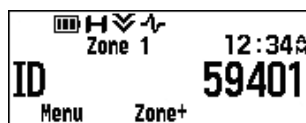
The channel name is displayed.



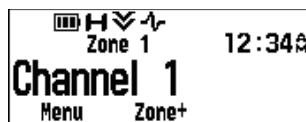
Pressing the **Digit 1x Up** button displays the Selcall code (TX Address) and changes the Selcall code from “59401” to “59402”.



Pressing the **Digit 1x Down** button changes the Selcall code from “59402” to “59401”.



The transceiver restores the channel name display when the length of time configured for **Mode Reset Timer** elapses.



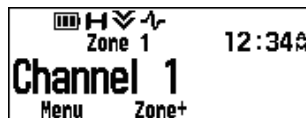
● Digit 10x Up/ Digit 10x Down

The following is the operation example of when the transceiver is configured as below:

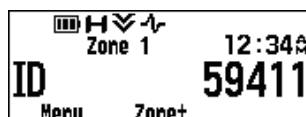
TX Address: 59401

Selcall Digits: 1, 2, 3, 4, 5

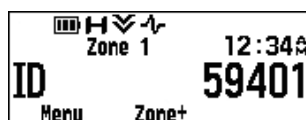
The channel name is displayed.



Pressing the **Digit 10x Up** button displays the Selcall code (**TX Address**) and changes the Selcall code from “59401” to “59411”.



Pressing the **Digit 10x Down** button changes the Selcall code from “59411” to “59401”.



The transceiver restores the channel name display when the length of time configured for **Mode Reset Timer** elapses.



Note

- If the function is executed by pressing the **Digit 1x Up**, **Digit 1x Down**, **Digit 10x Up**, or **Digit 10x Down** button, a Button Beep A (1 beep) sounds from the transceiver.
- If no digit is specified as a changeable digit in **Selcall Digits**, a Button-entry Error Tone (1 beep) sounds from the transceiver and a Selcall code cannot be changed even by pressing the **Digit 1x Up**, **Digit 1x Down**, **Digit 10x Up**, or **Digit 10x Down** button.
- If only one digit is specified as a changeable digit in **Selcall Digits**, a Button-entry Error Tone (1 beep) sounds from the transceiver and a Selcall code cannot be changed even by pressing the **Digit 10x Up**, or **Digit 10x Down** button.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Selectable Group Tone

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Selectable Group Tone is the function that allows a user to enter the **Group Tone** for a digit specified by **Selcall Digits**. The operation varies as follows depending on the configuration for **Group Tone** (0 to 9, or A to E).

● If the Group Tone is from A to E:

Example 1:

Selectable Group Tone: Check

Group Tone: A

The **Group Tone** can be entered if the **[0]** button is pressed and held. "G" appears on the display.

Pressing the **[▲]** or **[▼]** button changes the digit as follows:

→ 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 → G → 0 → 1 ...

← 1 ← 2 ← 3 ← 4 ← 5 ← 6 ← 7 ← 8 ← 9 ← G ← 0 ← 1 ...

If "G" appears between 9 and 0, the **Group Tone** can be entered.

Example 2:

Selectable Group Tone: Uncheck

Group Tone: A

The **Group Tone** cannot be entered even if the **[0]** button is pressed and held. "0" is entered when the **[0]** button is pressed.

Pressing the **[▲]** or **[▼]** button changes the digit as follows:

→ 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 → 0 → 1 ...

← 1 ← 2 ← 3 ← 4 ← 5 ← 6 ← 7 ← 8 ← 9 ← 0 ← 1 ...

"G" does not appear between 9 and 0.

● If the Group Tone is from 0 to 9:

Example 1:

Selectable Group Tone: Check

Group Tone: 3

The **Group Tone** can be entered if the **[0]** button is pressed and held or if the **[3]** button is pressed. "G" appears on the display.

Pressing the **[▲]** or **[▼]** button changes the digit as follows:

→ 1 → 2 → G → 4 → 5 → 6 → 7 → 8 → 9 → 0 → 1 ...

← 1 ← 2 ← G ← 4 ← 5 ← 6 ← 7 ← 8 ← 9 ← 0 ← 1 ...

If "G" appears between 2 and 4, the **Group Tone** can be entered.

Example 2:

Selectable Group Tone: Uncheck

Group Tone: 3

The **Group Tone** cannot be entered even if the **[0]** button is pressed and held. "0" is entered when the **[0]** button is pressed.

Pressing the **[3]** button emits a Button-entry Error Tone (1 beep) from the transceiver.

Pressing the **[▲]** or **[▼]** button changes the digit as follows:

→ 1 → 2 → 4 → 5 → 6 → 7 → 8 → 9 → 0 → 1 ...

← 1 ← 2 ← 4 ← 5 ← 6 ← 7 ← 8 ← 9 ← 0 ← 1 ...

"G" does not appear between 2 and 4.

Note

- The configuration for **Selectable Group Tone** is applied only to the operation to enter a 5-tone code in Selcall Mode.

Configuration using KPG-D3/ D3N

Configuring **Selectable Group Tone** to be enabled or disabled ( **See** Radio Configuration > Protocol Options > 5-tone > Profiles > General > Selectable Digits)

Selcall List

Selcall List is the list where a Selcall code used for making an individual call with 5-tone signaling is configured. A maximum of 1500 Selcall codes can be configured in **Selcall List**.

Also, the list number of a **Selcall List** can be configured for each System Parameter.

Configuration using KPG-D3/ D3N

Configuring **Selcall List** ( **See** Radio Configuration > System Properties > ID/Status List > ID/Status List > 5-tone Selcall > 5-tone Selcall List)

Group Tone

Group Tone is the tone used when the transceiver makes a Group Call. The transceiver can initiate a call to several transceivers at the same time by sending and receiving a 5-tone code containing a **Group Tone**.

For example, if “A” is configured in **Group Tone**, the transceiver can initiate a call to transceivers from 12340 to 12349, and 1234A to 1234E by sending the 5-tone code 1234A.

Table 7-8 Usage Example of Group Tone

Encode Code	Decode Code
1234A	12340
	12341
	12342
	12343
	12344
	12345
	12346
	12347
	12348
	12349
	1234A
	1234B
	1234C
	1234D
	1234E

- Generally, “A” is used as the **Group Tone**.

Tones from “A” to “E” are usually used as special tones, and the tones are not used for a transceiver individual ID. Therefore, in the above example, transceiver can actually initiate a call to transceivers from 12340 to 12349.

Configuration using KPG-D3/ D3N

Configuring **Group Tone** ( See Radio Configuration > Protocol Options > 5-tone > Profiles > General)

Digit Entry Method

Digit Entry Method is the method to enter a 5-tone code in Selcall Mode, Status Mode, or Receive Entry Mode.

Table 7-9 Digit Entry Method

Configuration	Description
Replace ^{*1}	If a 5-tone code is entered by pressing a button on the keypad in Selcall Mode, Status Mode, or Receive Entry Mode, the following appears on the display according to the type of the 5-tone code: Selcall code: The TX Address configured for the selected channel appears. Status code: The TX Address configured for the selected channel appears. Receive code: The RX Address configured for the selected channel appears. A 5-tone code can be entered by overwriting the displayed 5-tone code.
Overwrite	If the transceiver enters Selcall Mode, Status Mode, or Receive Entry Mode, the last entered 5-tone code appears on the display. A 5-tone code can be entered by overwriting the displayed 5-tone code.

^{*1} The 5-tone code cannot be substituted when the 5-tone code is entered using the [▲] or [▼] button, or using the **Digit 1x Up**, **Digit 1x Down**, **Digit 10x Up**, or **Digit 10x Down** button.

Note

- In My ID Mode, the last entered 5-tone code appears regardless of the configuration for **Digit Entry Method**. **My ID** is retained in the transceiver even after the transceiver is turned off. (Refer to [My ID](#).)
- The Selcall code, Status code, and Receive code are retained in the transceiver even after the transceiver is turned off.

Configuration using KPG-D3/ D3N

Configuring **Digit Entry Method** ( See Radio Configuration > Protocol Options > 5-tone > Profiles > General)

Selcall Digits

Selcall Digits is the number of digits for a Selcall code that can be changed by selecting a Selcall code from the **Selcall List** or directly entering a code in Selcall Mode. The Selcall code having the number of digits (from 1 to 8) specified by **Selcall Digits** can be changed.

Example:

Selcall code: 59400511

Selcall Digits: 4, 5, 6

If the Selcall code is changed by directly entering a code, the code in the 4th to 6th digits "005" can be changed.

If selecting a Selcall code from the **Selcall List**, the Selcall code can be changed by selecting from the Selcall codes having the same number of digits as the number of digits specified by **Selcall Digits** (3 digits). (Refer to [Changing the Selcall Code.](#))

Configuration using KPG-D3/ D3N

Configuring **Selcall Digits** ( [See](#) Radio Configuration > Protocol Options > 5-tone > Profiles > General > Selectable Digits)

7.4 Sending and Receiving a Status Message (Status Call)

Status Message is a simplified messaging system to inform the base station or others of various types of information by sending and receiving a status number with 5-tone signaling. Using the Status Message, the transceiver can inform the base station of the transceiver status with a message, or the base station can provide instructions to mobile stations with a message.

To use Status Message, a message corresponding to a status number needs to be determined in advance.

A status number and a message corresponding to the status number can be configured using KPG-D3/ D3N. In addition, the 5-tone code to be sent in Status Message can be changed using the transceiver button.

The 5-tone code to be sent in Status Message is referred to as "Status code".

To send and receive a Status Message using 5-tone signaling, a script for Status Message must be created in **Encode Format** and **Decode Format** in advance and configured for the transceiver.

- **If sending a 5-tone code in a Status Call:**

The transceiver sends a Status code according to the script created in **Encode Format**. (Refer to [Encode Format.](#))

- **If receiving a 5-tone code in a Status Call:**

The transceiver receives a Status code according to the script created in **Decode Format**. (Refer to [Decode Format.](#))

Sending a Status Message

A Status code can be sent using one of the following functions. However, an Encode Format to send a Status code needs to be configured for each function.

Table 7-10 Encode Function

Function	Behavior
Pressing PTT	Encode Format is executed when the PTT switch is pressed.
Releasing PTT	Encode Format is executed when the PTT switch is released.
Call 1 to Call 6	Encode Format is executed when the Call 1 to Call 6 button is pressed.
On-hook/ Off-hook (Mobile only)	Encode Format is executed when the microphone switches to the on-hook or off-hook state.
Channel Select	Encode Format is executed when the channel is changed.
Power-on/ Power-off	Encode Format is executed when the transceiver is turned on or off.
Auto Transmit	Encode Format is executed when GPS data is automatically sent.
Emergency Button	Encode Format is executed when the transceiver enters Emergency Mode by pressing the Emergency button.
Man-down	Encode Format is executed when the transceiver enters Emergency Mode by the Man-down function.
Stationary	Encode Format is executed when the transceiver enters Emergency Mode by the Stationary function.
Motion	Encode Format is executed when the transceiver enters Emergency Mode by the Stationary function.
Lone Worker	Encode Format is executed when the transceiver enters Emergency Mode by the Lone Worker function.

A Status code can also be sent by specifying a Status code in Status Mode and executing any of the operations above. (Refer to [Changing the Status Code](#).)

Note

- If **Sidetone** is enabled, the tone of a Status code can sound from the transceiver speaker when the transceiver sends the Status code. (Refer to [Sidetone](#).)

Configuration using KPG-D3/ D3N

Configuring **Encode Format** to be executed when sending ( [See](#) Radio Configuration > Protocol Options > 5-tone > Encode/Decode Format > Encode)

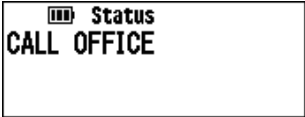
Receiving a Status Message

The transceiver behavior varies depending on whether the transceiver stores the received Status code or not.

Transceiver behavior

● If the transceiver does not store the received Status code:

This is the example of when **Decode Format** to display the received Status code on the display is configured.
The transceiver executes **Decode Format** when the transceiver receives a Status code.

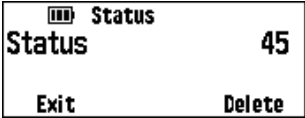


Note

- The transceiver display status, LED status, and Alert Tone status are cleared if any transceiver button is pressed or the length of time configured for **Auto Reset Timer** elapses.
- If the received Status code matches the Status code configured in **Status List** of the transceiver, the corresponding Status Name appears on the display.

● If the transceiver stores the received Status code:

This is the example of when **Decode Format** to store the received Status code in the transceiver stack memory and display the received Status code on the display is configured.
The transceiver executes **Decode Format** when the transceiver receives a Status code. The transceiver enters Stack Mode.
(Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)



Note

- If the transceiver stores the received Status code, the corresponding Status Name appears on the display.

Configuration using KPG-D3/ D3N

Configuring **Decode Format** to be executed when receiving ( **See** Radio Configuration > Protocol Options > 5-tone > Encode/Decode Format > Decode)

Changing the Status Code

In Status Mode, the Status code can be changed by selecting a Status code configured in **Status List** or directly entering a Status code having the number of digits (from 1 to 8) specified by **Status Digits**. (Refer to [Status List](#).)

The transceiver can enter Status Mode and the Status code can be changed using one of the following operations:

- **PF button**

Pressing the **Status** button places the transceiver in Status Mode.

Or, pressing the **Individual + Status** or **Group + Status** button places the transceiver in Selcall Mode. Pressing the **Menu** () or **[*]** button subsequently places the transceiver in Status Mode.

- **Menu button**

Pressing the **Menu** button to enter Menu Mode and then selecting “Status” places the transceiver in Status Mode.

Or, pressing the **Menu** button to place the transceiver in Menu Mode, and then selecting “Individual + Status” or “Group + Status” places the transceiver in Selcall Mode. Pressing the **Menu** () or **[*]** button subsequently places the transceiver in Status Mode. (Refer to Common Function Part [Using Menu Mode](#).)

- **Keypad entry**

If “Status” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the transceiver keypad places the transceiver in Status Mode.

Or, if “Individual + Status” or “Group + Status” is configured for **Keypad Operation**, pressing the **[0]** to **[9]** buttons on the keypad places the transceiver in Selcall Mode. Pressing the **Menu** () or **[*]** button subsequently places the transceiver in Status Mode.

The transceiver enters the Status code shortcut entry mode or goes into the respective state as the first digit of the Status code is entered. (Refer to Common Function Part [Keypad Operation](#).)

- **SELM (Encode Format Command)**

The transceiver enters Status Mode by executing the SELM command of **Encode Format**. The transceiver behavior in Status Mode is the same as when the **Status** button is pressed. (Refer to [SELC](#).)

- **SELS (Encode Format Command)**

The transceiver enters Status Mode by executing the SELS command of **Encode Format**. The transceiver behavior in Status Mode is the same as when the **Status** button is pressed. (Refer to [SELMC](#).)

Operating the transceiver

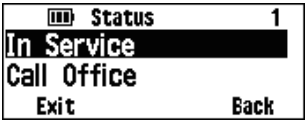
● Changing the Status code by selecting from the Status List

1 Select one of the following operations to place the transceiver in Status Mode.

- Press the **Status** button.
- Press the **Individual + Status** or **Group + Status** button, and then press the **Menu** () or **[*]** button.

The transceiver enters Status Mode and then the **Status List** appears. Status Name corresponding to the Status code having the same number of digits as the number of digits specified by **Status Digits** appears. The following displays are the Status Name display examples. (Refer to [Status Digits](#).)

The following operations are identical even if the transceiver enters Status Mode by a user pressing the **Menu** button, with keypad entry, or with command operation.

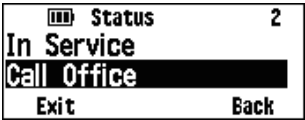


Note

- If a name corresponding to a Status code is not configured in **Status List**, the Status code appears.

2 Select a Status code from the Status List by pressing the **[▲]** or **[▼]** button.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **Menu** () or **[*]** button.

The selected Status code is confirmed and the transceiver exits Status Mode.



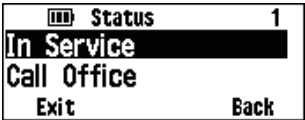
● Changing the Status code by directly entering a Status code

1 Select one of the following operations to place the transceiver in Status Mode.

- Press the **Status** button.
- Press the **Individual + Status** or **Group + Status** button, and then press the **Menu** ([]) or [*****] button.

The transceiver enters Status Mode and then the **Status List** appears. Status Name corresponding to the Status code having the same number of digits as the number of digits specified by **Status Digits** appears. The following displays are the Status Name display examples. (Refer to [Status Digits](#).)

The following operations are identical even if the transceiver enters Status Mode by a user pressing the **Menu** button, with keypad entry, or with command operation.

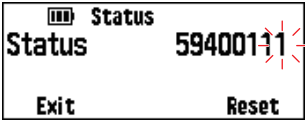


Note

- If a name corresponding to a Status code is not configured in **Status List**, the Status code appears.

2 Press and hold the **Menu** ([]) button.

A **Status** code can be entered.



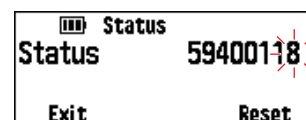
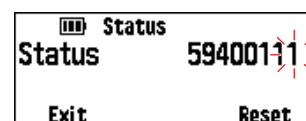
3 Enter a Status code.

Refer to Common Function Part “[Entering or Deleting a Code](#)” for entry method.

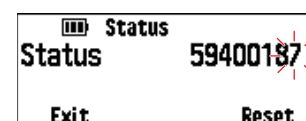
- **If entering a Status code by using the keypad:**

A Status code can be entered by pressing a button on the keypad. The entered Status code appears in the rightmost digit as below:

Press the [8] button.



Press the [7] button.



- **If entering a Status code after specifying the digit:**

A Status code can be entered by pressing the [▲] or [▼] button.

Pressing the [◀] button shifts the cursor to the left.

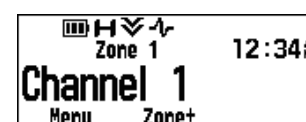
Pressing the [▶] button shifts the cursor to the right.

Note

- If “Replace” is configured for **Digit Entry Method**, a Status code can be entered after the **TX Address** configured for the selected channel substitutes for the Status code. If no **TX Address** is configured for the selected channel, a Status code can be entered after “11111111” substitutes for the Status code. (Refer to [Digit Entry Method](#).)

4 Press the Menu ([□]) or [*] button.

The entered Status code is confirmed and the transceiver exits Status Mode.



Note

- If no digit is specified as a changeable digit for **Receive Digits**, the transceiver cannot enter Receive Entry Mode.
- Pressing the **Back** ([↵]) or [#] button restores the value of the Status code before the change.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the **Keypad Operation** of the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment > General > Keypad)

Status List

Status List is the list where a Status code used for making an individual call with 5-tone signaling is configured. A maximum of 1500 Status codes can be configured in **Status List**.

Also, the list number of a **Status List** can be configured for each System Parameter.

Configuration using KPG-D3/ D3N

Configuring **Status List** ( **See** Radio Configuration > System Properties > ID/Status List > ID/Status List > 5-tone Status > 5-tone Status List)

Status Digits

Status Digits is the number of digits for a Status code that can be changed by selecting a Status code from the **Status List** or directly entering a code in Status Mode. The Status code having the number of digits (from 1 to 8) specified by **Status Digits** can be changed.

Example:

Status code: 59400503

Status Digits: 6, 7

If the Status code is changed by directly entering a code, the code in the 6th and 7th digits "50" can be changed. If selecting a Status code from the **Status List**, the Status code can be changed by selecting from Status codes having the same number of digits as the number of digits specified by **Status Digits** (2 digits). (Refer to [Changing the Status Code.](#))

Configuration using KPG-D3/ D3N

Configuring **Status Digits** ( **See** Radio Configuration > Protocol Options > 5-tone > Profiles > General > Selectable Digits)

7.5 Sending and Receiving a Short Message (Short Data Call)

A message consisting of a maximum of 48 characters can be sent and received by using the combination of the FleetSync Short Message function and a 5-tone code.

By using a Short Message, information can reliably be sent to the target party.

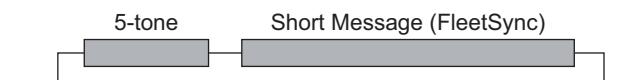


Figure 7-7 Short Message

To send and receive a Short Message by using 5-tone signaling, a script for Status Message must be created in **Encode Format** and **Decode Format** in advance and configured for the transceiver.

- **If sending a Short Message:**

The SFSM command in **Encode Format** is used. (Refer to [SFSM](#).)

- **If receiving a Short Message:**

The RFS command in **Decode Format** is used. (Refer to [RFS](#).)

Sending a Short Message

A Short Message is entered in Short Message Mode, and the entered Short Message is sent by using one of the following functions. However, **Encode Format** to send a Short Message needs to be configured for each function.

Table 7-11 Encode Function

Function	Behavior
Pressing PTT	Encode Format is executed when the PTT switch is pressed.
Releasing PTT	Encode Format is executed when the PTT switch is released.
Call 1 to Call 6	Encode Format is executed when the Call 1 to Call 6 button is pressed.
On-hook/ Off-hook (Mobile only)	Encode Format is executed when the microphone switches to the on-hook or off-hook state.
Channel Select	Encode Format is executed when the channel is changed.
Power-on/ Power-off	Encode Format is executed when the transceiver is turned on or off.
Auto Transmit	Encode Format is executed when GPS data is automatically sent.
Emergency Button	Encode Format is executed when the transceiver enters Emergency Mode by pressing the Emergency button.
Man-down	Encode Format is executed when the transceiver enters Emergency Mode by the Man-down function.
Stationary	Encode Format is executed when the transceiver enters Emergency Mode by the Stationary function.
Motion	Encode Format is executed when the transceiver enters Emergency Mode by the Stationary function.
Lone Worker	Encode Format is executed when the transceiver enters Emergency Mode by the Lone Worker function.

By using one of the following operations, the transceiver can enter Short Message Mode and a Short Message can be entered:

● PF button

Pressing the **Short Message** button places the transceiver in Short Message Mode.

Or, pressing the **Individual + Short Message** or **Group + Short Message** button places the transceiver in Selcall Mode.

Pressing the **Menu** ([) or [*****] button subsequently places the transceiver in Short Message Mode.

● Menu button

Pressing the **Menu** button to enter Menu Mode and then selecting “Short Message” places the transceiver in Short Message Mode.

Or, pressing the **Menu** button to place the transceiver in Menu Mode, and then selecting “Individual + Short Message” or “Group + Short Message” places the transceiver in Selcall Mode. Pressing the **Menu** ([) or [*****] button subsequently places the transceiver in Short Message Mode. (Refer to Common Function Part [Using Menu Mode](#).)

● Keypad entry

If “Short Message” is configured for **Keypad Operation**, pressing the [**0**] to [**9**] buttons on the keypad places the transceiver in Short Message Mode.

Or, if “Individual + Short Message” or “Group + Short Message” is configured for **Keypad Operation**, pressing the [**0**] to [**9**] buttons on the keypad places the transceiver in Selcall Mode. Pressing the **Menu** ([) or [*****] button subsequently places the transceiver in Short Message Mode. (Refer to Common Function Part [Keypad Operation](#).)

● SELT (Encode Format Command)

The transceiver enters Short Message Mode by executing the SELT command of **Encode Format**. The transceiver behavior in Short Message Mode is the same as the behavior when the **Short Message** button is pressed. However, to use the SELT command of **Encode Format**, the command to send a 5-tone code and Short Message after the SELT command needs to be configured. (Refer to [SELT](#).)

Operating the transceiver

This is the operation example of when the **Encode Format** to send a Short Message is configured for the **Call 1** button.

1 Select one of the following operations to place the transceiver in Short Message Mode.

- Press the **Status** button.
- Press the **Individual + Status** or **Group + Status** button, and then press the **Menu** ([) or [*****] button.

The transceiver enters Short Message Mode.

The following operations are identical even if the transceiver enters Status Mode by a user pressing the **Menu** button, with keypad entry, or with command operation.



2 Enter a Short Message.

A maximum of 48 characters can be entered. Refer to Common Function Part “[Entering or Deleting Characters](#)” for entry method.



3 Press the **Call 1** button.

If **Encode Format** is configured as follows, the transceiver sends the 5-tone code corresponding to #594^K45, and then sends the entered Short Message after 50 ms elapses.

Encode Format (Example):

TXS DEL 100 TSET EEA LEN 40 SEND #594^K45 DEL 100 TXK SFSM RX



Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver (See Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the **Keypad Operation** of the transceiver (See Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring **Encode Format** to be executed when sending (See Radio Configuration > Protocol Options > 5-tone > Encode/Decode Format > Encode)

Receiving a Short Message

Upon receiving a Short Message, the transceiver can display the received Short Message on the display.

The transceiver executes **Decode Format** when the transceiver receives a 5-tone code. If **Decode Format** is configured as follows, the receiving transceiver receives a Short Message if the received 5-tone code matches the 5-tone code preconfigured for the transceiver. When the reception completes, the received Short Message appears on the display, and an Alert Tone 5 sounds from the transceiver.

Decode Format (Example):

CMP #594 STO 67 RFS ALERT 5

Note

- A received Short Message can be left as a record. The record can be checked in Stack Mode. (Refer to Common Function Part [Viewing the Receive History \(Stack\)](#).)

Transceiver behavior

1 The transceiver starts receiving a Short Message.

"Receive Data" appears.



2 The transceiver receives a Short Message.

The “” icon blinks and “Complete” appears.



The initial portion (three lines) of the Code Name and Short Message of the transmitting transceiver appears for three seconds. Then, the display is scrolled line by line every two seconds until the last line is shown. After the last line is shown, the display scroll is repeated from the first line.



Configuration using KPG-D3/ D3N

Configuring **Decode Format** to be executed when receiving ( See Radio Configuration > Protocol Options > 5-tone > Encode/Decode Format > Decode)

7.6 Entering a DTMF Code Directly by Using the Keypad to Send (Free-dial Entry)

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Free-dial Entry is the function to allow a user to enter a DTMF code directly using the keypad and send the entered code by using the SDIAL command of **Encode Format**.

By using one of the following operations, the transceiver can enter Free-dial Entry Mode and a DTMF code with a maximum of 34 digits can be entered:

● Keypad entry

If “Free-dial Entry” is configured for **Keypad Operation**, pressing the [0] to [9], [A] to [D], [*], or [#] button on the keypad places the transceiver in Free-dial Entry Mode. The transceiver will be on hold as the first digit of the DTMF code is entered. (Refer to Common Function Part [Keypad Operation](#).)

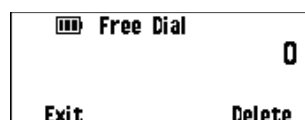
● SELD (Encode Format Command)

The transceiver enters Free-dial Entry Mode by executing the SELD command of **Encode Format**. (Refer to [SELD](#).) The entered DTMF code can be sent by using the SDIAL command of **Encode Format**. (Refer to [SDIAL](#).)

Operating the transceiver

Press the [0] to [9], [A] to [D], [*], or [#] button on the keypad.

For example, if the [0] button is pressed, the transceiver enters Free-dial Entry Mode and “0” is entered. Refer to Common Function Part “[Entering or Deleting Characters](#)” for entry method.



Configuration using KPG-D3/ D3N

- Assigning functions to the **Keypad Operation** of the transceiver ( See Radio Configuration > Global Options > Button Assignment > General > Keypad)
- Configuring **Encode Format** to be executed when sending ( See Radio Configuration > Protocol Options > 5-tone > Encode/Decode Format > Encode)

7.7 Monitor Functions

“Monitor is opened (Monitor Open)” means that the received 5-tone code matches the 5-tone code preconfigured for the transceiver and the speaker is unmuted. “Monitor is closed (Monitor Close)” means that the received 5-tone code no longer matches the 5-tone code preconfigured for the transceiver and the speaker is muted.

The opening or closing operation of the monitor using 5-tone signaling can be used for various purposes.

To use this function, scripts opening the monitor and closing the monitor need to be created in **Encode Format** or **Decode Format** in advance and configured for the transceiver. (Refer to [USING THE 5-TONE ENCODE/ DECODE FORMAT.](#))

The monitor opens and the “🔊” icon appears if the received 5-tone code matches the 5-tone code preconfigured for the transceiver. The transceiver behavior when the monitor is opened or closed can be configured in **Encode Format** or **Decode Format** according to the usage environment of the transceiver. For example, if the transceiver is configured to blink the “🔊” icon when the monitor is opened, a user can more surely notice that a call has been received.

In addition, the monitor can be opened by using the **Monitor** or **Monitor Momentary** button.

The following functions are relevant to opening or closing the monitor:

- Monitor Function
- Monitor Button Action
- Automatic Close

Note

- When the channel is changed while the monitor is open, the monitor is still open only if the channel is an analog channel and the same System Parameter is configured. When the channel is changed to a channel where a different System Parameter is configured or to a digital channel, the monitor is closed. Even if the channel is changed to a channel where the same System Parameter is configured, the monitor is closed if the channel is a mixed channel.
- If the **Monitor** button is pressed on a mixed channel, the monitor status does not change even if the time configured for **Auto Reset Timer** elapses.

Monitor Function

Monitor Function is the function to determine the transceiver behavior when the monitor is opened or closed.

Table 7-12 Monitor Function

Configuration	Description
QT/DQT	If the monitor is opened, the “” icon appears, and the QT/DQT signaling is disabled. The transceiver can unmute the speaker just by receiving a carrier. If the monitor is closed, the “” icon disappears, and the QT/DQT signaling is enabled.  Note - For Mobile, if the microphone is in the off-hook state when Off-hook Decode is disabled, the transceiver can unmute the speaker just by receiving a carrier. - When the transceiver is in Squelch Level Mode, the transceiver can unmute the speaker just by receiving a carrier.
5-tone	If the monitor is opened, the “” icon appears, and the 5-tone signaling is disabled. The transceiver can unmute the speaker just by receiving the QT/DQT signaling. If a QT tone or DQT code is not configured for the transceiver, the transceiver can unmute the speaker just by receiving a carrier. If the monitor is closed, the “” icon disappears, and the 5-tone signaling is enabled.  Note For Mobile, if the microphone is in the off-hook state when Off-hook Decode is disabled, the transceiver unmutes the speaker if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Monitor Function** ( **See** Radio Configuration > Protocol Options > 5-tone > Profiles > General > Monitor)

Monitor Button Action

Monitor Button Action is the function to determine the transceiver behavior of when the **Monitor** button is pressed.

Table 7-13 Monitor Button Action

Configuration	Description
Open	The monitor is opened and the “” icon appears when the Monitor button is pressed. The transceiver behaves according to the configuration for Monitor Function while the monitor is open. (Refer to Monitor Function.) The transceiver does not respond at all if the Monitor button is pressed while the monitor is open.
Close	The monitor is closed and the “” icon disappears when the Monitor button is pressed. The transceiver does not respond at all if the Monitor button is pressed while the monitor is closed.
Both	The monitor is opened or closed every time the Monitor button is pressed.
Disable	The transceiver does not respond at all even if the Monitor button is pressed.

Note

- For Mobile, if the **Monitor** button is pressed when the External Monitor port is active, a Button-entry Error Tone (1 beep) sounds from the transceiver, and the transceiver does not respond at all.
- The configuration for **Monitor Button Action** does not apply to the **Monitor Momentary** button.

Configuration using KPG-D3/ D3N

Configuring **Monitor Button Action** ( See Radio Configuration > Protocol Options > 5-tone > Profiles > General > Monitor)

Automatic Close

Automatic Close is the function that closes the monitor automatically if the specified digit place of the received 5-tone code matches that of **RX Address**.

By using this function, the monitor for transceivers other than the target transceiver can automatically be closed.

Example:

The following is an example when the first, second and third digits are specified as the target digits for comparison in **Automatic Close**:

- **When the transceiver waiting to receive the 5-tone code (RX Address) 59405 receives the 5-tone code 59405:**

The monitor is closed if the monitor is open when the first “594” match. If the transceiver receives “05” subsequently, the monitor is opened because the all codes match.

- **When the transceiver waiting to receive the 5-tone code (RX Address) 59402 receives the 5-tone code 59405:**

The monitor is closed if the monitor is open when the first “594” match. If the transceiver receives “05” subsequently, the monitor is closed because the codes do not match.

Automatic Close ☒ ☒ ☒ ☐ ☐ ☐ ☐ ☐

Encode Code	RX Address	
5 9 4 0 5	5 9 4 0 0	Monitor Close
	5 9 4 0 1	Monitor Close
	5 9 4 0 2	Monitor Close
	5 9 4 0 3	Monitor Close
	5 9 4 0 4	Monitor Close
	5 9 4 0 5 → Open	Monitor Close → Monitor Open
	5 9 4 0 6	Monitor Close
	5 9 4 0 7	Monitor Close
		Monitor Close

Figure 7-8 Automatic Close

Configuration using KPG-D3/ D3N

Configuring **Automatic Close** ( See Radio Configuration > Protocol Options > 5-tone > Profiles > General > Monitor)

7.8 Conditions to Pause Scanning (Scan Configuration)

Scan Configuration is the condition to pause scanning.

The condition to pause scanning can be configured for each System Parameter by using KPG-D3/ D3N.

Table 7-14 Scan Configuration

Configuration	Description
Carrier	The transceiver pauses scanning if the transceiver receives a carrier during the scan. Dropout Delay Time is activated if the carrier disappears. After the time configured for Dropout Delay Time elapses, the transceiver resumes the scan. If the transceiver has finished transmission, the transceiver resumes the scan after the time configured for Dwell Time elapses.
QT/DQT	The transceiver pauses scanning if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver during the scan. The time measurement of Dropout Delay Time starts if the carrier disappears or the QT/DQT becomes unmatched. After the time configured for Dropout Delay Time elapses, the transceiver resumes the scan. Or, if the transceiver has finished transmission, the transceiver resumes the scan after the time configured for Dwell Time elapses.
5-tone	If the first digit of the received 5-tone code matches the first digit of the RX Address configured for the transceiver during the scan, the transceiver waits to receive the 5-tone code. The subsequent digits are compared in the same way. The transceiver pauses scanning if all digits of the 5-tone code are found to be matching. The time measurement of Dropout Delay Time starts if the carrier disappears. After the time configured for Dropout Delay Time elapses, the transceiver resumes the scan. Or, if the transceiver has finished transmission, the transceiver resumes the scan after the time configured for Dwell Time elapses.
QT/DQT + 5-tone	If the first digit of the received 5-tone code matches the first digit of the RX Address configured for the transceiver, and if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver during the scan, the transceiver waits to receive the 5-tone code. The subsequent digits are compared in the same way. The transceiver pauses scanning if all digits of the 5-tone code are found to be matching. The time measurement of Dropout Delay Time starts if the carrier disappears or the QT/DQT becomes unmatched. After the time configured for Dropout Delay Time elapses, the transceiver resumes the scan. Or, if the transceiver has finished transmission, the transceiver resumes the scan after the time configured for Dwell Time elapses.
5-tone with Monitor	If the first digit of the received 5-tone code matches the first digit of the RX Address configured for the transceiver during the scan, the transceiver waits to receive the 5-tone code. The subsequent digits are compared in the same way. The transceiver pauses scanning if all digits of the 5-tone code are found to be matching. The transceiver resumes the scan if the monitor is not opened while the transceiver is pausing scanning. Dropout Delay Time is activated if the carrier disappears. The transceiver pauses scanning while the monitor is open. The transceiver resumes the scan if the monitor is closed.
QT/DQT + 5-tone with Monitor	If the first digit of the received 5-tone code matches the first digit of the RX Address configured for the transceiver, and if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver during the scan, the transceiver waits to receive the 5-tone code. The subsequent digits are compared in the same way. The transceiver pauses scanning if all digits of the 5-tone code are found to be matching. The transceiver resumes the scan if the monitor is not opened while the transceiver is pausing scanning. The transceiver pauses scanning while the monitor is open. The transceiver resumes the scan if the monitor is closed.

Note

- If anything other than “5-tone with Monitor” or “QT/DQT + 5-tone with Monitor” is configured for **Scan Configuration**, the transceiver resumes the scan with the 5-tone code matched after the time configured for **Dropout Delay Time** or **Dwell Time** elapses even while the time measurement of **Auto Reset Timer** is carried out.
- If “5-tone with Monitor” or “QT/DQT + 5-tone with Monitor” is configured for **Scan Configuration**, the transceiver pauses scanning while the monitor is open regardless of the presence of a busy signal or the matching state of QT/DQT or 5-tone code.

Configuration using KPG-D3/ D3N

Configuring **Scan Configuration** ( **See** Radio Configuration > Protocol Options > 5-tone > Profiles > General)

Scan Behavior

The scan behavior and transceiver behavior vary as below according to the monitor status or the **Auto Reset Timer** status while the transceiver is scanning:

- If the channel is changed with the monitor opened during the scan and if a different System Parameter is configured for the channel, the monitor is closed.

Example: Channel 3: System Parameter 2, Channels other than Channel 3: System Parameter 1

Table 7-15 Scan Behavior

Channel	→	1	→	2	→	3	→	4	→	1
System Parameter	→	1	→	1	→	2	→	1	→	1
Monitor State	Open	Open	Open	Open	Open	Close	Close	Close	Close	Close

- If the channel is changed to a channel using anything other than 5-tone signaling during the scan, the monitor is closed. If **Auto Reset Timer** is activated, the matching state of 5-tone code is reset if the time configured for **Auto Reset Timer** has elapsed. If **Auto Reset Timer** is not activated, the matching state of 5-tone code is retained.

Note

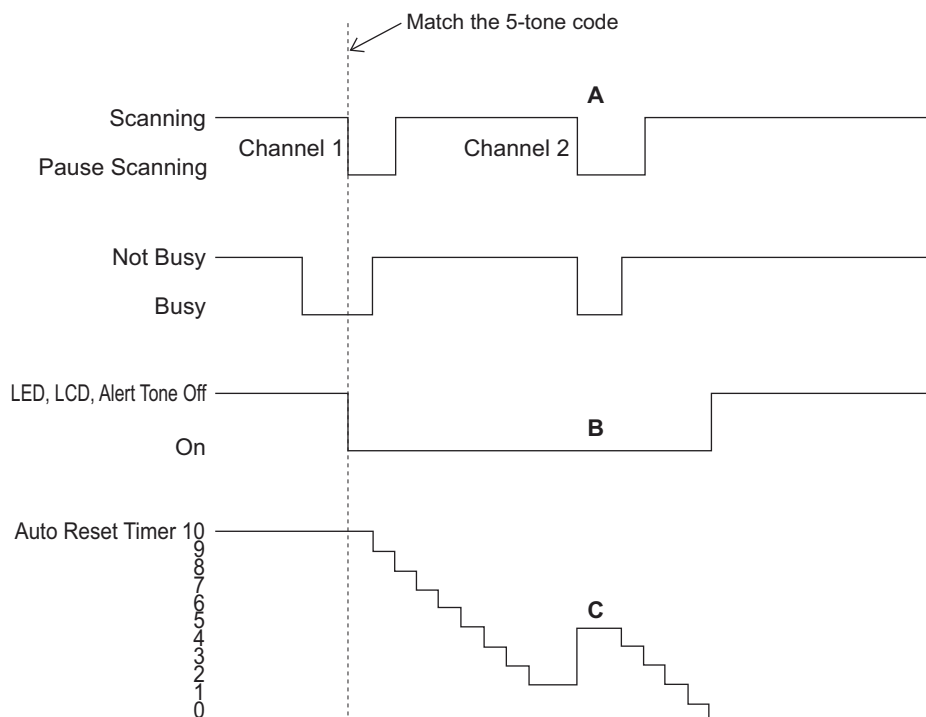
- The matching state of 5-tone code means the behavior to change the LED, LCD, and Monitor statuses, which is executed by receiving a 5-tone code (Decode).
- If the **Monitor** button is pressed while the transceiver is scanning and the monitor status is changed from closed to opened, **Auto Reset Timer** is activated according to the configuration for System Parameter of the **Revert Channel**, and then the monitor is closed after the time configured for **Auto Reset Timer** elapses. Except when the transceiver is scanning, **Auto Reset Timer** is automatically set according to the configuration for System Parameter of the selected channel.
- If the scan is resumed while the timer for **Auto Reset Timer** is counting down and then the scan is paused, **Auto Reset Timer** is reactivated according to the configuration for System Parameter of the channel where the scan is paused. If the transceiver detects a busy signal or the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver (if QT/DQT is configured), **Auto Reset Timer** is automatically extended.

Example:

Channel 1:

Scan Configuration: 5-tone**Auto Reset Timer:** 10 sec

Channel 3:

Scan Configuration: Carrier**Auto Reset Timer:** 5 sec**Figure 7-9 Scan Behavior 1**

- A:** The transceiver pauses scanning upon detection of a busy signal because “Carrier” is configured for **Scan Configuration**.
- B:** The matching state of 5-tone code (LED, LCD, Alert Tone) continues on Channel 1 because the 5-tone code does not match on Channel 2.
- C:** If the scan pauses on Channel 2 while the timer for **Auto Reset Timer** is counting down on Channel 1, and if the transceiver detects a busy signal or the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver (if QT/DQT is configured), **Auto Reset Timer** is automatically extended according to the configuration for System Parameter of Channel 2.

- The following is the scan behavior when “5-tone with Monitor” or “QT/DQT + 5-tone with Monitor” is configured for **Scan Configuration**. If the received 5-tone code matches the 5-tone code preconfigured for the transceiver and if the scan is paused while the monitor is open, when the status of monitor is changed from opened to closed after the time configured for **Auto Reset Timer** elapses, the transceiver immediately resumes the scan if the time configured for **Dropout Delay Time** or **Dwell Time** has elapsed.

Example:

Monitor (Auto Reset Timer): Check

Auto Reset Timer: The value larger than the configuration value for **Dropout Delay Time**

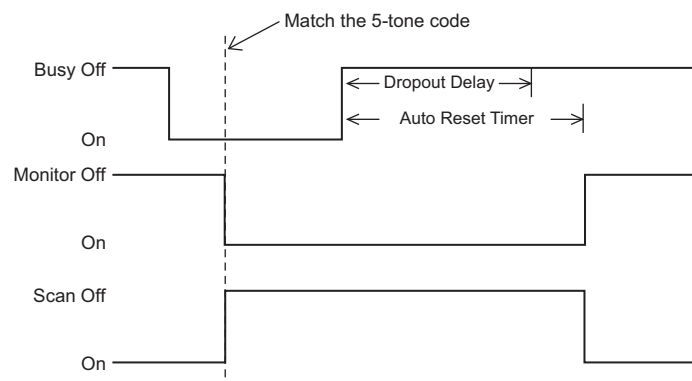


Figure 7-10 Scan Behavior 2

- The transceiver pauses scanning if an **Encode Format** is executed during the scan. Usually, if the time configured for **Dwell Time** elapses after the Encode Format is executed, the transceiver resumes the scan.

7.9

Transferring the Received 5-tone Code (Transfer)

Supported Models: Mobile

Transfer is the function to transfer a specific 5-tone code to another transceiver when the transceiver receives a 5-tone code.

By using this function, signals from the base station can be transferred via a Mobile transceiver to a transceiver in an area which the signals from the base station cannot reach.

If the transceiver receives a 5-tone code when **Transfer** is enabled, the transceiver executes the **Encode Format** described using the XNOT command. (Refer to [XNOT](#).)

Pressing the **Transfer** button can enable or disable **Transfer**.

Or, pressing the **Menu** button causes the transceiver to enter Menu Mode, and then **Transfer** can be toggled between enabled and disabled by selecting "Transfer". (Refer to Common Function Part [Using Menu Mode](#).)

Operating the transceiver

● Enabling Transfer/ Disabling Transfer

1 Press the **Transfer** button when **Transfer** is disabled.

Transfer is enabled. "Trs" appears on the sub-display.

2 Press the **Transfer** button when **Transfer** is enabled.

Transfer is disabled. "Trs" on the sub-display disappears.

Note

- If a zone number or a channel number is displayed on the sub-display, "Trs" appears if **Transfer** is enabled.
- **Transfer** is disabled if the transceiver enters Emergency Mode when **Transfer** is enabled.

Configuration using KPG-D3/ D3N

Assigning functions to the PF buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)

7.10

About the Behavior in Emergency Mode

If a channel with 5-tone signaling configured is selected by changing a zone or a channel when **Emergency Channel Lock** is disabled, **Encode Format** is not executed even if **Encode Format** of Emergency is configured. In this case, the transceiver behaves according to the configuration for Emergency Profile.

Encode/ Decode Format is the script used to send and receive a 5-tone code. A script can be created by using various types of commands for encoding and decoding.

This chapter explains the description of each command, the usage example, and the transceiver behavior. In addition, configuration range is also described for commands having a limit in its configuration range.

8.1 Encode Format

Encode Format is the script used to send a 5-tone code. The script that determines the timing to send a 5-tone code or the transceiver behavior when a 5-tone code is sent can be created using the following commands:

ALERT num

Description	When the ALERT num command is executed, the transceiver emits the Alert Tone configured for “num”. The Alert Tone can be configured by selecting from 8 types of Alert Tones configured for the transceiver. (Refer to Common Function Part Configuring the Alert Tone (Special Alert Tone) .)
Range	num: 1 to 8
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #12345 DEL 50 RX ALERT 2
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode and an Alert Tone 2 sounds.

AUTR

Description	Upon execution of the AUTR command, Auto Reset Timer is activated and then the timer for Auto Reset Timer starts counting down. Upon lapse of the time configured for Auto Reset Timer , the transceiver restores the display in receive mode, turns the LED off, or disables the Alert Tone or Monitor function according to the configuration for Auto Reset Timer . (Refer to Auto Reset Timer .)
Usage Example	Sample Script
	Encode Format: OPEN TXS DEL 100 TSET EEA LEN 40 SEND #12345 DEL 50 RX AUTR
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver opens the monitor and starts transmitting, the transceiver sends a 5-tone code #12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode and the timer for Auto Reset Timer starts counting down.

BEEP num

Description	When the BEEP num command is executed, the transceiver emits the beep tone configured for “num”. The beep can be configured by selecting from 48 types of beep patterns (0 to 47).
Range	num: 0 to 47
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #12345 DEL 50 RX BEEP 2
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode and a Beep 2 sounds from the transceiver.

BKTOF

Description	Upon execution of BKTOF while the transceiver is transmitting the Background Tone (1630 Hz) after executing the BKTON command, the transceiver stops transmitting the Background Tone.
Usage Example	Sample Script
	Encode Format: EMGON REP 5 TXS DEL 200 TSET EEA LEN 40 SEND #59499 DEL 100 BKTON TXM DELL 5 BKTOF RX RSML 5
	Transceiver behavior
	After a lapse of 200 ms from when the transceiver enters Emergency Mode and starts transmitting, the transceiver sends a 5-tone code #59499 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 100 ms after transmitting all tones, the transceiver activates the Background Tone. The transceiver unmutes the microphone and continues transmitting for the subsequent 5 sec, and then reverts to receive mode. The transceiver stops transmitting the Background Tone when reverting to receive mode, and then starts transmitting again after 5 sec elapse. The transceiver repeats the above behavior 5 times.

BKTON

Description	Upon execution of the BKTON command, the transceiver transmits the Background Tone (1630 Hz). The BKTON command is used together with the BKTOF command.
Usage Example	Sample Script
	Encode Format: EMGON REP 5 TXS DEL 200 TSET EEA LEN 40 SEND #59499 DEL 100 BKTON TXM DELL 5 BKTOF RX RSML 5
	Transceiver behavior
	After a lapse of 200 ms from when the transceiver enters Emergency Mode and starts transmitting, the transceiver sends a 5-tone code #59499 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 100 ms after transmitting all tones, the transceiver activates the Background Tone. The transceiver unmutes the microphone and continues transmitting for the subsequent 5 sec, and then reverts to receive mode. The transceiver stops transmitting the Background Tone when reverting to receive mode, and then starts transmitting again after 5 sec elapse. The transceiver repeats the above behavior 5 times.

BLTOF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Portable: When the BLTOF command is executed is executed, the display backlight goes off. Mobile: When the BLTOF command is executed, “Off” is configured in LCD Brightness. The BLTOF command is used for the transceiver to behave as if the transceiver is turned off when the transceiver is in Emergency Mode.
Usage Example	Sample Script
	Encode Format: EMGON BLTOF LEN 0 TEXT ‘ ’ DIFIX REP 5 TXS DEL 200 TSET EEA LEN 40 SEND #59499 DEL 50 TXM DELL 5 RX RSML 5
	Decode Format: CMP ^RX12345 EMGOF REPOF BLTON MONO BEEP 3 ENCI ENC_textof
	Encode Format (ENC_textof): TXTOF
	Transceiver behavior ^RX12345: 59401 (RX stands for RX Address) When the transceiver enters Emergency Mode, the display backlight is turned off. After a lapse of 200 ms from when the transceiver enters Emergency Mode and starts transmitting, the transceiver sends a 5-tone code #59499 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver unmutes the microphone and continues transmitting for the subsequent 5 sec, and then reverts to receive mode. The transceiver starts transmitting again after 5 sec elapse. The transceiver repeats the above behavior 5 times. If the transceiver receives a 5-tone code #59401 when the transceiver reverts to receive mode, the transceiver exits Emergency Mode. The backlight lights, the monitor is opened, and a Beep 3 sounds from the transceiver.

CLOSE

Description	Upon execution of the CLOSE command, the transceiver closes the monitor.
Usage Example	Sample Script
	Encode Format: CLOSE TXM SCTP
	Transceiver behavior
	The transceiver transmits after the monitor is closed. At this time, the QT tone or DQT code is also transmitted.
	 Note The XCLOS and XOPEN commands are used to detect the monitor status when the Encode Format is started. After the monitor status is detected by each command, the transceiver behaves as below according to the monitor status. (Refer to XCLOS, OPEN.) XCLOS: If the monitor is closed, the commands subsequent to XCLOS are not executed. XOPEN: If the monitor is open, the commands subsequent to XOPEN are not executed.

CTTP

Description	Upon execution of the CTTP command, the transceiver activates Clear to Transpond . Clear to Transpond is the function that the transceiver does not send an acknowledgment while a carrier is present on the channel after reception; the transceiver waits to send an acknowledgment until the carrier disappears.
Usage Example	Sample Script
	Decode Format: CMP #54321 BEEP 16 MONF ENCI encAck
	Encode Format (encAck): CTTP TXS DEL 100 TSET EEA LEN 40 SEND #59480 DEL 50 RX
	Transceiver behavior Upon receipt of a 5-tone code #54321, a Beep 16 sounds from the transceiver. The transceiver opens the monitor and the “  ” icon blinks at this time. The transceiver starts transmitting if no carrier is present on the channel. After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59480 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode. The transceiver does not transmit while a carrier is present on the channel; the transceiver waits to transmit until the carrier disappears.

DEL xtime

Description	When the DEL xtime command is executed, the transceiver waits to execute the next command for the length of time configured for “xtime”. DEL stands for “Delay”. The DEL xtime command can be used when a wait time until the transceiver enters transmit or receive mode is required or when an unmodulated signal needs to be transmitted for sending or receiving 5-tone codes in 2 frames.
Range	xtime: 0 ms to 7000 ms (in steps of 1 ms)
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #12345 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

DELL ltime

Description	When the DELL ltime command is executed, the transceiver waits to execute the next command for the length of time configured for "ltime". DELL stands for "Delay Long". The DELL ltime command can be used when a wait time until the transceiver enters transmit or receive mode is required or when a long transmission time is required during Emergency Mode.
Range	ltime: 0 sec to 255 sec (in steps of 1 sec)
Usage Example	Sample Script
	Encode Format: REP 30 TXS DEL 200 TSET EEA LEN 40 SEND #12345678 DEL 50 TXM DELL 10 RX RSML 5
	Transceiver behavior
	After a lapse of 200 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #12345678 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver unmutes the microphone and continues transmitting for the subsequent 10 sec, and then reverts to receive mode. The transceiver starts transmitting again after 5 sec elapse. The transceiver repeats the above behavior 30 times.

DIFIX

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the DIFIX command, the transceiver current display remains unchanged.
Usage Example	Sample Script
	Encode Format: DIFIX EMGON TXS DEL 200 TSET EEA LEN 40 SEND #59499 DEL 50 TXM DELL 10 REP 5 RX RSML 5
	Transceiver behavior
	The transceiver enters Emergency Mode with the current display unchanged. After a lapse of 200 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59499 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver unmutes the microphone and continues transmitting for the subsequent 10 sec, and then reverts to receive mode. The transceiver starts transmitting again after 5 sec elapse. The transceiver repeats the above behavior 5 times.  Note - The fixed display by the DIFIX command can be reset by the following operations: - Disabling Emergency Mode - Turning off the transceiver

DISPF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the DISPF command is executed, the information on the transceiver display starts blinking.
Usage Example	Sample Script
	Encode Format: TXT SCPH DEL 180 RX OPEN DISPF
	Transceiver behavior
	The transceiver transmits the QT Reverse Burst tone for 180 ms and then reverts to receive mode. At this time, the transceiver opens the monitor and the current display blinks.

DISPS

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the DISPS command is executed, the blinking of the display by the execution of the DISPF command stops and the transceiver returns to the normal display.
Usage Example	Sample Script
	Decode Format: STO 12345 QUEUE DISPQ DISPF LEDF MONO ENCI transpond
	Encode Format (transpond): TXS DEL 500 TSET EEA LEN 40 SEND #54321 DEL 20 RX DEL 2000 DISPS LEDS
	Transceiver behavior
	The received 5-tone code blinks on the display, and the LED flashes. The transceiver opens the monitor and proceeds to Transpond at this time. After a lapse of 500 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #54321 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 20 ms after transmitting all tones, the transceiver reverts to receive mode. After 2 sec elapse, the display and LED stop blinking.

DTAIL

Description	Upon execution of the DTAIL command, the transceiver sends the DQT turn-off code.
Usage Example	Sample Script
	Encode Format: TXT DTAIL DEL 180 RX
	Transceiver behavior
	The transceiver sends the DQT turn-off code for 180 ms and then reverts to receive mode.

EMGON

Description	Upon execution of the EMGON command, the transceiver enters Emergency Mode. To exit Emergency Mode, pressing the Emergency button, turning the transceiver off, or executing the EMGOF command of Decode Format is required. (Refer to EMGOF .)
Usage Example	Sample Script
	Encode Format: EMGON TXS DEL 200 TSET EEA LEN 40 SEND #59499 DEL 50 TXM DELL 10 REP 5 RX RSML 5
	Transceiver behavior
	After a lapse of 200 ms from when the transceiver enters Emergency Mode and starts transmitting, the transceiver sends a 5-tone code #59499 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver unmutes the microphone and continues transmitting for the subsequent 10 sec, and then reverts to receive mode. The transceiver starts transmitting again after 5 sec elapse. The transceiver repeats the above behavior 5 times.  Note • Even if the EMGON command is executed, the display does not remain unchanged unlike the DIFIX command execution.

ENC enc

Description	When the ENC enc command is executed, the transceiver executes the Encode Format configured for “enc”. The ENC enc command is used to encode the 5-tone codes in the 2nd and 3rd frames. An Encode Format name needs to be configured for “enc”.
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #594^K45 DEL 50 RX ENC 2nd_frame
	Encode Format (2nd_frame): TXS DEL 200 TSET EEA LEN 40 SEND ^RX12345 DEL 50 RX
	Transceiver behavior After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code corresponding to #594^K45 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode temporarily and then starts transmitting again. After a lapse of 200 ms from when the transceiver resumes transmission, the transceiver sends a 5-tone code corresponding to ^RX12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

ENTTM ltime

Description	Upon execution of the ENTTM ltime command, the transceiver exits each Function Mode, such as Selcall Mode, Status Mode, or Stack Mode, if the time configured for “ltime” elapses.
Range	ltime: 0 sec to 255 sec (in steps of 1 sec)
Usage Example	Sample Script
	Decode Format: STO 12345 QUEUE DISPQ BEEP 1 ENCI test_ENTTM
	Encode Format (test_ENTTM): ENTTM 10
	Transceiver behavior
	The transceiver enters Stack Mode and the Queue Number of the 5-tone code stored in the transceiver appears on the display. A Beep 1 sounds from the transceiver. The timer to exit Function Mode is set to 10 sec. The transceiver exits Stack Mode and reverts to the normal display after 10 sec elapse.
	 Note If the ENTTM ltime command is used, the length of time configured for Mode Reset Timer is disabled. (Refer to Common Function Part Mode Reset Timer.)

ERRX0

Description	The transceiver aborts the execution of Encode Format without emitting an error tone if the command beginning with letter X (such as the XCARR or XCLOS command) is executed after executing the ERRX0 command.
Usage Example	Sample Script
	Encode Format: ERRX1 OPEN XCLOS ERRX0 XCARR TXM
	Transceiver behavior
	If the monitor is closed, the transceiver opens the monitor, emits an error tone, and then aborts the execution of Encode Format. If the monitor is open and if the transceiver does not detect any carrier, the transceiver unmutes the microphone and starts transmitting. If the transceiver detects a carrier, the transceiver aborts the execution of Encode Format without emitting an error tone.

ERRX1

Description	The transceiver emits an error tone and aborts the execution of Encode Format if the command beginning with letter X (such as the XCARR or XCLOS command) is executed after executing the ERRX1 command.
Usage Example	Sample Script
	Encode Format: ERRX1 XCARR TXM SCTP
	Transceiver behavior
	If the transceiver does not detect any carrier, the transceiver unmutes the microphone and transmits the QT tone or DQT code configured for the channel. If the transceiver detects a carrier, the transceiver emits an error tone and aborts the execution of Encode Format .

IDLOF

Description	Upon execution of the IDLOF command, the transceiver aborts the execution of the IDLON vtime enc command.
	The IDLOF command is used to stop sending the ID at regular time intervals.
Usage Example	Sample Script
	Encode Format (ENC_IDLOF): IDLOF
	Encode Format (ENC_IDLON): IDLON 5 ENCIDL
	Encode Format (ENCIDL): TXS DEL 100 TSET EEA LEN 40 SEND #59499 DEL 50 RX
	Transceiver behavior The transceiver aborts the execution of the IDLON vtime enc command and executes the Encode Format (ENCIDL) . After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59499 in the EEA signaling format. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

IDLON vtime enc

Description	Upon execution of the IDLON vtime enc command, the transceiver executes the Encode Format configured for “enc” at the intervals configured for “vtime”.
	The IDLON vtime enc command is used to send the ID at regular time intervals after the transceiver is turned on.
Range	vtime (Very Long Time): 0 min to 255 min (in steps of 1 min) enc: Encode Format Name
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #59499 DEL 50 RX IDLON 5 ENCIDL
	Encode Format (ENCIDL): TXS DEL 100 TSET EEA LEN 40 SEND #59499 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59499 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode. If the transceiver does not transmit within 5 minutes or does not open the monitor within 5 minutes after the transceiver finishes the transmission, the transceiver resends 5-tone code #59499. The transceiver repeats this behavior until the transceiver is turned off. If the transceiver carries out transmission within 5 minutes after the transceiver finishes the transmission, it returns to the standby state after transmission is complete. The standby time is 5 minutes. If the monitor is opened within 5 minutes after the transceiver completes the transmission, the transceiver returns to the standby state when the monitor is closed. The standby time is 5 minutes.

KEYD

Description	When the KEYD command is executed, the transceiver locks all buttons, and all button operations become disabled. Using this command in combination with the Decode Format prevents the receiving transceiver from being operated. In addition, the Encode Format containing this command can be assigned to a button to use like the Button Lock button.
Usage Example	Sample Script
	Decode Format: CMP #12300 MONC ENCI lock
	Encode Format (lock): KEYD
	Transceiver behavior Upon receipt of a 5-tone code #12300, the transceiver closes the monitor and locks all the buttons to prevent any operation.

KEYE

Description	When the KEYE command is executed, the transceiver unlocks all buttons. Using this command in combination with the Decode Format unlocks the button lock state of the receiving transceiver. In addition, the Encode Format containing this command can be assigned to a button to use like the Button Lock button.
Usage Example	Sample Script
	Decode Format: CMP #12301 MONO ENCI Unlock
	Encode Format (Unlock): KEYE
	Transceiver behavior Upon receipt of a 5-tone code #12301, the transceiver opens the monitor and unlocks all the buttons.  Note If no button is operated within the length of time configured in Auto Button Lock Timer after the button lock state is unlocked by the KEYE command, the transceiver automatically enters the button lock state.

KNOBD

Supported Models: Portable

Description	Upon execution of the KNOBD command, the transceiver locks the Selector , and any operation of the Selector becomes disabled. For Portable, the KNOBD command can be used only if 16 Zone/Channel Selector is disabled by using KPG-D3/ D3N.
Usage Example	Sample Script
	Decode Format: CMP #12300 MONC ENCI lock_K
	Encode Format (lock_K): KNOBD
	Transceiver behavior Upon receipt of a 5-tone code #12300, the transceiver closes the monitor and locks the Selector .

KNOBE

Supported Models: Portable

Description	Upon execution of the KNOBE command, the transceiver unlocks the lock state of the Selector .
Usage Example	Sample Script
	Decode Format: CMP #12301 MONO ENCI Unlock_K
	Encode Format (Unlock_K): KNOBE
	Transceiver behavior Upon receipt of a 5-tone code #12301, the transceiver opens the monitor and unlocks the lock state of the Selector .

LEDF

Description	When the LEDF command is executed, the LED flashes in yellow color.
Usage Example	Sample Script
	Decode Format: CMP #12300 ENCI transpond
	Encode Format (transpond): TXS DEL 500 TSET EEA LEN 40 SEND #12301 DEL 20 RX LEDF
	Transceiver behavior Upon receipt of a 5-tone code #12300, the transceiver starts transmitting. After a lapse of 500 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #12301 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 20 ms after transmitting all tones, the transceiver reverts to receive mode and flashes the LED yellow.

LEDF2

Description	When the LEDF2 command is executed, the LED flashes in blue color.
Usage Example	Sample Script
	Decode Format: CMP #12300 ENCI transpond
	Encode Format (transpond): TXS DEL 500 TSET EEA LEN 40 SEND #12301 DEL 20 RX LEDF2
	Transceiver behavior Upon receipt of a 5-tone code #12300, the transceiver starts transmitting. After a lapse of 500 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #12301 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 20 ms after transmitting all tones, the transceiver reverts to receive mode and flashes the LED blue.

LEDS

Description	When the LEDS command is executed, the flashing LED goes off.
Usage Example	Sample Script
	Decode Format: STO 12345 QUEUE DISPQ DISPF LEDF MONO ENCI transpond
	Encode Format (transpond): TXS DEL 500 TSET EEA LEN 40 SEND #54321 DEL 20 RX DEL 2000 DISPS LEDS
	Transceiver behavior The received 5-tone code blinks on the display, and the LED flashes. The transceiver opens the monitor and proceeds to Transpond at this time. After a lapse of 500 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #54321 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 20 ms after transmitting all tones, the transceiver reverts to receive mode. After 2 sec elapse, the display and LED stop blinking.

LEN xtime

Description	Upon execution of the LEN xtime command, the transceiver transmits each tone of the 5-tone code, single tone, or DTMF code for the length of time configured for "xtime".
Range	xtime: 0 ms to 7000 ms (in steps of 1 ms)
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #59401 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59401 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

OPEN

Description	Upon execution of the OPEN command, the transceiver opens the monitor.
	The transceiver behaves according to the configuration for Monitor Function after the monitor is opened. (Refer to Monitor Function .)
Usage Example	Sample Script
	Encode Format (PTT Release): TXT DTAIL DEL 180 RX OPEN
	Transceiver behavior
	After the transceiver sends the DQT turn-off code for 180 ms, the transceiver reverts to receive mode and opens the monitor.

PAUSE lwttime

Description	Upon execution of the PAUSE lwttime command, the transceiver starts the timer for Encode Pause Time to count down. The time for Encode Pause Time is configured for “lwttime”.
Range	lwttime: 0 sec to 300 sec (in steps of 1 sec)
Usage Example	Sample Script
	Encode Format (PTT Press): TXS DEL 100 TSET EEA LEN 40 SPAUS SEND #594^K45 TXM
	Encode Format (PTT Release): RX PAUSE 5
	Transceiver behavior
	Pressing the PTT switch causes the transceiver to start transmission. After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code corresponding to #594^K45 in the EEA signaling format. Each tone length is 40 ms. After transmitting all tones, the transceiver unmutes the microphone and continues to transmit. However, while the timer for Encode Pause Time is counting down, the transceiver unmutes the microphone and continues to transmit without sending the 5-tone code corresponding to #594^K45. Upon release of the PTT switch, the transceiver reverts to receive mode and the timer for Encode Pause Time counts down 5 sec.

RACK stime dec

Description	When the RACK stime dec command is executed, the transceiver enters the standby state with the Decode Format configured for “dec” for the length of time configured for “stime”. The RACK stime dec command is used when an acknowledgment from the receiving transceiver is required after the transceiver transmits.
Range	stime (Standard Time): 0 ms to 2550 ms (in steps of 10 ms) dec: Decode Format Name
Usage Example	Sample Script
	Encode Format: REP 10 TXS DEL 100 TSET EEA LEN 40 SEND #59499 DEL 50 RX RACK 2500 DecAck RSML 5
	Decode Format (DecAck): CMP #54321 REPOF BEEP 16 MONF
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59499 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode and waits to receive an acknowledgment. If the transceiver does not receive the 5-tone code #54321 within 2500 ms after the transceiver finishes the transmission, the transceiver resends a 5-tone code #59499 after a lapse of 5 sec. The transceiver repeats the above behavior 10 times. If the transceiver receives the 5-tone code #54321 within 2500 ms after the transceiver finishes the transmission, the transceiver stops repeating the above behavior, and then emits a Beep 16 and opens the monitor.

RAUXA0

Supported Models: Mobile

Description	When the RAUXA0 command is executed, the AUX A port becomes inactive. If the AUX A function is assigned to an AUX Output port, or if a 5-tone code is received, the external device connected to the AUX Output port can be controlled.
Usage Example	Sample Script
	Decode Format: CMP #54321 ENCI AUX0_OFF CMP #54322 ENCI AUX0_ON
	Encode Format (AUX0_OFF): RAUXA0
	Encode Format (AUX0_ON): RAUXA1
	Transceiver behavior
	If the transceiver receives the 5-tone code #54321, the transceiver deactivates the AUX A port. If the transceiver receives the 5-tone code #54322, the transceiver activates the AUX A port.

RAUXA1

Supported Models: Mobile

Description	When the RAUXA1 command is executed, the AUX A port becomes active.
	If the AUX A function is assigned to an AUX Output port, or if a 5-tone code is received, the external device connected to the AUX Output port can be controlled.
	Sample Script
	Decode Format: CMP #54321 ENCI AUX0_OFF CMP #54322 ENCI AUX0_ON Encode Format (AUX0_OFF): RAUXA0 Encode Format (AUX0_ON): RAUXA1
	Transceiver behavior
Usage Example	If the transceiver receives the 5-tone code #54321, the transceiver deactivates the AUX A port. If the transceiver receives the 5-tone code #54322, the transceiver activates the AUX A port.

RAUXB0

Supported Models: Mobile

Description	When the RAUXB0 command is executed, the AUX B port becomes inactive.
	If the AUX B function is assigned to an AUX Output port, or if a 5-tone code is received, the external device connected to the AUX Output port can be controlled.
	Sample Script
	Decode Format: CMP #54321 ENCI AUX0_OFF CMP #54322 ENCI AUX0_ON Encode Format (AUX0_OFF): RAUXB0 Encode Format (AUX0_ON): RAUXB1
	Transceiver behavior
Usage Example	If the transceiver receives the 5-tone code #54321, the transceiver deactivates the AUX B port. If the transceiver receives the 5-tone code #54322, the transceiver activates the AUX B port.

RAUXB1

Supported Models: Mobile

Usage Example	Description
	When the RAUXB1 command is executed, the AUX B port becomes active. If the AUX B function is assigned to an AUX Output port, or if a 5-tone code is received, the external device connected to the AUX Output port can be controlled.
	Sample Script
	Decode Format: CMP #54321 ENCI AUX0_OFF CMP #54322 ENCI AUX0_ON Encode Format (AUX0_OFF): RAUXB0 Encode Format (AUX0_ON): RAUXB1
	Transceiver behavior
	If the transceiver receives the 5-tone code #54321, the transceiver deactivates the AUX B port. If the transceiver receives the 5-tone code #54322, the transceiver activates the AUX B port.

REP rep

Usage Example	Description
	When the REP rep command is executed, the transceiver executes Encode Format repeatedly for the number of times configured for “rep”.
	Range
	rep: 0 (infinite) or 1 time to 255 times
	Sample Script
Usage Example	Encode Format: REP 10 TXS DEL 100 TSET EEA LEN 40 SEND #59499 DEL 50 RX RACK 2500 DecAck RSML 5 Decode Format (DecAck): CMP #54321 REPOF BEEP 16 MONF
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59499 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode and waits to receive an acknowledgment.
	If the transceiver does not receive the 5-tone code #54321 within 2500 ms after the transceiver finishes the transmission, the transceiver resends a 5-tone code #59499 after a lapse of 5 sec.
	The transceiver repeats the above behavior 10 times.
Usage Example	If the transceiver receives the 5-tone code #54321 within 2500 ms after the transceiver finishes the transmission, the transceiver stops repeating the above behavior, and then emits a Beep 16 and opens the monitor.

RIGN stime

Description	Upon execution of the RIGN stime command, the transceiver disables Automatic Close for the length of time configured for “stime”. The RIGN stime command is used to prevent the monitor from being closed by Automatic Close if the transceiver receives a call from another transceiver while the transceiver waits to receive an acknowledgment. (Refer to Automatic Close.)
Range	stime (Standard Time): 0 ms to 2550 ms (in steps of 10 ms)
Usage Example	Sample Script
	Encode Format: OPEN TXS DEL 100 TSET EEA LEN 40 SEND #123^K45 DEL 50 RIGN 2000 RX
	Transceiver behavior
	The transceiver opens the monitor and starts transmitting. After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code corresponding to #123^K45 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode and disables Automatic Close for 2000 ms.

RKILL1

Description	Upon execution of the RKILL1 command, “Error” appears on the display, the transceiver enters the Kill state, and all operations become disabled. For the portable transceiver (Basic Model), the LED flash alternates between a yellow and a green light, and all transceiver operations are disabled. To revive the transceiver from the Kill state, configuration data needs to be written to the transceiver by using KPG-D3/ D3N. This function is used to prevent an unauthorized person from using the transceiver; for example, when the transceiver is stolen.
Usage Example	Sample Script
	Decode Format: CMP #98790 ENCI enc_kill CMP #98795 ENCI enc_stun CMP #98796 ENCI enc_rvive
	Encode Format (enc_kill): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#90 DEL 50 RKILL1
	Encode Format (enc_stun): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#95 DEL 50 RSTUN
	Encode Format (enc_rvive): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#96 DEL 50 RVIVE
Usage Example	Transceiver behavior
	The transceiver starts transmitting upon receipt of the 5-tone code #98790, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#90 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after all tones are transmitted, “Error” appears on the display and all operations become disabled. For the portable transceiver (Basic Model), the LED flash alternates between a yellow and a green light, and all transceiver operations are disabled.
	The transceiver starts transmitting upon receipt of the 5-tone code #98795, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#95 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after all tones are transmitted, “Stun” appears on the display and all operations become disabled. For the portable transceiver (Basic Model), the LED flash alternates between a yellow and a green light, and all transceiver operations are disabled.
	The transceiver starts transmitting upon receipt of the 5-tone code #98796, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#96 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver revives from the Stun state and the transceiver operation becomes enabled.
	Note - Using the RKILL1 command of Decode Format also places the transceiver in the Kill state. (Refer to RKILL1.) - The RKILL1 command of Encode Format is effective to place the transceiver in the Kill state after sending an acknowledgment.

RKILL2

Description	Upon execution of the RKILL2 command, “Error” appears on the display, the transceiver enters the Kill state, and all operations become disabled. For the portable transceiver (Basic Model), the LED flash alternates between a yellow and a green light, and all transceiver operations are disabled. All the configuration data configured for the transceiver is deleted. To revive the transceiver from the Kill state, configuration data needs to be written to the transceiver by using KPG-D3/ D3N. This function is used to prevent an unauthorized person from using the transceiver; for example, when the transceiver is stolen.
Usage Example	Sample Script Decode Format: CMP #98790 ENCI enc_kill CMP #98795 ENCI enc_stun CMP #98796 ENCI enc_rvive Encode Format (enc_kill): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#90 DEL 50 RKILL2 Encode Format (enc_stun): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#95 DEL 50 RSTUN Encode Format (enc_rvive): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#96 DEL 50 RVIVE Transceiver behavior The transceiver starts transmitting upon receipt of the 5-tone code #98790, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#90 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after all tones are transmitted, “Error” appears on the display and all operations become disabled. For the portable transceiver (Basic Model), the LED flash alternates between a yellow and a green light, and all transceiver operations are disabled. All the configuration data configured for the transceiver is deleted. The transceiver starts transmitting upon receipt of the 5-tone code #98795, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#95 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after all tones are transmitted, “Stun” appears on the display and all operations become disabled. For the portable transceiver (Basic Model), the LED flash alternates between a yellow and a green light, and all transceiver operations are disabled. The transceiver starts transmitting upon receipt of the 5-tone code #98796, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#96 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver revives from the Stun state and the transceiver operation becomes enabled.  Note - Using the RKILL2 command of Decode Format also places the transceiver in the Kill state. (Refer to RKILL2.) - The RKILL2 command of Encode Format is effective to place the transceiver in the Kill state after sending an acknowledgment.

RSML Itime

Description	When the RSML Itime command is executed, the transceiver executes Encode Format repeatedly by the REP rep command at the intervals configured for “Itime”. (Refer to REP rep .) The RSML Itime command is used for the transceiver to wait to receive an acknowledgment.
Range	Itime: 0 sec to 255 sec (in steps of 1 sec)
Usage Example	Sample Script
	Encode Format: REP 10 TXS DEL 100 TSET EEA LEN 40 SEND #59499 DEL 50 RX RACK 2500 DecAck RSML 5 Decode Format (DecAck): CMP #54321 REPOF BEEP 16 MONF
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59499 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode and waits to receive an acknowledgment. If the transceiver does not receive the 5-tone code #54321 within 2500 ms after the transceiver finishes the transmission, the transceiver resends a 5-tone code #59499 after a lapse of 5 sec. The transceiver repeats the above behavior 10 times. If the transceiver receives the 5-tone code #54321 within 2500 ms after the transceiver finishes the transmission, the transceiver stops repeating the above behavior, and then emits a Beep 16 and opens the monitor.

RSMS stime

Description	When the RSMS stime command is executed, the transceiver executes Encode Format repeatedly by the REP rep command at the intervals configured for “stime”. (Refer to REP rep .)
Range	stime (Standard Time): 0 ms to 2550 ms (in steps of 10 ms)
Usage Example	Sample Script
	Encode Format: REP 10 TXS DEL 100 TSET EIA LEN 33 SEND #59499 DEL 20 RX RSMS 800 Decode Format: CMP #54321 REPOF BEEP 16 MONF
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59499 in the EIA signaling format. Each tone length is 33 ms. Upon lapse of 20 ms after transmitting all tones, the transceiver reverts to receive mode. After a lapse of 800 ms, the transceiver resends a 5-tone code #59499. The transceiver repeats the above behavior 10 times. While the transceiver is in receive mode, the transceiver waits to receive with the Decode Format configured for the selected channel. If the transceiver receives a 5-tone code #54321, the transceiver stops repeating the above behavior, and then emits a Beep 16 and opens the monitor.

RSTUN

Description	Upon execution of the RSTUN command, “Stun” appears on the display, the transceiver enters the Remote Stun state, and all operations become disabled. To revive the transceiver from the Remote Stun state, the transceiver in the Remote Stun state must receive the 5-tone code to execute the RVIVE command, and then the RVIVE command must be executed. Or, configuration data needs to be written to the transceiver by using KPG-D3/ D3N. This function is used to prevent an unauthorized person from using the transceiver; for example, when the transceiver is stolen.
Usage Example	Sample Script
	Decode Format: CMP #98790 ENCI enc_kill CMP #98795 ENCI enc_stun CMP #98796 ENCI enc_rvive Encode Format (enc_kill): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#90 DEL 50 RKILL1 Encode Format (enc_stun): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#95 DEL 50 RSTUN Encode Format (enc_rvive): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#96 DEL 50 RVIVE
	Transceiver behavior
	The transceiver starts transmitting upon receipt of the 5-tone code #98790, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#90 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after all tones are transmitted, “Error” appears on the display and all operations become disabled. The transceiver starts transmitting upon receipt of the 5-tone code #98795, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#95 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after all tones are transmitted, “Stun” appears on the display and all operations become disabled. The transceiver starts transmitting upon receipt of the 5-tone code #98796, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#96 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver revives from the Remote Stun state and the transceiver operation becomes enabled.  Note - Using the RSTUN command of Decode Format also places the transceiver in the Remote Stun state. (Refer to RSTUN.) - The RSTUN command of Encode Format is effective to place the transceiver in the Remote Stun state after sending an acknowledgment.

RVIVE

Description	Upon execution of the RVIVE command, the transceiver revives from the Remote Stun state and all the transceiver operation becomes enabled.
Usage Example	Sample Script
	Decode Format: CMP #98790 ENCI enc_kill CMP #98795 ENCI enc_stun CMP #98796 ENCI enc_rvive
	Encode Format (enc_kill): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#90 DEL 50 RKILL1
	Encode Format (enc_stun): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#95 DEL 50 RSTUN
	Encode Format (enc_rvive): TXS DEL 100 TSET CCIR LEN 100 SEND ^RX123#96 DEL 50 RVIVE
Usage Example	Transceiver behavior
	The transceiver starts transmitting upon receipt of the 5-tone code #98790, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#90 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after all tones are transmitted, "Error" appears on the display and all operations become disabled.
	The transceiver starts transmitting upon receipt of the 5-tone code #98795, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#95 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after all tones are transmitted, "Stun" appears on the display and all operations become disabled.
	The transceiver starts transmitting upon receipt of the 5-tone code #98796, and after a lapse of 100 ms, the transceiver sends a 5-tone code corresponding to ^RX123#96 in the CCIR signaling format. Each tone length is 100 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver revives from the Remote Stun state and the transceiver operation becomes enabled.
	 Note - Using the RVIVE command of Decode Format also revives the transceiver from the Remote Stun state. (Refer to RVIVE.) - The RVIVE command of Encode Format is effective to revive the transceiver from the Remote Stun state after sending an acknowledgment.

RXF rf-freq

Description	Upon execution of the RXF rf-freq command, the transceiver waits to receive on the frequency configured for "rf-freq". The frequency supported by the transceiver in use must be configured for "rf-freq".
Range	rf-freq: Receive frequency
Usage Example	Sample Script
	Encode Format: TXT DTAIL DEL 180 RXF 451.01250 DEL 5000 RXP
	Transceiver behavior
	The transceiver sends the DQT turn-off code for 180 ms and then waits to receive on the receive frequency of 451.01250 MHz. After 5 sec elapse, the transceiver waits to receive on the receive frequency configured for the current channel.

RXP

Description	Upon execution of the RXP command, the transceiver waits to receive on the receive frequency configured for the current channel.
Usage Example	Sample Script
	Encode Format: TXT DTAIL DEL 180 RXF 451.01250 DEL 5000 RXP
	Transceiver behavior
	The transceiver sends the DQT turn-off code for 180 ms and then waits to receive on the receive frequency of 451.01250 MHz. After 5 sec elapse, the transceiver waits to receive on the receive frequency configured for the current channel.

RX

Description	Upon execution of the RX command, the transceiver reverts to receive mode.
Usage Example	Sample Script
	Encode Format: TXT DTAIL DEL 180 RX
	Transceiver behavior
	The transceiver sends the DQT turn-off code for 180 ms and then reverts to receive mode.

SBUSY

Description	If the transceiver detects a signal or if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver when executing the SBUSY command, the transceiver does not execute the SEND command which is subsequent to the SBUSY command.
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SBUSY SEND #59402 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, if the transceiver detects a signal or if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver, the transceiver reverts to receive mode without sending the 5-tone code #59402. If the transceiver does not detect any signal, the transceiver sends the 5-tone code #59402 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SCHK

Description	Upon execution of the SCHK command, the transceiver sends the least significant digit of checksum data by adding the digit to the code to be sent. The SCHK command is used in combination with the SLEN ofs command. (Refer to SLEN ofs.)
Usage Example	Sample Script
	Encode Format: SELD TXD DEL 50 LEN 150 DEL 60 SDIAL SLEN 1 SCHK DEL 50 RX
	Transceiver behavior
	The transceiver enters Free-dial Entry Mode. The following is the example of when DTMF code 1234 is entered. The transceiver sends the DTMF code as below: 1) The entered DTMF code 1234 is sent as the Encode Code. Each tone length is 150 ms. 2) After 150 ms elapse, the value 5, obtained by adding the value configured for “ofs” of the SLEN ofs command (1) to the number of digits of entered DTMF code (4), is added to the DTMF code 1234 and sent. 3) After 150 ms elapse, the value 5 in the least significant digit of checksum data is added to the DTMF code 1234 and sent. Checksum data can be calculated by adding each tone number of the sent DTMF code 1234 and the value 5 calculated in 2). (1 + 2 + 3 + 4 + 5 = 15) Upon lapse of 50 ms after sending the DTMF code, the transceiver reverts to receive mode. The DTMF code which is sent in the above example is 123455.

SCLOS

Description	If the monitor is closed when executing the SCLOS command, the transceiver does not execute the SEND command which is subsequent to the SCLOS command.
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SCLOS SEND #59402 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver reverts to receive mode without sending the 5-tone code #59402 if the monitor is closed. If the monitor is open, the transceiver sends the 5-tone code #59402 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SCOFF

Description	Upon execution of the SCOFF command, the transceiver stops transmitting the QT tone or DQT code. The SCOFF command is used as the Encode Format which is executed when the PTT switch is released (Releasing PTT). Continuing the transmission for several 100 ms after executing the SCOFF command reduces the Squelch Tail Noise on the receiving transceiver.
Usage Example	Sample Script
	Encode Format: TXT SCOFF DEL 200 RX
	Transceiver behavior
	The transceiver stops transmitting the QT tone or DQT code. The transceiver continues transmitting for 200 ms, and then reverts to receive mode.

SCPH

Description	Upon execution of the SCPH command, the transceiver transmits the QT Reverse Burst tone.
Usage Example	Sample Script
	Encode Format: TXT SCPH DEL 180 RX
	Transceiver behavior
	The transceiver transmits the QT Reverse Burst tone for 180 ms and then reverts to receive mode.

SCR st-tone

Description	Upon execution of the SCR st-tone command, the transceiver waits to receive with the QT tone or DQT code configured for "st-tone".
Range	st-tone: QT tone (67.0 Hz to 254.1 Hz) or DQT code (D000N to D777N or D000I to D777I)
Usage Example	Sample Script
	Encode Format: TXT DTAIL DEL 200 RX SCR 151.4 DEL 5000 SCRP
	Transceiver behavior
	The transceiver sends the DQT turn-off code for 200 ms and then waits to receive with the QT tone of 151.4 Hz. After 5 sec elapse, the transceiver waits to receive with the QT tone or DQT code for receiving configured for the current channel.

SCRP

Description	Upon execution of the SCRP command, the transceiver waits to receive with the QT tone or DQT code for receiving configured for the current channel.
Usage Example	Sample Script
	Encode Format: TXT SCPH DEL 200 RX SCR 151.4 DEL 5000 SCR
	Transceiver behavior
	The transceiver sends the QT Reverse Burst tone for 200 ms and then waits to receive with the QT tone of 151.4 Hz. After 5 sec elapse, the transceiver waits to receive with the QT tone or DQT code for receiving configured for the current channel.

SCT st-tone

Description	Upon execution of the SCT st-tone command, the transceiver transmits using the QT tone or DQT code configured for “st-tone”.
Range	st-tone: QT tone (67.0 Hz to 254.1 Hz) or DQT code (D000N to D777N or D000I to D777I)
Usage Example	Sample Script
	Encode Format: TXS SCTP DEL 250 TSET ZVEI LEN 70 SEND #59402 DEL 50 SCT 151.4 DEL 250 SEND ^K12345 SCOFF DEL 250 RX
	Transceiver behavior
	The transceiver starts transmitting using the QT tone or DQT code for transmitting configured for the current channel. After a lapse of 250 ms, the transceiver sends a 5-tone code #59402 in the ZVEI signaling format. Each tone length is 70 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver changes the QT tone to the tone of 151.4 Hz. After a lapse of 250 ms, the transceiver sends a 5-tone code corresponding to ^K12345. The transceiver stops transmitting the QT tone or DQT code. After 250 ms elapse, the transceiver reverts to receive mode.

SCTP

Description	Upon execution of the SCTP command, the transceiver transmits using the QT tone or DQT code for transmitting configured for the current channel.
Usage Example	Sample Script
	Encode Format: TXM DEL 100 SCTP
	Transceiver behavior
	The transceiver transmits using the QT tone or DQT code for transmitting configured for the current channel.

SDIAL

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon executing the SDIAL command, the transceiver sends all codes entered as dial numbers. A maximum of 34 digits of dial numbers can be entered using the keypad. The SDIAL command is recommended to be used together with the SLEN and SCHK commands in order to reduce failures that may occur due to poor signal conditions.
Usage Example	Sample Script
	Encode Format: SELD TXD DEL 100 LEN 150 SDIAL DEL 50 RX
	Transceiver behavior
	Pressing the button to which the above Encode Format is assigned places the transceiver in Free-dial Entry Mode, and a DTMF code can be entered. (Refer to Entering a DTMF Code Directly by Using the Keypad to Send (Free-dial Entry).) A DTMF code is entered using the keypad. Then, if the Menu () button or the Call 1 to Call 6 button is pressed, the transceiver continuously sends the entered DTMF code for 150 ms per digit after 100 ms elapse. The transceiver sends the DTMF code for 50 ms, and then reverts to receive mode.  Note If the TXS command is used, the code “*” is sent as “E” tone and the code “#” is sent as “F” tone (unmodulated).

SELC

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the SELC command, the transceiver enters Selcall Mode. In Selcall Mode, a Selcall code can be selected from the Selcall List to send. The transceiver behavior in Selcall Mode is the same as when the Selcall button is pressed.
Usage Example	Sample Script
	Encode Format: SELC TXS DEL 100 TSET EEA LEN 40 SENDC DEL 100 RX
	Decode Format: STO 12345 QUEUE DISPM MONO BEEP 12
	Transceiver behavior Pressing the button to which the above Encode Format is assigned places the transceiver in Selcall Mode, and a Selcall code can be selected from the Selcall List. (Refer to Changing the Selcall Code.) If the Menu () or [*] button, or the Call 1 to Call 6 button is pressed after selecting a Selcall code from the Selcall List, the transceiver sends the selected Selcall code by using the EEA signaling format after 100 ms elapse. Each tone length is 40 ms. The transceiver sends the Selcall code for 100 ms, and then reverts to receive mode. The receiving transceiver stores the received Selcall code to the Queue buffer. The transceiver displays the Selcall code stored in the Queue buffer on the display and opens the monitor. A Beep 12 sounds from the transceiver.  Note The SELC command is skipped while “Remote Control” is displayed.

SELCH channel

Description	When the SELCH channel command is executed, the transceiver migrates to the channel configured for “channel”.
	If UP is configured for “channel”, executing the SELCH channel command increases the channel number by one. If DOWN is configured for “channel”, executing the SELCH channel command decreases the channel number by one.
Range	channel: Channel number 1 to Channel number 512, UP or DOWN
Usage Example	Sample Script
	Encode Format: SELCH 2 TXS DEL 100 TSET EEA LEN 40 SEND #12345 DEL 50 RX
	Transceiver behavior
	The transceiver migrates to channel 2 and starts transmitting. After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SELD

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the SELD command, the transceiver enters Free-dial Entry Mode. In Free-dial Entry Mode, a maximum of 34 digits of DTMF code can be entered using the keypad.
Usage Example	Sample Script
	Encode Format: SELD TXD DEL 100 LEN 150 SDIAL DEL 50 RX
	Transceiver behavior
	Pressing the button to which the above Encode Format is assigned places the transceiver in Free-dial Entry Mode, and a DTMF code can be entered. (Refer to Entering a DTMF Code Directly by Using the Keypad to Send (Free-dial Entry) .) A DTMF code is entered using the keypad. Then, if the Menu () button or the Call 1 to Call 6 button is pressed, the transceiver continuously sends the entered DTMF code for 150 ms per digit after 100 ms elapse. The transceiver sends the DTMF code for 50 ms, and then reverts to receive mode.

 **Note**

- If the **TXS** command is used, the code “*” is sent as “E” tone and the code “#” is sent as “F” tone (unmodulated).
- The **SELD** command is skipped while “Remote Control” is displayed.

SELGR zone

Description	When the SELGR zone command is executed, the transceiver migrates to the zone configured for “zone”. If UP is configured for “zone”, executing the SELGR zone command increases the zone number by one. If DOWN is configured for “zone”, executing the SELGR zone command decreases the zone number by one.
Range	zone: Zone number 1 to Zone number 128, UP or DOWN
Usage Example	Sample Script
	Encode Format: SELGR 3 SELCH 2 TXS DEL 100 TSET EEA LEN 40 SEND #12345 DEL 50 RX
	Transceiver behavior
	The transceiver migrates to channel 2 in zone 3 and starts transmitting. After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SELM

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the SELM command, the transceiver enters Status Mode. In Status Mode, a Status code can be selected from the Status List to send. The transceiver behavior in Status Mode is the same as when the Status button is pressed.
Usage Example	Sample Script
	Encode Format: SELM TXS DEL 100 TSET EEA LEN 40 SENDS DEL 100 RX
	Decode Format: SSTO 12345 QUEUE DISPM MONO BEEP 1
	Transceiver behavior
	Pressing the button to which the above Encode Format is assigned places the transceiver in Status Mode, and a Status code can be selected from the Status List . (Refer to Changing the Status Code .) If the Menu () or [*] button, or the Call 1 to Call 6 button is pressed after selecting a Selcall code from the Status List , the transceiver sends the selected Status code by using the EEA signaling format after 100 ms elapse. Each tone length is 40 ms. The transceiver sends the Status code for 100 ms, and then reverts to receive mode. The receiving transceiver stores the received Status code in the Queue buffer. The transceiver displays the Status code stored in the Queue buffer on the display and opens the monitor. A Beep 1 sounds from the transceiver.  Note • The SELM command is skipped while “Remote Control” is displayed.

SELMC

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the SELMC command, the transceiver enters Selcall Mode and Status Mode. The transceiver behavior of when the SELMC command is executed is the same as when the Selcall + Status button is pressed.
Usage Example	Sample Script
	Encode Format: SELMC TXS DEL 100 TSET EEA LEN 40 SENDC SENDS DEL 100 RX
	Decode Format: STO 123 SSTS 45 QUEUE DISPM BEEP 8 MONF
	Transceiver behavior
	Pressing the button to which the above Encode Format is assigned places the transceiver in Selcall Mode, and a Selcall code can be selected from the Selcall List. (Refer to Changing the Selcall Code.) If the Menu () or [*] button, or the Call 1 to Call 6 button is pressed after selecting a Selcall code from the Selcall List, the transceiver enters Status Mode, and a Status code can be selected from the Status List. (Refer to Changing the Status Code.) If the Menu () or [*] button, or the Call 1 to Call 6 button is pressed after selecting a Selcall and Status code from the Status List, the transceiver sends the selected Status code by using the EEA signaling format after 100 ms elapse. Each tone length is 40 ms. The transceiver sends the Selcall and Status codes for 100 ms, and then reverts to receive mode. The receiving transceiver stores the received Selcall and Status codes in the Queue buffer. The transceiver displays the Selcall and Status codes stored in the Queue buffer on the display and opens the monitor. A Beep 8 sounds from the transceiver.  Note The SELMC command is skipped while “Remote Control” is displayed.

SELS

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the SELS command, “Status” appears on the display and the transceiver enters Status Mode. In Status Mode, a Status code can be entered with the numbers from 0 to 9 and sent. The transceiver behavior in Status Mode is the same as when the Status button is pressed. (Refer to Changing the Status Code.)
Usage Example	Sample Script
	Encode Format: SELS TXS DEL 50 TSET EEA LEN 40 SEND ^RX12345^U45 DEL 50 RX
	Transceiver behavior
	Pressing the button to which the above Encode Format is assigned places the transceiver in Status Mode, and a Status code can be entered. (Refer to Changing the Status Code.) If the Menu () or [*] button, or the Call 1 to Call 6 button is pressed after entering a Status code, the transceiver sends a 5-tone code corresponding to ^RX12345 in the EEA signaling format after a lapse of 50 ms. In this case, the codes in the 1st to 5th digits of the 5-tone code configured as the RX Address are sent. Subsequently, the transceiver sends the Status code corresponding to ^U45 by using the EEA signaling format. In this case, the codes in the 4th and 5th digits of entered Status code are sent. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.
	 Note The SELS command is skipped while “Remote Control” is displayed.

SELT

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the SELT command, the transceiver enters Short Message Mode. In Short Message Mode, a Short Message can be entered and sent. The transceiver behavior in Short Message Mode is the same as the behavior when the Short Message button is pressed.
Usage Example	Sample Script
	Encode Format: SELT TXS DEL 100 TSET EEA LEN 40 SEND ^TX12345 DEL 100 TXK SFSM RX Decode Format: STO 12345 RFS ALERT 5
	Transceiver behavior
	Pressing the button to which the above Encode Format is assigned places the transceiver in Short Message Mode, and a Short Message can be entered. (Refer to Sending and Receiving a Short Message (Short Data Call).) If the Menu ([]) or [*] button, or the Call 1 to Call 6 button is pressed after entering a Short Message, the transceiver sends a 5-tone code corresponding to ^TX12345 in the EEA signaling format after a lapse of 100 ms. In this case, the codes in the 1st to 5th digits of the 5-tone code configured as the TX Address are sent. Upon lapse of 100 ms after transmitting all tones, the transceiver sends the entered Short Message. After a Short Message is sent, the transceiver reverts to receive mode.  Note The SELT command is skipped while “Remote Control” is displayed.

SEND #0 to SEND #F

Description	Upon execution of the SEND #n command (n: 0 to 9, A to F), the transceiver sends the Selcall code configured for “#n”. A Selcall code can be configured for “#n” like “#12345” and sent.
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #12345 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.  Note If the TXD command is used, the code “E” is sent as “*” tone and the code “F” is sent as “#” tone.

SEND ^K1 to SEND ^K8

Description	Upon execution of the SEND ^Kn command (n: 1 to 8), the transceiver sends the Selcall code corresponding to the digit configured for “^Kn”.
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND ^K12345 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends the codes in the 1st to 5th digits of the 5-tone code stored in the Selcall buffer in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SEND ^M1 to SEND ^M8

Description	Upon execution of the SEND ^Mn command (n: 1 to 8), the transceiver sends My ID corresponding to the digit configured for “^Mn”. (Refer to My ID .)
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND ^M12345 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends the codes in the 1st to 5th digits of the 5-tone code configured for the transceiver as My ID in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SEND ^Q1 to SEND ^Q8

Description	Upon execution of the SEND ^Qn command (n: 1 to 8), the transceiver sends the Queue code corresponding to the digit configured for “^Qn”. The Queue code is the 5-tone code stored in the transceiver Queue buffer.
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND ^Q12345 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends the codes in the 1st to 5th digits of the 5-tone code stored in the transceiver Queue buffer in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SEND ^RX1 to SEND ^RX8

Description	Upon execution of the SEND ^RXn command (n: 1 to 8), the transceiver sends the RX Address corresponding to the digit configured for “^RXn”. RX Address can be configured for each channel. (Refer to TX Address/ RX Address .)
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND ^RX12345 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends the codes in the 1st to 5th digits of the 5-tone code configured for the transceiver as RX Address in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SEND ^TX1 to SEND ^TX8

Description	Upon execution of the SEND ^TXn command (n: 1 to 8), the transceiver sends the TX Address corresponding to the digit configured for “^TXn”. TX Address can be configured for each channel. (Refer to TX Address/ RX Address.)
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND ^TX12345 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends the codes in the 1st to 5th digits of the 5-tone code configured for the transceiver as TX Address in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SEND ^U1 to SEND ^U8

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the SEND ^Un command (n: 1 to 8), the transceiver sends the Status code corresponding to the digit configured for “^Un”. The Status code to be sent can be selected from the Status List in Status Mode or specified by directly entering the Status code. (Refer to Changing the Status Code.)
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND ^RX123^U45 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends the codes in the 1st to 3rd digits of the 5-tone code configured for the transceiver as RX Address in the EEA signaling format. Subsequently, the transceiver sends the codes in the 4th and 5th digits of the selected Status code by using the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SEND ^V1 to SEND ^V8

Description	Upon execution of the SEND ^Vn command (n: 1 to 8), the transceiver sends the Receive code corresponding to the digit configured for “^Vn”. The Receive code to be sent can be selected in Receive Entry Mode. (Refer to Changing the Receive Code.)
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND ^RX123^V45 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends the codes in the 1st to 3rd digits of the 5-tone code configured for the transceiver as RX Address in the EEA signaling format. Subsequently, the transceiver sends the codes in the 4th and 5th digits of the selected Receive code by using the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SENDC

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the SENDC command, the transceiver sends the Selcall code selected by using the SELC or SELMC command. (Refer to SELC , SELMC .)
Usage Example	Sample Script
	Encode Format: SELC TXS DEL 100 TSET EEA LEN 40 SENDC DEL 100 RX
	Decode Format: STO 12345 QUEUE DISPM MONO BEEP 12
	Transceiver behavior
	Pressing the button to which the above Encode Format is assigned places the transceiver in Selcall Mode, and a Selcall code can be selected from the Selcall List . (Refer to Changing the Selcall Code .) If the Menu ([F7]) or [*] button, or the Call 1 to Call 6 button is pressed after selecting a Selcall code from the Selcall List , the transceiver sends the selected Selcall code by using the EEA signaling format after 100 ms elapse. Each tone length is 40 ms. The transceiver sends the Selcall code for 100 ms, and then reverts to receive mode. The receiving transceiver stores the received Selcall code to the Queue buffer. The transceiver displays the Selcall code stored in the Queue buffer on the display and opens the monitor. A Beep 12 sounds from the transceiver.

SENDS

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the SENDS command, the transceiver sends the Status code selected by using the SELM or SELMC command. (Refer to SELM , SELMC .)
Usage Example	Sample Script
	Encode Format: SELM TXS DEL 100 TSET EEA LEN 40 SENDS DEL 100 RX
	Decode Format: SSTO 12345 QUEUE DISPM MONO BEEP 1
	Transceiver behavior
	Pressing the button to which the above Encode Format is assigned places the transceiver in Status Mode, and a Status code can be selected from the Status List . (Refer to Changing the Status Code .) If the Menu ([F7]) or [*] button, or the Call 1 to Call 6 button is pressed after selecting a Selcall code from the Status List , the transceiver sends the selected Status code by using the EEA signaling format after 100 ms elapse. Each tone length is 40 ms. The transceiver sends the Status code for 100 ms, and then reverts to receive mode. The receiving transceiver stores the received Status code in the Queue buffer. The transceiver displays the Status code stored in the Queue buffer on the display and opens the monitor. A Beep 1 sounds from the transceiver.

SFS

Description	Upon receipt of a Short Message or Long Message in the FleetSync format via the COM port from an external device such as a PC, the base station transceiver sends a Short Message or Long Message in the FleetSync format to the mobile station transceiver. A 5-tone code can be sent simultaneously by using the SEND command at this time. By executing the SFS command, the transceiver converts the received data to the FleetSync format and sends the data.
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #12345 DEL 100 TXK SFS RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 100 ms after transmitting all tones, the transceiver sends a Short Message or Long Message in the FleetSync format. After a Short Message or Long Message is sent, the transceiver reverts to receive mode.

SFSM

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	By executing the SFSM command, the transceiver sends a Short Message in the FleetSync format. The Short Message to be sent can be directly entered in Short Message Mode. (Refer to Sending and Receiving a Short Message (Short Data Call).)
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #594^K45 DEL 100 TXK SFSM RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code corresponding to #594^K45 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 100 ms after transmitting all tones, the transceiver sends the Short Message entered in Short Message Mode. After a Short Message is sent, the transceiver reverts to receive mode.

SGPS

Description	Upon execution of the SGPS command, the transceiver sends the GPS data acquired from the GPS receiver connected to the GPS port of the transceiver.
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #59402 DEL 100 TXK SGPS RX
	Decode Format: CMP ^RX12345 RGPS
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59402 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 100 ms after transmitting all tones, the transceiver sends the GPS data. After the GPS data is sent, the transceiver reverts to receive mode.

SLEN ofs

Description	Upon execution of the SLEN ofs command, the transceiver sends as the Selcall code the remainder of when a value, obtained by adding the number configured for “ofs” to the number of digits of Selcall code to be sent, is divided by 10. The SLEN ofs command can be used in combination with the SCHK command to calculate a checksum. (Refer to SCHK.)
Range	ofs (Off Set): 0 to 9 (in steps of 1)
Usage Example	Sample Script
	Encode Format: SELD TXD DEL 50 LEN 150 SDIAL DEL 150 SLEN 1 DEL 150 SCHK DEL 50 RX
	Transceiver behavior
	The transceiver enters Free-dial Entry Mode. The following is the example of when DTMF code 1234 is entered. The transceiver sends the DTMF code as below: 1) The entered DTMF code 1234 is sent as the Encode Code. Each tone length is 150 ms. 2) After 150 ms elapse, the value 5, obtained by adding the value configured for “ofs” of the SLEN ofs command (1) to the number of digits of entered DTMF code 1234 (4), is added to the DTMF code 1234 and sent. 3) After 150 ms elapse, the value 5 in the least significant digit of checksum data is added to the DTMF code 1234 and sent. Checksum data can be calculated by adding each tone number of the sent DTMF code 1234 and the value 5 calculated in 2). $(1 + 2 + 3 + 4 + 5 = 15)$ Upon lapse of 50 ms after sending the DTMF code, the transceiver reverts to receive mode. The DTMF code which is sent in the above example is 123455.
	 Note • The value 5, calculated in 2), is the remainder of when the value 5, obtained by adding the value configured for “ofs” of the SLEN ofs command (1) to the number of digits of code 1234 (4), is divided by 10. The following are the examples to calculate the value. • A dialed number string 1234567 (7 digits long) coupled with the SLEN 3 command $(7 + 3)$ divided by Modulus 10 = a remainder of 0 • A dialed number string 456376247623 (12 digits long) coupled with the SLEN 9 command $(12 + 9)$ divided by Modulus 10 = a remainder of 1 • No dialed number (without any digits) coupled with the SLEN 5 command $(0 + 5)$ divided by Modulus 10 = a remainder of 5

SOPEN

Description	If the monitor is open when executing the SOPEN command, the transceiver does not execute the SEND command which is subsequent to the SOPEN command.
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SOPEN SEND #59402 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver reverts to receive mode without sending the 5-tone code #59402 if the monitor is opened. If the monitor is closed, the transceiver sends the 5-tone code #59402 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

SPAUS

Description	If the timer for Encode Pause Time is counting down when executing the SPAUS command, the transceiver does not execute the SEND command which is subsequent to the SPAUS command.
Usage Example	Sample Script
	Encode Format (PTT Press): TXS DEL 100 TSET EEA LEN 40 SPAUS SEND #594^K45 TXM
	Encode Format (PTT Release): RX PAUSE 5
	Transceiver behavior
	Pressing the PTT switch causes the transceiver to start transmission. After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code corresponding to #594^K45 in the EEA signaling format. Each tone length is 40 ms. After transmitting all tones, the transceiver unmutes the microphone and continues to transmit. However, while the timer for Encode Pause Time is counting down, the transceiver unmutes the microphone and continues to transmit without sending the 5-tone code corresponding to #594^K45. Upon release of the PTT switch, the transceiver reverts to receive mode and the timer for Encode Pause Time counts down 5 sec.

STOPS

Description	When the STOPS command is executed, the transceiver stops scanning.
Usage Example	Sample Script
	Encode Format: ERRX1 STOPS XSCAN TXM
	Transceiver behavior
	If the scan has started, an error tone sounds from the transceiver and the scan stops. If the scan stops, the transceiver starts transmitting.

STRTS

Description	When the STRTS command is executed, the transceiver starts scanning.
Usage Example	Sample Script
	Encode Format: STRTS
	Transceiver behavior
	The transceiver starts scanning.

TEXT 'text'

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the TEXT 'text' command is executed, the transceiver displays the text string configured for "text" on the display.
	Execution of the TXTOF command restores the previous display. (Refer to TXTOF .)
Usage Example	Sample Script
	Encode Format: TEXT 'Kenwood' DELL 5 TXTOF
	Transceiver behavior
	The text "Kenwood" is displayed. Upon lapse of 5 sec after the transceiver starts displaying the text string, the display reverts to the previous display.

TONE af-freq

Description	Upon execution of the TONE af-freq command, the transceiver transmits the single tone configured for "af-freq".
	The length of the single tone to be sent can be configured for the LEN xtime command. (Refer to LEN xtime .) If the transceiver receives a signal from the repeater, Group Call, or Selective Call, the transceiver opens the monitor. Transmitting a single tone can close the opened monitor.
Range	af-freq: 300 Hz to 3000 Hz (in steps of 1 Hz)
Usage Example	Sample Script
	Encode Format: TXS DEL 250 LEN 6000 TONE 2135 DEL 150 RX
	Transceiver behavior
	After a lapse of 250 ms from when the transceiver starts transmitting, the transceiver transmits the single tone of 2135 Hz for 6 sec. Upon lapse of 150 ms after transmitting the single tone, the transceiver reverts to receive mode.

TPD

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the TPD command, the transceiver exits Transparency Mode. Upon execution of the TPE command, the transceiver enters Transparency Mode. (Refer to TPE .)
Usage Example	Sample Script
	Encode Format: SELD TXD DEL 50 LEN 150 DEL 80 TPE SDIAL DEL 50 TPD TXS DEL 100 TSET EEA LEN 40 SEND #12345 DEL 50 RX
	Transceiver behavior
	Pressing the button to which the above Encode Format is assigned places the transceiver in Free-dial Entry Mode, and a DTMF code can be entered. (Refer to Entering a DTMF Code Directly by Using the Keypad to Send (Free-dial Entry) .) If the Menu () button or the Call 1 to Call 6 button is pressed after the DTMF code 123456 is entered, the transceiver sends the DTMF code D1234D56 in Transparency Mode. Then, the transceiver disables Transparency Mode and sends the 5-tone code #12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

TPE

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the TPE command, the transceiver enters Transparency Mode.
	In Transparency Mode, the transceiver can send a large packet size of data by means of a Selcall tone. "D" is inserted every 4 digits of the 5-tone code to be sent so as not to call a transceiver other than the target transceiver.
Usage Example	Sample Script
	Encode Format: SELD TXD DEL 50 LEN 150 DEL 80 TPE SDIAL DEL 50 TPD TXS DEL 100 TSET EEA LEN 40 SEND #12345 DEL 50 RX
	Transceiver behavior
	Pressing the button to which the above Encode Format is assigned places the transceiver in Free-dial Entry Mode, and a DTMF code can be entered. (Refer to Entering a DTMF Code Directly by Using the Keypad to Send (Free-dial Entry) .) If the Menu () button or the Call 1 to Call 6 button is pressed after the DTMF code 123456 is entered, the transceiver sends the DTMF code D1234D56 in Transparency Mode. Then, the transceiver disables Transparency Mode and sends the 5-tone code #12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

TSET toneset

Description	Upon execution of the TSET toneset command, the transceiver sends a 5-tone code in the signaling format configured for "toneset".
	If a signaling format is configured with TSET toneset command, the tone length for each signaling format needs to be configured with the LEN xtime command. (Refer to LEN xtime .)
Range	toneset: ZVEI, CCIR, EEA, PZVEI, DZVEI, PCCIR, PDZVEI, ZVEI-2, EIA, Natel, AP-369, Kenwood
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET Kenwood LEN 70 SEND #98765 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #98765 in the Kenwood signaling format. Each tone length is 70 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

TXD

Description	Upon execution of the TXD command, the transceiver sends the DTMF code. The transceiver mutes the microphone during the transmission of the DTMF code.
	The length of each code of DTMF code to be sent can be configured for the LEN xtime command. (Refer to LEN xtime .) If Sidetone is enabled, the tone of a DTMF code sounds from the transceiver. (Refer to Sidetone .)
Usage Example	Sample Script
	Encode Format: TXD DEL 100 LEN 150 SEND #1234 TXM
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends the DTMF code #1234. Each tone length is 150 ms. After transmitting all tones, the transceiver unmutes the microphone and continues to transmit.

TXF rf-freq

Description	Upon execution of the TXF rf-freq command, the transceiver transmits using the frequency configured for “rf-freq”. The transceiver mutes the microphone and speaker during the transmission. The frequency supported by the transceiver in use must be configured for “rf-freq”.
Range	rf-freq: Transmit frequency
Usage Example	Sample Script
	Encode Format: TXF 451.25500 TXS DEL 50 LEN 6000 TONE 2135 DEL 2000 RX TXP TXS DEL 50 LEN 1000 TONE 1000 DEL 50 RX
	Transceiver behavior
	The transceiver transmits the single tone of 2135 Hz for 6 sec on the transmit frequency of 451.25500 MHz. Upon lapse of 2 sec after transmitting the single tone, the transceiver transmits the single tone of 1000 Hz for 1 sec on the transmit frequency configured for the current channel. Upon lapse of 50 ms after transmitting the single tone, the transceiver reverts to receive mode.

TXK

Description	Upon execution of the TXK command, the transceiver sends the FFSK code. The transceiver mutes the microphone during the transmission of the FFSK code.
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #594^K45 DEL 100 TXK SFSM RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code corresponding to #594^K45 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 100 ms after transmitting all tones, the transceiver sends the Short Message entered in Short Message Mode. After a Short Message is sent, the transceiver reverts to receive mode. (Refer to Sending and Receiving a Short Message (Short Data Call) .)

TXM

Description	Upon execution of the TXM command, the transceiver unmutes the microphone and starts transmitting. The transceiver mutes the speaker during the transmission.
	The TXM command can normally be configured for the transceiver behavior upon a press of the PTT switch (Pressing PTT).
Usage Example	Sample Script
	Encode Format: TXM SCTP
	Transceiver behavior
	The transceiver transmits using the QT tone or DQT code configured for the current channel. Subsequently, the transceiver unmutes the microphone and continues to transmit.

TXP

Description	Upon execution of the TXP command, the transceiver transmits using the transmit frequency configured for the current channel.
	The transceiver mutes the microphone and speaker during the transmission.
Usage Example	Sample Script
	Encode Format: TXF 451.25500 TXS DEL 50 LEN 6000 TONE 2135 DEL 2000 RX TXP TXS DEL 50 LEN 1000 TONE 1000 DEL 50 RX
	Transceiver behavior
	The transceiver transmits the single tone of 2135 Hz for 6 sec on the transmit frequency of 451.25500 MHz. Upon lapse of 2 sec after transmitting the single tone, the transceiver transmits the single tone of 1000 Hz for 1 sec on the transmit frequency configured for the current channel. Upon lapse of 50 ms after transmitting the single tone, the transceiver reverts to receive mode.

TXS

Description	Upon execution of the TXS command, the transceiver sends a 5-tone code or a single tone. The transceiver mutes the microphone during the transmission.
	If Sidetone is enabled, a tone of the 5-tone code or single tone sounds from the transceiver speaker. (Refer to Sidetone .)
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND ^RX123^V45 DEL 50 RX
	Transceiver behavior
	After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends the codes in the 1st to 3rd digits of the 5-tone code configured for the transceiver as RX Address in the EEA signaling format. Subsequently, the transceiver sends the codes in the 4th and 5th digits of the selected Receive code by using the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode.

TXT

Description	Upon execution of the TXT command, the transceiver transmits the QT Reverse Burst tone or DQT turn-off code. The transceiver mutes the microphone and speaker during the transmission.
Usage Example	Sample Script
	Encode Format (PTT Release): TXT SCPH DEL 180 DTAIL DEL 180 RX
	Transceiver behavior
	If a QT tone is configured for the current channel, the transceiver transmits the Reverse Burst tone for 180 ms. If a DQT code is configured for the current channel, the transceiver sends the DQT turn-off code for 180 ms.

TXTOF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the TXTOF command when a text string appears on the display by executing the TEXT command, the display returns to the previous display.
Usage Example	Sample Script
	Encode Format: TEXT 'Hello Kenwood' DELL 3 TXTOF
	Transceiver behavior
	The text string "Hello Kenwood" appears on the display. The display reverts to the previous display upon lapse of 3 sec.

VIB

Supported Models: Portable (NX-3200/ NX-3300/ NX-3400)

Description	Upon execution of the VIB command when Vibrator is enabled, the Vibrator unit vibrates. The Vibrator unit vibrates for 10 sec at 500-ms intervals. Pressing any button while the Vibrator unit is vibrating stops the Vibrator unit from vibrating.
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 ENCI enc_ack
	Encode Format (enc_ack): TXS DEL 100 TSET EEA LEN 40 SEND #12345 DEL 50 RX VIB
	Transceiver Behavior
Upon receipt of a 5-tone code corresponding to ^RX12345 when Vibrator is enabled, the transceiver executes Encode Format (enc_ack). After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode and the Vibrator unit vibrates.	

XCARR

Description	If the transceiver detects a carrier when executing the XCARR command, the transceiver does not execute commands subsequent to the XCARR command and aborts the execution of Encode Format .
Usage Example	Sample Script
	Encode Format: ERRX1 XCARR TXM
	Transceiver behavior
	If the transceiver detects a carrier on the current channel, the transceiver emits an error tone and does not start transmission. If the transceiver does not detect any carrier on the current channel, the transceiver unmutes the microphone and starts transmitting.

XCLOS

Description	If the monitor is closed when executing the XCLOS command, the transceiver does not execute commands subsequent to the XCLOS command and aborts the execution of Encode Format .
Usage Example	Sample Script
	Encode Format: OPEN XCLOS TXS DEL 100 TSET EEA LEN 40 SEND ^RX12345 DEL 50 RX CLOSE
	Transceiver behavior
	The transceiver verifies whether or not the monitor is open, and if the monitor is closed, the transceiver opens the monitor and aborts the execution of Encode Format . If the monitor is open, the transceiver starts transmitting. After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code corresponding to ^RX12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode and closes the monitor.

XCTCM

Description	Upon execution of the XCTCM command, transmission is restricted by Busy Channel Lockout depending on the status of QT/DQT signaling. The transceiver behavior upon execution of the XCTCM command varies as below according to the status of QT/DQT signaling: ● If QT/DQT signaling is disabled by pressing the Monitor button: The transceiver executes commands subsequent to the XCTCM command. ● If QT/DQT signaling is not disabled: If the transceiver does not detect any carrier, the transceiver can transmit if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver. If the received QT tone or DQT code does not match the QT tone or DQT code preconfigured for the transceiver, or if the transceiver detects only a carrier, the transceiver does not execute commands subsequent to the XCTCM command and aborts the execution of Encode Format.
Usage Example	Sample Script
	Encode Format: XCTCM TXM SCTP
	Transceiver behavior
	If the transceiver does not detect any carrier, or if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver, the transceiver starts transmitting. If the received QT tone or DQT code does not match the QT tone or DQT code preconfigured for the transceiver, the transceiver does not start transmission and aborts the execution of Encode Format .

XCTCN

Description	Upon execution of the XCTCN command, if the transceiver detects only a carrier or if the received QT tone or DQT code does not match the QT tone or DQT code preconfigured for the transceiver, the transceiver does not execute commands subsequent to the XCTCN command and aborts the execution of Encode Format. The XCTCN command is used so as not to interfere with the use of repeater by other user groups when operating the transceiver via a repeater.
Usage Example	Sample Script
	Encode Format: ERRX1 XCTCN TXM
	Transceiver behavior
	If the transceiver detects only a carrier, or if the received QT tone or DQT code does not match the QT tone or DQT code preconfigured for the transceiver, the transceiver emits an error tone and does not start transmission.

XCTCW

Description	Upon execution of the XCTCW command, the transceiver aborts the execution of Encode Format if the transceiver does not detect any carrier or if the received signaling does not match the signaling preconfigured for the transceiver. The transceiver can transmit only if the received signaling matches the signaling preconfigured for the transceiver.
Usage Example	Sample Script
	Encode Format: ERRX1 XCTCW TXM
	Transceiver behavior
	If the transceiver does not detect any carrier, or if the received signaling does not match the signaling preconfigured for the transceiver, the transceiver emits an error tone and does not start transmission.

XNOT

Supported Models: Mobile

Description	Upon execution of the XNOT command when Transfer is enabled, the transceiver executes commands subsequent to the XNOT command.
	Upon execution of the XNOT command when Transfer is disabled, the transceiver does not execute commands subsequent to the XNOT command. (Refer to Transferring the Received 5-tone Code (Transfer) .)
Usage Example	Sample Script
	Decode Format: CMP #59405 BEEP 1 ENCI transfer
	Encode Format (transfer): XNOT TXS DEL 100 TSET EEA LEN 40 SEND #59402 RX
	Transceiver behavior
Usage Example	Upon receipt of a 5-tone code #59405, a Beep 1 sounds from the transceiver and the transceiver executes Encode Format (transfer).
	If the Transfer function is enabled, the transceiver starts transmitting. After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59402 in the EEA signaling format. Each tone length is 40 ms. After transmitting all tones, the transceiver reverts to receive mode.
	If the Transfer function is disabled, the transceiver does not execute commands subsequent to the XNOT command.

XOPEN

Description	If the monitor is open when executing the XOPEN command, the transceiver does not execute commands subsequent to the XOPEN command and aborts the execution of Encode Format .
Usage Example	Sample Script
	Encode Format: CLOSE XOPEN TXS DEL 100 TSET EEA LEN 40 SEND ^RX12345 DEL 50 RX OPEN
	Transceiver behavior
	The transceiver verifies whether or not the monitor is open, and if the monitor is open, the transceiver closes the monitor and aborts the execution of Encode Format . If the monitor is closed, the transceiver starts transmitting. After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code corresponding to ^RX12345 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode and opens the monitor.

XSAT st-tone

Description	If the transceiver is receiving the QT tone or DQT code configured for “st-tone” when executing the XSAT st-tone command, the transceiver does not execute commands subsequent to the XSAT st-tone command and aborts the execution of Encode Format .
Range	st-tone: QT tone (67.0 Hz to 254.1 Hz) or DQT code (D000N to D777N or D000I to D777I)
Usage Example	Sample Script
	Encode Format: XSAT 88.5 TXS DEL 100 TSET EEA LEN 40 SEND #59402 DEL 50 RX
	Transceiver behavior
	If the transceiver is not receiving the QT tone of 88.5 Hz, the transceiver starts transmitting. After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59402 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode. If the transceiver is receiving the QT tone of 88.5 Hz, the transceiver does not execute commands subsequent to the XSAT st-tone command and aborts the execution of Encode Format .

XSCAN

Description	If the transceiver is scanning or pauses scanning when executing the XSCAN command, the transceiver does not execute commands subsequent to the XSCAN command and aborts the execution of Encode Format .
Usage Example	Sample Script
	Encode Format: ERRX1 STOPS XSCAN TXM
	Transceiver behavior
	If the transceiver is scanning or pauses scanning, the transceiver stops scanning and emits an error tone. The transceiver does not start transmission. If the scan has stopped, the transceiver unmutes the microphone and starts transmitting.

XSENS

Description	If the transceiver is scanning when executing the XSENS command, the transceiver does not execute commands subsequent to the XSENS command and aborts the execution of Encode Format .
Usage Example	Sample Script
	Encode Format: XSENS TXM
	Transceiver behavior
	If the transceiver is scanning, the transceiver does not execute commands subsequent to the XSENS command and aborts the execution of Encode Format . If the scan has stopped, the transceiver unmutes the microphone and starts transmitting.

8.2 Decode Format

Decode Format is the script used to receive a 5-tone code. The script that determines the timing to receive a 5-tone code or the transceiver behavior when a 5-tone code is received can be created using the following commands.

Basically, in **Decode Format**, each command in Decode Format can be executed to control the transceiver behavior if a 5-tone code received in a Group Call or Individual Call matches the 5-tone code preconfigured for the transceiver.

Whether or not a 5-tone matches is determined by comparing the received 5-tone code with the 5-tone code preconfigured for the transceiver using the **CMP** command.

ALERT num

Description	If the 5-tone code received in a Group Call or Individual Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the ALERT num command, and emits the Alert Tone configured for “num”. The Alert Tone can be configured by selecting from 8 types of Alert Tones configured for the transceiver. (Refer to Common Function Part Configuring the Alert Tone (Special Alert Tone).)
Range	num: 1 to 8
Usage Example	Sample Script
	Decode Format: CMP #12345 MONO ALERT 8
	Transceiver behavior
	Upon receipt of a 5-tone code #12345, the transceiver opens the monitor, the “  ” icon appears, and an Alert Tone 8 sounds from the transceiver.

ALERTG num

Description	If the 5-tone code received in a Group Call containing the Group Tone matches the 5-tone code preconfigured for the transceiver, the transceiver executes the ALERTG num command, and emits the Alert Tone configured for “num”. (Refer to Group Tone.) The Alert Tone can be configured by selecting from 8 types of Alert Tones configured for the transceiver. (Refer to Common Function Part Configuring the Alert Tone (Special Alert Tone).)
Range	num: 1 to 8
Usage Example	Sample Script
	Decode Format: CMP ^TX12345 MONF ALERTI 4 ALERTG 2
	Transceiver behavior
	^TX12345: 59401 (TX stands for TX Address), Group Tone: A
	Upon receipt of a 5-tone code #59401, the transceiver opens the monitor, the “” icon blinks, and an Alert Tone 4 sounds from the transceiver. (Individual Call) Upon receipt of a 5-tone code #5940A, the transceiver opens the monitor, the “” icon blinks, and an Alert Tone 2 sounds from the transceiver. (Group Call)

ALERTI num

Description	If the 5-tone code received in an Individual Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the ALERTI num command, and emits the Alert Tone configured for “num”. The Alert Tone can be configured by selecting from 8 types of Alert Tones configured for the transceiver. (Refer to Common Function Part Configuring the Alert Tone (Special Alert Tone) .)
Range	num: 1 to 8
Usage Example	Sample Script
	Decode Format: CMP ^TX12345 MONF ALERTI 4 ALERTG 2
	Transceiver behavior
	^TX12345: 59401 (TX stands for TX Address), Group Tone: A Upon receipt of a 5-tone code #59401, the transceiver opens the monitor, the “  ” icon blinks, and an Alert Tone 4 sounds from the transceiver. (Individual Call) Upon receipt of a 5-tone code #5940A, the transceiver opens the monitor, the “  ” icon blinks, and an Alert Tone 2 sounds from the transceiver. (Group Call)

AUTR

Description	Upon execution of the AUTR command, Auto Reset Timer is activated and then Auto Reset Timer starts counting down. Upon lapse of the time configured for Auto Reset Timer , the transceiver restores the display in receive mode, turns the LED off, or disables the Alert Tone or Monitor function according to the configuration for Auto Reset Timer . (Refer to Auto Reset Timer .)
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 MONO AUTR
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) Upon receipt of a 5-tone code #59401, the transceiver opens the monitor, and Auto Reset Timer starts counting down.

BEEP num

Description	If the 5-tone code received in a Group Call or Individual Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the BEEP num command, and emits the beep configured for “num”. The beep can be configured by selecting from 48 types of beep patterns (0 to 47).
Range	num: 0 to 47
Usage Example	Sample Script
	Decode Format: CMP #12345 BEEP 12
	Transceiver behavior
	Upon receipt of a 5-tone code #12345, a Beep 12 sounds from the transceiver.

BEEPG num

Description	If the 5-tone code received in a Group Call containing the Group Tone matches the 5-tone code preconfigured for the transceiver, the transceiver executes the BEEPG num command, and emits the beep configured for “num”. (Refer to Group Tone.) The beep can be configured by selecting from 48 types of beep patterns (0 to 47).
Range	num: 0 to 47
Usage Example	Sample Script
	Decode Format: CMP ^TX12345 BEEPI 15 BEEPG 16
	Transceiver behavior
	^TX12345: 12301 (TX stands for TX Address), Group Tone: A Upon receipt of a 5-tone code #12301, a Beep 15 sounds from the transceiver. (Individual Call) Upon receipt of a 5-tone code #1230A, a Beep 16 sounds from the transceiver. (Group Call)

BEEPI num

Description	If the 5-tone code received in an Individual Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the BEEPI num command, and emits the beep configured for “num”. The beep can be configured by selecting from 48 types of beep patterns (0 to 47).
Range	num: 0 to 47
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 BEEPI 15 BEEPG 16
	Transceiver behavior
	^RX12345: 12301 (RX stands for RX Address), Group Tone: A Upon receipt of a 5-tone code #12301, a Beep 15 sounds from the transceiver. (Individual Call) Upon receipt of a 5-tone code #1230A, a Beep 16 sounds from the transceiver. (Group Call)

BLTOF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Portable: When the BLTOF command is executed is executed, the display backlight goes off.
	Mobile: When the BLTOF command is executed, “Off” is configured in LCD Brightness .
Usage Example	Sample Script
	Decode Format: CMP #12345 MONC BEEP 8 BLTOF
	Transceiver behavior
	Upon receipt of a 5-tone code #12345, the transceiver closes the monitor, a Beep 8 sounds from the transceiver, and the transceiver behaves as below:
	Portable: When the BLTOF command is executed is executed, the display backlight goes off. Mobile: When the BLTOF command is executed, “Off” is configured in LCD Brightness .

BLTON

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Portable: When the BLTON command is executed, the display backlight lights up.
	Mobile: When the BLTON command is executed, “High” is configured in LCD Brightness .
Usage Example	Sample Script
	Encode Format: EMGON BLTOF REP 5 TXS DEL 200 TSET EEA LEN 40 SEND #59499 DEL 50 TXM DEL 5000 RX RSML 5
	Decode Format: CMP ^RX12345 EMGOF REPOF BLTON MONO BEEP 3
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) Upon receipt of a 5-tone code #59401 in Emergency Mode, the transceiver exits Emergency Mode, and the transceiver behaves as below: Portable: When the BLTON command is executed, the display backlight lights up. Mobile: When the BLTON command is executed, “High” is configured in LCD Brightness . Then, the transceiver opens the monitor and a Beep 3 sounds from the transceiver.

CKSAT

Description	Upon execution of the CKSAT command, the transceiver determines whether the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver. The transceiver executes the commands subsequent to the CKSAT command if the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver.
Usage Example	Sample Script
	Decode Format: CKSAT CMP ^RX12345 MONO BEEP 15
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) The transceiver determines whether the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver. If the received QT tone or DQT code matches the QT tone or DQT code preconfigured for the transceiver, the transceiver opens the monitor and a Beep 15 sounds from the transceiver upon receipt of a 5-tone code #59401.

CMP #*

Description	Upon execution of the CMP #* command, the transceiver compares the received 5-tone code with the 5-tone code preconfigured for the transceiver. The transceiver executes the commands following the CMP #* command if the received 5-tone code matches the 5-tone code configured for “#*”. The 5-tone code to be compared is configured for “#*”. If any code from 0 to 9 and A to E is received for *, the transceiver determines the 5-tone code matches.
Usage Example	Sample Script
	Decode Format: CMP #12* STO 45 QUEUE BEEP 13
	Transceiver behavior
	The following assumes that the transceiver receives a 5-tone code #12345. The 1st and 2nd digits of received 5-tone code (#12) matches; therefore, the transceiver determines that the 5-tone code matches even if any code from 0 to 9 and A to E is received for * in the subsequent 3rd digit. The transceiver executes the next command, and stores the code 45 in the 4th and 5th digits of received 5-tone code in the Queue buffer. Then, a Beep 13 sounds from the transceiver.

CMP #0 to CMP #F

Description	Upon execution of the CMP #n command (n: 0 to 9, A to F), the transceiver compares the received 5-tone code with the 5-tone code preconfigured for the transceiver. The transceiver executes the commands following the CMP #n command if the received 5-tone code matches the 5-tone code configured for “#n”. The 5-tone code to be compared can be configured for “#n” like “#12345”.
Usage Example	Sample Script
	Decode Format: CMP #12345 MONF BEEP 12
	Transceiver behavior
	Upon receipt of a 5-tone code #12345, the transceiver opens the monitor, the “  ” icon blinks, and an Beep 12 sounds from the transceiver.

CMP ^K1 to CMP ^K8

Description	Upon execution of the CMP ^Kn command (n: 1 to 8), the transceiver compares the received 5-tone code with the Selcall code stored in the Selcall buffer. The Selcall code to be compared is only the code corresponding to the digit configured for “^Kn”. The transceiver executes the commands subsequent to the CMP ^Kn command if the received 5-tone code matches the Selcall code stored in the Selcall buffer. Placing the transceiver in Selcall Mode stores the Selcall code in the Selcall buffer. (Refer to Changing the Selcall Code.)
Usage Example	Sample Script
	Decode Format: CMP ^K12345 MONO BEEP 11 ENCI K_add
	Encode Format (K_add): TEXT 'Key-Disp' DELL 1 TXTOF
	Transceiver behavior The transceiver compares the received 5-tone code with the code in the 1st to 5th digits of the Selcall code stored in the Selcall buffer. The transceiver opens the monitor and emits a Beep 11 if the received 5-tone code matches the Selcall code stored in the Selcall buffer. Then, the transceiver executes the Encode Format (K_add). The text string “Key-Disp” appears on the display, and the display reverts to the previous display upon lapse of 1 sec after the transceiver starts displaying the text string.

CMP ^M1 to CMP ^M8

Description	Upon execution of the CMP ^Mn command (n: 1 to 8), the transceiver compares the received 5-tone code with the My ID code stored in the My ID buffer. The My ID code to be compared is only the code corresponding to the digit configured for “^Mn”. The transceiver executes the commands following the CMP ^Mn command if the received 5-tone code matches the My ID code stored in the My ID buffer. My ID can be configured using KPG-D3/ D3N. In addition, My ID can be changed in My ID Mode when the transceiver is turned on. (Refer to My ID.)
Usage Example	Sample Script
	Decode Format: CMP ^M12345 MONO BEEP 11
	Transceiver behavior
	The transceiver compares the received 5-tone code with the code in the 1st to 5th digits of the My ID code stored in the My ID buffer. The transceiver opens the monitor and emits a Beep 11 if the received 5-tone code matches the My ID code stored in the My ID buffer.

CMP ^Q1 to CMP ^Q8

Description	Upon execution of the CMP ^Qn command (n: 1 to 8), the transceiver compares the received 5-tone code with the Queue code stored in the Queue buffer. The Queue code to be compared is only the code corresponding to the digit configured for “^Qn”. The transceiver executes the commands following the CMP ^Qn command if the received 5-tone code matches the Queue code stored in the Queue buffer.
	The Queue code is stored in the Queue buffer in the following ways. - Pressing the Stack button to place the transceiver in Stack Mode stores the Queue code in the Queue buffer. - Executing the QUEUE command after executing the STO command in a Decode Format stores the Queue code in the Queue buffer.
Usage Example	Sample Script
	Decode Format: CMP ^Q12345 MONO BEEP 12 XPASS STO 12345 QUEUE BEEP 1
	Transceiver behavior
	The transceiver compares the received 5-tone code with the code in the 1st to 5th digits of the Queue code stored in the Queue buffer. The transceiver opens the monitor and emits a Beep 12 if the received 5-tone code matches the Queue code stored in the Queue buffer. If the received 5-tone code does not match the Queue code stored in the Queue buffer, the transceiver stores the received 5-tone code in the Queue buffer after storing it in the temporary buffer. Then, a Beep 1 sounds from the transceiver.

CMP ^RX1 to CMP ^RX8

Description	Upon execution of the CMP ^RXn command (n: 1 to 8), the transceiver compares the received 5-tone code with the RX Address preconfigured for the transceiver. The RX Address to be compared is only the code corresponding to the digit configured for “^RXn”. The transceiver executes the commands following the CMP ^RXn command if the received 5-tone code matches the RX Address preconfigured for the transceiver. (Refer to TX Address/ RX Address .)
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 BEEPI 15 BEEPG 16
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address), Group Tone: A Upon receipt of a 5-tone code #59401, a Beep 15 sounds from the transceiver. (Individual Call) Upon receipt of a 5-tone code #5940A, a Beep 16 sounds from the transceiver. (Group Call)

CMP ^TONE

Description	Upon execution of the CMP ^TONE command, the transceiver compares the received single tone with the single tone preconfigured for the transceiver. The following parameters are compared: • Frequency (Decode Single Tone) (Refer to Frequency (Decode Single Tone).) • Duration (Decode Single Tone) (Refer to Duration (Decode Single Tone).) The transceiver executes the commands following the CMP ^TONE command if the received single tone matches the single tone preconfigured for the transceiver.
Usage Example	Sample Script
	Decode Format: CMP ^TONE BEEP 17
	Transceiver behavior
	A Beep 17 sounds from the transceiver if the transceiver receives the single tone of 2500 Hz for 5000 ms when the transceiver is configured as below: Frequency (Decode Single Tone): 2500 Hz Duration (Decode Single Tone): 5000 ms

CMP ^TX1 to CMP ^TX8

Description	Upon execution of the CMP ^TXn command (n: 1 to 8), the transceiver compares the received 5-tone code with the TX Address preconfigured for the transceiver. The TX Address to be compared is only the code corresponding to the digit configured for “^TXn”. The transceiver executes the commands following the CMP ^TXn command if the received 5-tone code matches the TX Address preconfigured for the transceiver. (Refer to TX Address/ RX Address.)
Usage Example	Sample Script
	Decode Format: CMP ^TX12345 BEEP 46
	Transceiver behavior
	^TX12345: 59401 (TX stands for TX Address) Upon receipt of a 5-tone code #59401, a Beep 46 sounds from the transceiver.

CMP ^U1 to CMP ^U8

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the CMP ^Un command (n: 1 to 8), the transceiver compares the received 5-tone code with the Status code stored in the Status buffer. The Status code to be compared is only the code corresponding to the digit configured for “^Un”. The transceiver executes the commands following the CMP ^Un command if the received 5-tone code matches the Status code stored in the Status buffer. Placing the transceiver in Status Mode stores the Status code in the Status buffer. (Refer to Changing the Status Code.)
Usage Example	Sample Script
	Decode Format: CMP ^U12345 MONO BEEP 13 ENCI U_add
	Encode Format (U_add): TEXT ‘U-Disp’ DELL 1 TXTOF
	Transceiver behavior The transceiver compares the received 5-tone code with the code in the 1st to 5th digits of the Status code stored in the Status buffer. The transceiver opens the monitor and emits a Beep 13 if the received 5-tone code matches the Status code stored in the Status buffer. Then, the transceiver executes the Encode Format (U_add). The text string “U-Disp” appears on the display, and the display reverts to the previous display upon lapse of 1 sec after the transceiver starts displaying the text string.

CMP ^V1 to CMP ^V8

Description	Upon execution of the CMP ^Vn command (n: 1 to 8), the transceiver compares the received 5-tone code with the Receive code stored in the Selectable Receive buffer. The Receive code to be compared is only the code corresponding to the digit configured for “^Vn”. The transceiver executes the commands subsequent to the CMP ^Vn command if the received 5-tone code matches the Receive code stored in the Selectable Receive buffer. Pressing the Receive Entry button to place the transceiver in Receive Entry Mode stores the selected Receive code in the Selectable Receive buffer. (Refer to Changing the Receive Code.)
Usage Example	Sample Script
	Decode Format: CMP ^V12345 MONO BEEP 13 ENCI V_add
	Encode Format (V_add): TEXT ‘V-Disp’ DELL 1 TXTOF
	Transceiver behavior The transceiver compares the received 5-tone code with the code in the 1st to 5th digits of the Receive code stored in the Selectable Receive buffer. The transceiver opens the monitor and emits a Beep 13 if the received 5-tone code matches the Receive code stored in the Selectable Receive buffer. Then, the transceiver executes the Encode Format (V_add). The text string “V-Disp” appears on the display, and the display reverts to the previous display upon lapse of 1 sec after the transceiver starts displaying the text string.

DECA dec

Description	If the 5-tone code received in a Group Call or Individual Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the DECA dec command, and executes the Decode Format configured for “dec”.
Range	dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^RX123 DECA deca
	Decode Format (deca): CMP ^RX12345 ENCA text_a
	Encode Format (text_a): TEXT ‘Called’ DELL 1 TXTOF
	Transceiver behavior ^RX12345: 12301 (RX stands for RX Address), Group Tone: A If the 1st to 3rd digits of the received 5-tone code are #123, #A23, #1A3, #12A, #AA3, #A2A, #1AA, or #AAA, the transceiver executes the Decode Format (deca). Upon receipt of a 5-tone code #12301, the transceiver executes the Encode Format (text_a). Upon execution of the Encode Format (text_a), “Called” appears on the display. Upon lapse of 1 sec after the transceiver starts displaying the text string, the display reverts to the previous display.

DECAT time dec

Description	If the 5-tone code received in a Group Call or Individual Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the DECAT time dec command, and executes the Decode Format configured for “dec” for the length of time configured for “time”. The DECAT time dec command is used to wait for a certain period of time to decode the 5-tone codes in the 2nd and 3rd frames.
Range	time: 0 ms to 2550 ms (in steps of 10 ms) dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 DECAT 1500 DecNextFive
	Decode Format (DecNextFive): STO 12345 CMP #F MONO QUEUE DISPQ BEEP 3
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) Upon receipt of 5-tone code #59401, the transceiver executes the Decode Format (DecNextFive) for 1500 ms. If the transceiver receives the subsequent 5-tone code before 1500 ms elapse, the transceiver stores the received 5-tone code in the temporary buffer and opens the monitor. Next, the transceiver stores the received 5-tone code in the Queue buffer and displays the code on the display. Then, a Beep 3 sounds from the transceiver.

DECF dec

Description	If the received 5-tone code does not match the 5-tone code preconfigured for the transceiver, the transceiver executes the DECF dec command, and executes the Decode Format configured for “dec”. The DECF dec command is normally used when the script to be executed in Decode Format is insufficient in size.
Range	dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^RX123#00 BEEP 0 DECF beep_1
	Decode Format (beep_1): CMP ^RX123#01 BEEP 1
	Transceiver behavior Upon receipt of a 5-tone code ^RX123#00, a Beep 0 sounds from the transceiver. Upon receipt of a 5-tone code other than ^RX123#00, the transceiver executes the Decode Format (beep_1). Upon receipt of a 5-tone code ^RX123#01, a Beep 1 sounds from the transceiver.

DECG dec

Description	If the 5-tone code received in a Group Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the DECG dec command, and executes the Decode Format configured for “dec”.
Range	dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^RX123 DECG decg
	Decode Format (decg): CMP ^RX12345 ENCG text_g
	Encode Format (text_g): TEXT 'Group' DELL 1 TXTOF
	Transceiver behavior ^RX12345: 12301 (RX stands for RX Address), Group Tone: A If the 1st to 3rd digits of the received 5-tone code are #A23, #1A3, #12A, #AA3, #A2A, #1AA, or #AAA, the transceiver executes the Decode Format (decg). If the 5-tone code received in a Group Call containing the Group Tone A matches the 5-tone code preconfigured for the transceiver, “Group” appears on the display. Upon lapse of 1 sec after the transceiver starts displaying the text string, the display reverts to the previous display.

DECGT time dec

Description	If the 5-tone code received in a Group Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the DECGT time dec command, and executes the Decode Format configured for “dec” for the length of time configured for “time”. The DECGT time dec command is used to wait for a certain period of time to decode the 5-tone codes in the 2nd and 3rd frames.
Range	time: 0 ms to 2550 ms (in steps of 10 ms) dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 DECGT 1500 DecNextFive Decode Format (DecNextFive): STO 12345 CMP #F MONO QUEUE DISPQ BEEP 3
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) Upon receipt of 5-tone code #59401, the transceiver executes the Decode Format (DecNextFive) for 1500 ms. If the transceiver receives the subsequent 5-tone code before 1500 ms elapse, the transceiver stores the received 5-tone code in the temporary buffer and opens the monitor. Next, the transceiver stores the received 5-tone code in the Queue buffer and displays the code on the display. Then, a Beep 3 sounds from the transceiver.

DECI dec

Description	If the 5-tone code received in an Individual Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the DECI dec command, and executes the Decode Format configured for “dec”.
Range	dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^RX123 DECI deci Decode Format (deci): CMP ^RX12345 ENCI text_I Encode Format (text_I): TEXT 'Individual' DELL 1 TXTOF
	Transceiver behavior
	^RX12345: 12301 (RX stands for RX Address) Only if the 1st to 3rd digits of the received 5-tone code are #123, the transceiver executes the Decode Format (deci). Upon receipt of a 5-tone code #12301, the transceiver executes the Encode Format (text_I). Upon execution of the Encode Format (text_I), “Individual” appears on the display. Upon lapse of 1 sec after the transceiver starts displaying the text string, the display reverts to the previous display.

DECIT time dec

Description	If the 5-tone code received in an Individual Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the DECIT time dec command, and executes the Decode Format configured for “dec” for the length of time configured for “time”. The DECIT time dec command is used to wait for a certain period of time to decode the 5-tone codes in the 2nd and 3rd frames.
Range	time: 0 ms to 2550 ms (in steps of 10 ms) dec: Decode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 DECIT 1500 DecNextFive Decode Format (DecNextFive): STO 12345 CMP #F MONO QUEUE DISPQ BEEP 3
	Transceiver behavior
	^RX12345: 12301 (RX stands for RX Address) Upon receipt of 5-tone code #12301, the transceiver executes the Decode Format (DecNextFive) for 1500 ms. If the transceiver receives the subsequent 5-tone code before 1500 ms elapse, the transceiver stores the received 5-tone code in the temporary buffer and opens the monitor. Next, the transceiver stores the received 5-tone code in the Queue buffer and displays the code on the display. Then, a Beep 3 sounds from the transceiver.

DISPF

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	When the DISPF command is executed, the information on the transceiver display starts blinking.
Usage Example	Sample Script
	Decode Format: STO 12345 QUEUE DISPQ DISPF MONO BEEP 9
	Transceiver behavior
	The transceiver stores the received 5-tone code in the Queue buffer after storing it in the temporary buffer. Next, the transceiver displays the received 5-tone code on the display and opens the monitor, and the contents displayed on the display blink. Then, a Beep 9 sounds from the transceiver.

DISPM

Description	Upon execution of the DISPM command, the transceiver enters Stack Mode. If the Selcall code or Status code stored in the Queue buffer matches the Selcall code or Status code configured in the Selcall List or Status List, the transceiver displays the corresponding Selcall List or Status List on the display. The DISPM command is used as the subsequent command after the QUEUE command is executed. The code having the same number of digits as the number of digits configured for the STO or SSTO command is compared.
Usage Example	Sample Script
	Encode Format: SELX TXS DEL 100 TSET EEA LEN 40 SENDC DEL 100 RX
	Decode Format: STO 12345 QUEUE DISPM MONO BEEP 12
	Transceiver behavior The transmitting transceiver can send the Selcall code upon execution of the above Encode Format. (Refer to SELC.) The receiving transceiver stores the received Selcall code in the temporary buffer and then stores the code in the Queue buffer. Next, the transceiver enters Stack Mode, and then displays the Selcall List corresponding to the Selcall code stored in the Queue buffer on the display and opens the monitor. Then, a Beep 12 sounds from the transceiver.  Note • If no name corresponding to the Selcall code or Status code is configured in the Selcall List or Status List, the Selcall code or Status code appears. • The DISPM command is skipped while “Remote Control” is displayed.

DISPQ

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the DISPQ command, the transceiver enters Stack Mode and displays the Selcall code or Status code stored in the Queue buffer on the display. The DISPQ command is used as the subsequent command after the QUEUE command is executed.
Usage Example	Sample Script
	Encode Format: SELM TXS DEL 100 TSET EEA LEN 40 SENDS DEL 100 RX
	Decode format: SSTO 12345 QUEUE DISPQ MONO BEEP 1
	Transceiver behavior The transmitting transceiver can send the Status code upon execution of the above Encode Format. (Refer to SELM.) The receiving transceiver stores the received Status code in the temporary buffer and then stores the code in the Queue buffer. Next, the transceiver enters Stack Mode, and then displays the Status code stored in the Queue buffer on the display and opens the monitor. Then, a Beep 1 sounds from the transceiver.  Note • The DISPQ command is skipped while “Remote Control” is displayed.

DSPMT

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the DSPMT command, if the Selcall code or Status code stored in the temporary buffer matches the Selcall code or Status code configured in the Selcall List or Status List, the transceiver displays the corresponding Selcall List or Status List on the display. The DSPMT command is used when not storing the 5-tone code received by executing the QUEUE command in the Queue buffer, or used to display the received 5-tone code as it is.
Usage Example	Sample Script
	Decode Format: STO 12345 DSPMT MONO BEEP 8
	Transceiver behavior
	The transceiver stores the received Selcall code in the temporary buffer. Next, the transceiver displays the Selcall List corresponding to the Selcall code stored in the temporary buffer on the display and opens the monitor. Then, a Beep 8 sounds from the transceiver.  Note If no name corresponding to the Selcall code or Status code is configured in the Selcall List or Status List, the Selcall code or Status code appears.

DSPQT

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the DSPQT command, the transceiver displays the Selcall code or Status code stored in the temporary buffer on the display. The DSPQT command is used when not storing the 5-tone code received by executing the QUEUE command in the Queue buffer, or used to display the received 5-tone code as it is.
Usage Example	Sample Script
	Decode Format: STO 12345 DSPQT MONO BEEP 8
	Transceiver behavior
	The transceiver stores the received Status code in the temporary buffer. Next, the transceiver displays the Status code stored in the temporary buffer on the display and opens the monitor. Then, a Beep 8 sounds from the transceiver.

EMGOF

Description	If the received 5-tone code matches the 5-tone code preconfigured for the transceiver while the transceiver is in Emergency Mode by the EMGON command, the transceiver executes the EMGOF command and exits Emergency Mode.
Usage Example	Sample Script
	Encode Format: EMGON REP 5 TXS DEL 200 TSET EEA LEN 40 SEND #59499 DEL 50 TXM DEL 5000 RX RSML 5
	Decode Format: CMP ^RX12345 EMGOF REPOF MONO BEEP 3
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) Upon receipt of a 5-tone code #59401 while the transceiver is in Emergency Mode by the EMGON command, the transceiver exits Emergency Mode and opens the monitor. Then, a Beep 3 sounds from the transceiver.

ENCA enc

Description	If the 5-tone code received in a Group Call or Individual Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the ENCA enc command, and executes the Encode Format configured for “enc”.
Range	enc: Encode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^RX123 DECA deca
	Decode Format (deca): CMP ^RX12345 ENCA text_a
	Encode Format (text_a): TEXT 'Called' DELL 1 TXTOF
	Transceiver behavior
	^RX12345: 12301 (RX stands for RX Address), Group Tone: A If the 1st to 3rd digits of the received 5-tone code are #123, #A23, #1A3, #12A, #AA3, #A2A, #1AA, or #AAA, the transceiver executes the Decode Format (deca). Upon receipt of a 5-tone code #12301, the transceiver executes the Encode Format (text_a). Upon execution of the Encode Format (text_a), “Called” appears on the display. Upon lapse of 1 sec after the transceiver starts displaying the text string, the display reverts to the previous display.

ENCG enc

Description	If the 5-tone code received in a Group Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the ENCG enc command, and executes the Encode Format configured for “enc”.
Range	enc: Encode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^RX123 DECG decg
	Decode Format (decg): CMP ^RX12345 ENCG text_g
	Encode Format (text_g): TEXT ‘Group’ DELL 1 TXTOF
	Transceiver behavior ^RX12345: 12301 (RX stands for RX Address), Group Tone: A If the 1st to 3rd digits of the received 5-tone code are #A23, #1A3, #12A, #AA3, #A2A, #1AA, or #AAA, the transceiver executes the Decode Format (decg). If the 5-tone code received in a Group Call containing the Group Tone A matches the 5-tone code preconfigured for the transceiver, “Group” appears on the display. Upon lapse of 1 sec after the transceiver starts displaying the text string, the display reverts to the previous display.

ENCI enc

Description	If the 5-tone code received in an Individual Call matches the 5-tone code preconfigured for the transceiver, the transceiver executes the ENCI enc command, and executes the Encode Format configured for “enc”.
Range	enc: Encode Format Name
Usage Example	Sample Script
	Decode Format: CMP ^RX123 DECI deci
	Decode Format (deci): CMP ^RX12345 ENCI text_I
	Encode Format (text_I): TEXT ‘Individual’ DELL 1 TXTOF
	Transceiver behavior ^RX12345: 12301 (RX stands for RX Address) Only if the 1st to 3rd digits of the received 5-tone code are #123, the transceiver executes the Decode Format (deci). Upon receipt of a 5-tone code #12301, the transceiver executes the Encode Format (text_I). Upon execution of the Encode Format (text_I), “Individual” appears on the display. Upon lapse of 1 sec after the transceiver starts displaying the text string, the display reverts to the previous display.

ERASE time

Description	Upon execution of the ERASE time command, the transceiver deletes all codes stored in the temporary buffer upon lapse of time configured for “time”. The ERASE time command is normally used to send and receive the 5-tone codes in 2 frames.
Range	time: 0 ms to 2550 ms (in steps of 10 ms)
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 QUEUE DISPQ MONF BEEP 9 XPASS STO 12345 ERASE 800
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND ^K12345 DEL 200 TSET EEA LEN 40 SEND ^RX12345 DEL 50 RX
	Transceiver behavior
	^RX12345: 12301 (RX stands for RX Address) If the transceiver receives a 5-tone code other than #12301 in the 1st frame, the transceiver stores the received 5-tone code in the temporary buffer. Next, the transceiver starts counting down the timer for deleting codes stored in the temporary buffer. Upon lapse of 800 ms, all codes stored in the temporary buffer are deleted. If the transceiver receives 5-tone code #12301 in the 2nd frame before 800 ms elapse, the transceiver stores the received 5-tone code in the Queue buffer and displays the code on the display. Next, the transceiver opens the monitor, the “” icon blinks, and a Beep 9 sounds from the transceiver. If the received 5-tone code matches the 5-tone code preconfigured for the transceiver, the transceiver executes the Decode Format up to the XPASS command. In this case, the commands subsequent to the XPASS command are not executed. Therefore, the 5-tone code #12301 received in the 2nd frame is not stored in the temporary buffer.

GRP0

Description	The transceiver recognizes tone 0 as the Group Tone when executing the CMP command subsequent to the GRP0 command.
Usage Example	Sample Script
	Decode Format: GRP0 CMP ^RX123 GRP0A CMP ^RX45 MONO BEEP 3
	Transceiver behavior
	The transceiver recognizes tone 0 as the Group Tone in all digits. The transceiver recognizes tone A as the Group Tone in the 4th and 5th digits. If the received 5-tone code matches the 5-tone code preconfigured for the transceiver, the transceiver opens the Monitor, and then a Beep 3 sounds.

GRP0A

Description	The transceiver recognizes tone A and tone 0 as the Group Tone when executing the CMP command subsequent to the GRP0A command.
Usage Example	Sample Script
	Decode Format: GRP0 CMP ^RX123 GRP0A CMP ^RX45 MONO BEEP 3
	Transceiver behavior
	The transceiver recognizes tone 0 as the Group Tone in all digits. The transceiver recognizes tone A as the Group Tone in the 4th and 5th digits. If the received 5-tone code matches the 5-tone code preconfigured for the transceiver, the transceiver opens the Monitor, and then a Beep 3 sounds.

GRPA

Description	The transceiver recognizes tone A as the Group Tone when executing the CMP command subsequent to the GRPA command.
Usage Example	Sample Script
	Decode Format: GRPN CMP ^RX123 GRPA CMP ^RX45 MONO BEEP 3
	Transceiver behavior
	^RX12345: 12301 (RX stands for RX Address) The transceiver does not recognize any Group Tone in the 1st to 3rd digits. The transceiver recognizes tone A as the Group Tone in the 4th and 5th digits. Upon receipt of a 5-tone code #12301, #1230A, #123A1, or #123AA, the transceiver opens the monitor, and a Beep 3 sounds from the transceiver. The transceiver recognizes tone A as the Group Tone if tone A is placed in the 4th or 5th digit.

GRPN

Description	The transceiver does not recognize any Group Tone when executing the CMP command subsequent to the GRPN command.
Usage Example	Sample Script
	Decode Format: GRPN CMP ^RX123 GRPA CMP ^RX45 MONO BEEP 3
	Transceiver behavior
	^RX12345: 12301 (RX stands for RX Address) The transceiver does not recognize any Group Tone in the 1st to 3rd digits. The transceiver recognizes tone A as the Group Tone in the 4th and 5th digits. Upon receipt of a 5-tone code #12301, #1230A, #123A1, or #123AA, the transceiver opens the monitor, and a Beep 3 sounds from the transceiver. The transceiver recognizes tone A as the Group Tone if tone A is placed in the 4th or 5th digit.

GRPP

Description	The transceiver recognizes the tone configured for Group Tone of the Profiles > General in current use as the Group Tone when executing the CMP command subsequent to the GRPP command.
Usage Example	Sample Script
	Decode Format: GRP0 CMP ^RX123 GRPP CMP ^RX45 MONO BEEP 3
	Transceiver behavior
	The transceiver recognizes tone 0 as the Group Tone in the 1st to 3rd digits. The transceiver recognizes tone A as the Group Tone in the 4th and 5th digits. If the received 5-tone code matches the 5-tone code preconfigured for the transceiver, the transceiver opens the Monitor, and then a Beep 3 sounds.

HORN

Supported Models: Mobile

Description	The transceiver executes the HORN command and Horn Alert is activated if the received 5-tone code matches the 5-tone code preconfigured for the transceiver. When Horn Alert is activated, Horn Alert functions according to the configurations in Logic Pattern, Power-on (Horn Alert) and Off-hook Horn Alert . If Horn Alert is disabled, Horn Alert does not function even if the transceiver receives a 5-tone code #59480.
Usage Example	Sample Script
	Decode Format: CMP #59480 LEDF HORN
	Transceiver behavior
	Upon receipt of a 5-tone code #59480, the LED flashes, and Horn Alert is activated.

LEDF

Description	The transceiver executes the LEDF command and the LED flashes yellow if the received 5-tone code matches the 5-tone code preconfigured for the transceiver.
Usage Example	Sample Script
	Decode Format: CMP #59480 MONO LEDF BEEP 12
	Transceiver behavior
	Upon receipt of a 5-tone code #59480, the transceiver opens the monitor, the LED flashes yellow, and a Beep 12 sounds from the transceiver.

LEDF2

Description	The transceiver executes the LEDF2 command and the LED flashes blue if the received 5-tone code matches the 5-tone code preconfigured for the transceiver.
Usage Example	Sample Script
	Decode Format: CMP #59480 MONO LEDF2 BEEP 12
	Transceiver behavior
	Upon receipt of a 5-tone code #59480, the transceiver opens the monitor, the LED flashes blue, and a Beep 12 sounds from the transceiver.

MONC

Description	The transceiver executes the MONC command and then closes the monitor and the “  ” icon disappears if the received 5-tone code matches the 5-tone code preconfigured for the transceiver.
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 MONC BEEP 15
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) Upon receipt of a 5-tone code #59401, the transceiver closes the monitor, and a Beep 15 sounds from the transceiver.

MONF

Description	The transceiver executes the MONF command and then opens the monitor and the “  ” icon blinks if the received 5-tone code matches the 5-tone code preconfigured for the transceiver.
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 MONF LEDF BEEP 12
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) Upon receipt of a 5-tone code #59401, the transceiver opens the monitor. The “  ” icon blinks, the LED flashes, and a Beep 12 sounds from the transceiver.

MONO

Description	The transceiver executes the MONO command and then opens the monitor and the “  ” icon blinks if the received 5-tone code matches the 5-tone code preconfigured for the transceiver.
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 MONO LEDF BEEP 12
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) Upon receipt of a 5-tone code #59401, the transceiver opens the monitor. The “  ” icon lights, the LED flashes, and a Beep 12 sounds from the transceiver.

QUEUE

Description	Upon execution of the QUEUE command, the transceiver stores the 5-tone code stored by the STO command in the temporary buffer to the Queue buffer.
Usage Example	Sample Script
	Encode Format: SELC TXS DEL 100 TSET EEA LEN 40 SENDC DEL 100 RX
	Decode Format: STO 12345 QUEUE DISPM MONO BEEP 12
	Transceiver behavior
The transmitting transceiver can send the Selcall code upon execution of the above Encode Format . (Refer to SELC .)	
The receiving transceiver stores the received Selcall code in the temporary buffer and then stores the code in the Queue buffer. Next, the transceiver enters Stack Mode, and then displays the Selcall List corresponding to the Selcall code stored in the Queue buffer on the display and opens the monitor. Then, a Beep 12 sounds from the transceiver. (Refer to DISPM .)	

REPOF

Description	The transceiver executes the REPOF command and stops repeating the execution of Encode Format by the REP rep command of Encode Format if the received 5-tone code matches the 5-tone code preconfigured for the transceiver. (Refer to REP rep.) The REPOF command is used when an acknowledgment from the receiving transceiver is required after the transceiver transmits.
Usage Example	Sample Script
	Encode Format: REP 10 TXS DEL 100 TSET EEA LEN 40 SEND #59499 DEL 50 RX RACK 2500 DecAck RSML 5
	Decode Format (DecAck): CMP #54321 REPOF BEEP 16 MONF
	Transceiver behavior After a lapse of 100 ms from when the transceiver starts transmitting, the transceiver sends a 5-tone code #59499 in the EEA signaling format. Each tone length is 40 ms. Upon lapse of 50 ms after transmitting all tones, the transceiver reverts to receive mode and waits to receive an acknowledgment. If the transceiver does not receive the 5-tone code #54321 within 2500 ms after the transceiver finishes the transmission, the transceiver resends a 5-tone code #59499 after a lapse of 5 sec. The transceiver repeats the above behavior 10 times. If the transceiver receives the 5-tone code #54321 within 2500 ms after the transceiver finishes the transmission, the transceiver stops repeating the above behavior, and then emits a Beep 16 and opens the monitor.

RFS

Description	The transceiver executes the RFS command and stores the received 5-tone code and Short Message in the Queue buffer if the received 5-tone code matches the 5-tone code preconfigured for the transceiver. The received 5-tone code and Short Message (or Long Message) can also be transferred to an external device such as a PC via a COM port.
Usage Example	Sample Script
	Decode Format: CMP ^RX123 STO 45 RFS
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) The transceiver waits to receive a Short Message or Long Message until 2 sec elapse after the transceiver receives a 5-tone code #59401. The transceiver stores the received 5-tone code in the temporary buffer. Upon receipt of a Short Message, the transceiver stores the received 5-tone code and Short Message in the Queue buffer. If the STO command is not described in Decode Format, the received 5-tone code and Short Message are not stored in the Queue buffer. Also, if “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” is configured for the COM port on the transceiver, the received 5-tone code and Short Message (or Long Message) are transferred to an external device such as a PC via a COM port.

RGPS

Description	Upon execution of the RGPS command, the transceiver sends the received GPS data from the Data port of the COM port to an external device such as a PC.
Usage Example	Sample Script
	Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND #59401 DEL 100 TXK SGPS RX
	Decode Format: CMP ^RX12345 RGPS
	Transceiver behavior ^RX12345: 59401 (RX stands for RX Address) The transceiver waits to receive GPS data until 2 sec elapse after the transceiver receives a 5-tone code #59401. Upon receipt of GPS data, the transceiver sends the received 5-tone code and the NMEA data from the Data port of the COM port to an external device such as a PC. To use this function, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be configured for the COM port on the transceiver. Also, the format of the NMEA data to be sent is determined by the transceiver configuration.

RKILL1

Description	Upon execution of the RKILL1 command, “Error” appears on the display, the transceiver enters the Kill state, and all operations become disabled. For the portable transceiver (Basic Model), the LED flash alternates between a yellow and a green light, and all transceiver operations are disabled. To revive the transceiver from the Kill state, configuration data needs to be written to the transceiver by using KPG-D3/ D3N. This function is used to prevent an unauthorized person from using the transceiver; for example, when the transceiver is stolen.
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 BEEP 10 MONF CMP #59490 RKILL1
	Transceiver behavior ^RX12345: 59401 (RX stands for RX Address) Upon receipt of a 5-tone code #59401, a Beep 10 sounds from the transceiver, the transceiver opens the monitor, and the “  ” icon blinks. Upon receipt of a 5-tone code #59490, “Error” appears on the display and all operations become disabled. For the portable transceiver (Basic Model), the LED flash alternates between a yellow and a green light, and all transceiver operations are disabled.
	 Note Using the RKILL1 command of Encode Format also places the transceiver in the Kill state. (Refer to RKILL1.)

RKILL2

Description	Upon execution of the RKILL2 command, “Error” appears on the display, the transceiver enters the Kill state, and all operations become disabled. For the portable transceiver (Basic Model), the LED flash alternates between a yellow and a green light, and all transceiver operations are disabled. All the configuration data configured for the transceiver is deleted. To revive the transceiver from the Kill state, configuration data needs to be written to the transceiver by using KPG-D3/ D3N. This function is used to prevent an unauthorized person from using the transceiver; for example, when the transceiver is stolen.
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 BEEP 10 MONF CMP #59490 RKILL2
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) Upon receipt of a 5-tone code #59401, a Beep 10 sounds from the transceiver, the transceiver opens the monitor, and the “  ” icon blinks. Upon receipt of a 5-tone code #59490, “Error” appears on the display and all operations become disabled. For the portable transceiver (Basic Model), the LED flash alternates between a yellow and a green light, and all transceiver operations are disabled. All the configuration data configured for the transceiver is deleted.  Note Using the RKILL2 command of Encode Format also places the transceiver in the Kill state. (Refer to RKILL2.)

RSTUN

Description	Upon execution of the RSTUN command, “Stun” appears on the display, the transceiver enters the Remote Stun state, and all operations become disabled. To revive the transceiver from the Remote Stun state, the transceiver in the Remote Stun state must receive the 5-tone code to execute the RVIVE command, and then the RVIVE command must be executed. Or, configuration data needs to be written to the transceiver by using KPG-D3/ D3N. This function is used to prevent an unauthorized person from using the transceiver; for example, when the transceiver is stolen.
Usage Example	Sample Script
	Decode Format: CMP #59495 RSTUN CMP #59496 RVIVE BEEP 2
	Transceiver behavior
	Upon receipt of a 5-tone code #59495, “Stun” appears on the display and all operations become disabled. Upon receipt of a 5-tone code #59496, the transceiver revives from the Remote Stun state, and a Beep 2 sounds from the transceiver.  Note Using the RSTUN command of Encode Format also places the transceiver in the Stun state. (Refer to RSTUN.)

RVIVE

Description	Upon execution of the RVIVE command, the transceiver revives from the Remote Stun state and all the transceiver operation becomes enabled.
Usage Example	Sample Script
	Decode Format: CMP #59495 RSTUN CMP #59496 RVIVE BEEP 2
	Transceiver behavior
	Upon receipt of a 5-tone code #59495, “Stun” appears on the display and all operations become disabled. Upon receipt of a 5-tone code #59496, the transceiver revives from the Remote Stun state, and a Beep 2 sounds from the transceiver. Note Using the RSTUN command of Encode Format also places the transceiver in the Stun state. (Refer to RVIVE.)

SELTXT ‘text’

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the SELTXT ‘text’ command, the transceiver displays the text string configured for “text” and the Selcall code stored in the temporary buffer on the display.
Range	text: A maximum of 14 alphanumeric characters
Usage Example	Sample Script
	Decode Format: STO 12345 SELTXT ‘CALL’ MONO BEEP 8
	Transceiver behavior
	The transceiver stores the received Selcall code in the temporary buffer. Next, the transceiver displays “CALL” and the Selcall code on the display and opens the monitor. Then, a Beep 8 sounds from the transceiver.

SENDPC

Description	Upon execution of the SENDPC command, the transceiver can send the received 5-tone code to a PC via the COM port on the transceiver. A maximum of 28 digits of 5-tone code can be sent to a PC.
Usage Example	Sample Script
	Decode Format: CMP ^RX123 STO 45 SENDPC
	Transceiver behavior
	^RX12345: 59401 (RX stands for RX Address) If the transceiver receives a 5-tone code #59401, the transceiver stores the received 5-tone code in the temporary buffer. Next, the received 5-tone code #59401 is sent via the COM port on the transceiver. To use this function, “Data”, “Data + GPS Data Output”, or “Data + Location Data Output” needs to be configured for the COM port on the transceiver.

SSTO 1 to SSTO 8

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the SSTO n command (n: 1 to 8), the transceiver stores the received Status code in the temporary buffer. The configured number subsequent to SSTO determines the digit of temporary buffer at which the received code is stored. A Status code with a maximum of 8 digits can be stored in the temporary buffer.
Usage Example	Sample Script
	Encode Format: SELM TXS DEL 100 TSET EEA LEN 40 SENDS DEL 100 RX
	Decode Format: SSTO 45 QUEUE DISPM MONO BEEP 1
	Transceiver behavior The transmitting transceiver can send the Status code upon execution of the above Encode Format. (Refer to SELM.) If the receiving transceiver receives the Status code, the receiving transceiver stores the received Status code at the 4th and 5th digits of temporary buffer and then stores the code in the Queue buffer. Next, the transceiver displays the Status List corresponding to the received Status code on the display and opens the monitor. Then, a Beep 1 sounds from the transceiver.

STO 1 to STO 8

Description	Upon execution of the STO n command (n: 1 to 8), the transceiver stores the received Selcall code in the temporary buffer. The configured number subsequent to STO determines the digit of temporary buffer at which the received code is stored. A Selcall code with a maximum of 8 digits can be stored in the temporary buffer.
Usage Example	Sample Script
	Encode Format: SELC TXS DEL 100 TSET EEA LEN 40 SENDC DEL 100 RX
	Decode Format: STO 12345 QUEUE DISPM MONO BEEP 12
	Transceiver behavior The transmitting transceiver can send the Selcall code upon execution of the above Encode Format. (Refer to SELC.) If the receiving transceiver receives the Selcall code, the receiving transceiver stores the received Selcall code at the 1st to 5th digits of temporary buffer and then stores the code in the Queue buffer. Next, the transceiver displays the Selcall List corresponding to the received Selcall code on the display and opens the monitor. Then, a Beep 12 sounds from the transceiver.

STTXT 'text'

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Description	Upon execution of the STTXT 'text' command, the transceiver displays the text string configured for "text" and the Status code stored in the temporary buffer on the display.
Range	text: A maximum of 14 alphanumeric characters
Usage Example	Sample Script
	Decode Format: SSTO 45 STTXT 'STATUS' MONO BEEP 8
	Transceiver behavior
	The transceiver stores the received Status code in the temporary buffer. Next, the transceiver displays "STATUS" and the Status code on the display and opens the monitor. Then, a Beep 8 sounds from the transceiver.

VIB

Supported Models: Portable (NX-3200/ NX-3300/ NX-3400)

Description	Upon execution of the VIB command when Vibrator is enabled, the Vibrator unit vibrates. The Vibrator unit vibrates for 10 sec at 500-ms intervals. Pressing any button while the Vibrator unit is vibrating stops the Vibrator unit from vibrating.
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 MONO VIB
	Transceiver Behavior
	Upon receipt of a 5-tone code corresponding to ^RX12345 when Vibrator is enabled, the transceiver opens the monitor, and the Vibrator unit vibrates.

XPASS

Description	If the received 5-tone code matches the 5-tone code preconfigured for the transceiver when executing the XPASS command, the transceiver suspends the execution of the Decode Format. If the received 5-tone code does not match the 5-tone code preconfigured for the transceiver when executing XPASS, the transceiver executes the commands following the XPASS command.
Usage Example	Sample Script
	Decode Format: CMP ^RX12345 QUEUE DISPQ MONF BEEP 9 XPASS STO 12345 ERASE 800 Encode Format: TXS DEL 100 TSET EEA LEN 40 SEND ^K12345 DEL 200 TSET EEA LEN 40 SEND ^RX12345 DEL 50 RX
	Transceiver behavior
	^RX12345: 12301 (RX stands for RX Address) If the transceiver receives a 5-tone code other than #12301 in the 1st frame, the transceiver stores the received 5-tone code in the temporary buffer. Next, the transceiver starts counting down the timer for deleting codes stored in the temporary buffer. Upon lapse of 800 ms, all codes stored in the temporary buffer are deleted. If the transceiver receives 5-tone code #12301 in the 2nd frame before 800 ms elapse, the transceiver stores the received 5-tone code in the Queue buffer and displays the code on the display. Next, the transceiver opens the monitor, the “” icon blinks, and a Beep 9 sounds from the transceiver. If the received 5-tone code matches the 5-tone code preconfigured for the transceiver, the transceiver executes the Decode Format up to the XPASS command. In this case, the commands subsequent to the XPASS command are not executed. Therefore, the 5-tone code #12301 received in the 2nd frame is not stored in the temporary buffer.

Emergency is the function to be used for the transceiver to transmit and receive for emergency purposes. This function is used for a user to immediately contact the base station in emergency situations.

The transceiver behaves according to the configurations in Emergency Mode when the transceiver is placed in Emergency Mode. The base station transceiver can notice an occurrence of an emergency situation in the transmitting transceiver upon receipt of a call by use of Emergency.

9.1 Placing the Transceiver in Emergency Mode

One of the following operations can place the transceiver in Emergency Mode:

● Emergency button

Pressing and holding the **Emergency** button for longer than the time configured in **Hold Delay** causes the transceiver to enter Emergency Mode.

For Portable, “Emergency” can be assigned to the **AUX** button or the **PF 1** button of the speaker microphone only as the function when the button is held.

For Mobile, “Emergency” can be assigned to the **AUX** button only as the function when the button is held.

Also, “Emergency” can be assigned to the AUX Input port for Mobile. In this case, the transceiver enters Emergency Mode if the AUX Input port to which “Emergency” is assigned goes low level. (Refer to Common Function Part [Available Functions for AUX Input Ports](#).)

● Lone Worker

If **Lone Worker** is used, the transceiver can automatically enter Emergency Mode and notify the base station of the emergency status when the transceiver becomes disabled from operating due to an accident.

When the time configured in **Lone Worker Interval** elapses and then the time configured in **Duration of Lone Worker Tone** elapses while the transceiver is in Lone Worker Mode, the transceiver enters Emergency Mode. (Refer to [Placing the Transceiver in Emergency Mode Using the Lone Worker Function](#).)

● Activity Detection

If **Activity Detection** is used, the transceiver automatically enters Emergency Mode and notifies the base station of the emergency status when the transceiver is detected to be in tilted, stationary, or shaking state for a certain period of time due to an accident. **Man-down Detection**, **Stationary Detection**, and **Motion Detection** are the functions available in **Activity Detection**. (Refer to [Placing the Transceiver in Emergency Mode by Using the Activity Detection Function](#).)

● Heart Rate Service/ Automatic Injury Detection Service

The transceiver enters Emergency Mode if the transceiver is connected to a Bluetooth-compatible device which supports **Heart Rate Service** or **Automatic Injury Detection Service** and the transceiver is in any of the following statuses: (Refer to Common Function Part [Activation of Emergency](#), [Notifying of Damage on a Bluetooth-compatible Device to the Transceiver \(Automatic Injury Detection Service\)](#).)

- When the status where the heart rate notified from a Bluetooth-compatible device goes higher than Upper Threshold continues while Delay Time is activated
- When the status where the heart rate notified from a Bluetooth-compatible device goes lower than Lower Threshold continues while Delay Time is activated
- When a notification of injury is received from a Bluetooth-compatible device

9.1 Placing the Transceiver in Emergency Mode

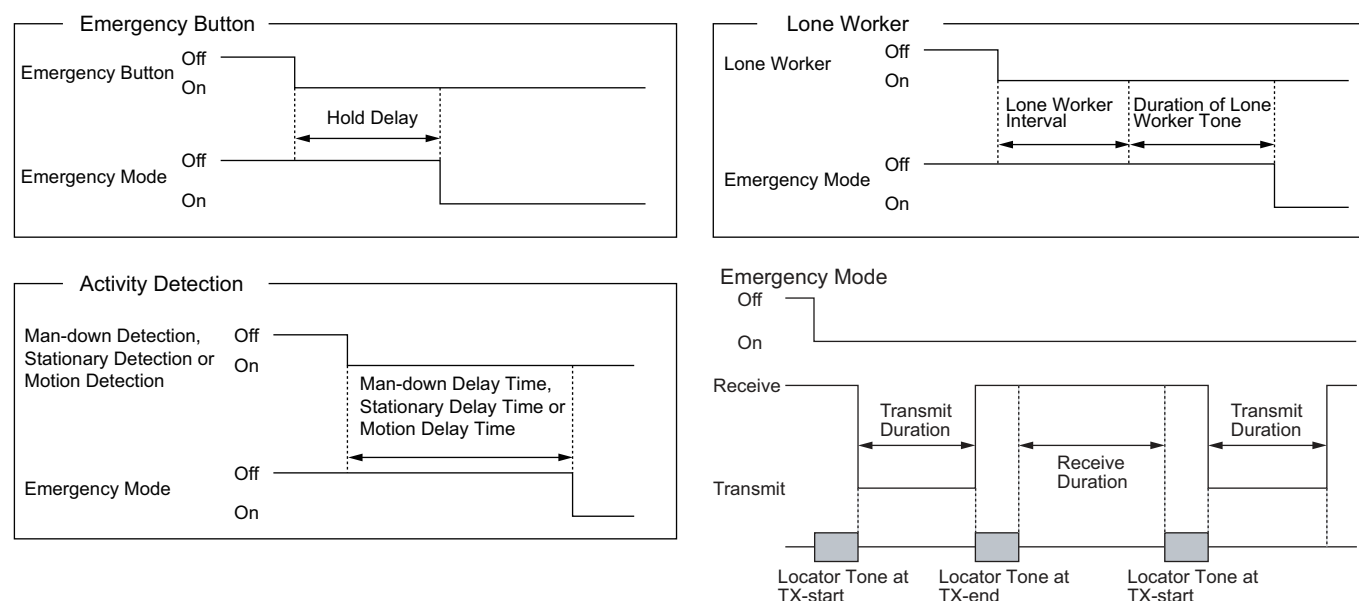


Figure 9-1 Emergency Mode

If Emergency Mode is activated by pressing the **Emergency** button or by the Lone Worker function, Emergency Mode will be exited when the **Emergency** button is pressed longer than the time configured in **Hold Delay** or when the transceiver is turned OFF.

If Emergency Mode is activated by the Activity Detection function, Emergency Mode will be exited when the transceiver is turned OFF.

However, if **Suspended Power-off** is enabled, the transceiver will not be turned off and remains in Emergency Mode even if the transceiver is operated to be turned off while in Emergency Mode. (Refer to [Suspended Power-off](#).)

Note

- If the transceiver enters Emergency Mode during a scan, Emergency behaves according to the configuration in **Emergency Profile** for the selected channel.
- The **PTT** switch can be used even if the transceiver is in Emergency Mode. The transceiver reverts to automatic receive mode when the transceiver completes transmitting by releasing the **PTT** switch.
- In Emergency Mode, the microphone sensitivity is determined by the configuration in **Emergency Microphone Sense**. (Refer to [Emergency Microphone Sense](#).)
- The transceiver does not decode the Stun Code and Optional Signaling in Emergency Mode.
- The transceiver exits Emergency Mode if receiving an Emergency Termination Status (FleetSync: 88) while in Emergency Mode.
- While the transceiver is under the following conditions, the transceiver does not enter Emergency Mode:
 - In the Stun state
 - If the transceiver is in Transceiver Password entry state
 - When “Selected” is configured in **Emergency Channel Type** and the selected channel is an error channel
- When in Emergency Mode, the transceiver controls the mute in the same behavior as with “QT/DQT” configured in **Audio Control (Analog)** on a channel in an Analog Conventional system. On an LTR Trunking system channel, the transceiver controls the mute in the same behavior as with “LTR ID” configured in **Audio Control**.
- The Radio Check command can also be received when the transceiver is in Emergency Mode.
- The following functions are disabled while the transceiver is in Emergency Mode:
 - **Lone Worker** button
 - Lone Worker Channel (if “Preset” is configured in **Lone Worker Type**)

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)

Emergency Alarm (MDC-1200)

Emergency Alarm is the function to send an Emergency Alarm Packet before the transceiver enters Emergency Mode to notify the base station that the transceiver is in an Emergency situation.

Using this function can reliably notify the base station that the transceiver is in an Emergency situation.

When the **Emergency** button is pressed on an analog channel with “MDC-1200” configured in **Signaling Type**, the transceiver sends out the Emergency Alarm Packet in the MDC-1200 format. Upon receipt of an acknowledgment, the transceiver enters Emergency Mode.

After sending an Emergency Alarm Packet, if the transceiver receives no acknowledgment until the length of time configured for **Maximum ACK Wait Time** elapses, the transceiver resends the Emergency Alarm. If the transceiver still cannot receive an acknowledgment after sending the Emergency Alarm 5 times, the transceiver enters Emergency Mode.

Note

- To use this function, **Emergency Alarm** needs to be enabled, and “MDC-1200” needs to be configured in ID Type.
- The transceiver receiving an Emergency Alarm Packet message notifies a user of the receipt of the Emergency Call according to the configuration for **Emergency Response**. (Refer to [Notifying the Receipt of an Emergency Call \(Emergency Response\)](#).)
- If a zone-channel is changed while the transceiver is in the Emergency Mode, the transceiver resends the Emergency Alarm Packet on the zone-channel to which the transceiver has migrated.

Configuration using KPG-D3/ D3N

Configuring **Emergency Alarm** to be enabled or disabled

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > Emergency > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > Emergency > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > Emergency > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > Emergency > MDC-1200)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > Emergency > MDC-1200)

9.2 Configuration Related to Transmission and Reception in Emergency Mode

The transceiver can have a maximum of 8 configurations related to transmission and reception in Emergency Mode as the Emergency Profile. By allocating **Emergency Profile** to each zone or channel, the Emergency behavior of the transceiver can vary depending on the zone or channel.

The functions that can be configured as an **Emergency Profile** are as follows:

- Emergency Channel Type
- Emergency Zone-Channel
- Emergency Mode Type
- LCD Brightness
- Emergency Cycle
- Locator Tone at TX-start
- Transmit Duration
- Locator Tone at TX-end
- Receive Duration
- TX/RX LED in Emergency

The common functions in Emergency Mode are as follows. One configuration from below is available for the transceiver:

- Emergency Display
- Emergency Microphone Sense
- Emergency Text
- Background Tone Transmission
- Emergency Channel Lock
- Suspended Power-off
- Remain Surveillance Mode
- Functions related to Lone Worker
- Functions related to Activity Detection
- Functions related to Bluetooth

Emergency Profile can be configured for each zone or channel. If “Zone Common” is configured in **Emergency Profile** for a channel, the transceiver executes the Emergency behavior by using **Emergency Profile Number** configured for the zone of the channel.

Also, an **Emergency ID** (Analog) can be configured for each Analog Conventional system. (Refer to [ID Sent When Emergency Mode is Activated.](#))

Configuration using KPG-D3/ D3N

- Configuring each function of **Emergency Profile** ( [See](#) Radio Configuration > Global Options > Emergency > Profiles)
- Configuring Common Functions for **Emergency Mode** ( [See](#) Radio Configuration > Global Options > Emergency > General)

About the Behavior in Emergency Mode in a Voting

If the transceiver enters the Emergency Mode while Personality configured in “Analog Voting” or “Analog Voting with Signaling” is selected on an Analog Conventional system, Emergency behaves according to the configuration of **Emergency Profile** as configured in Personality.

9.3 Zone-channel Functioning in Emergency Mode

The channel to be used when the transceiver enters Emergency Mode can be configured.

Emergency Channel Type

Emergency Channel Type is the type of a channel used when the transceiver is placed in Emergency Mode.

Table 9-1 Emergency Channel Type

Configuration	Description
Selected Channel	When the transceiver enters Emergency Mode, the transceiver resets the migration state of channels, such as Home Channel, and then the transceiver executes Emergency on the previously selected channel.
Preset Channel	After entering Emergency Mode, the transceiver migrates to the Zone-channel configured in Preset Zone-channel and then executes the Emergency behavior.

The transceiver behaves as below according to the configuration for **Emergency Channel Type**:

● Selected Channel

- If a channel in an Analog Conventional system or GID in an LTR Trunking system is selected:

The transceiver behaves according to the **ID Type** configuration. (Refer to [ID Type](#).)

Table 9-2 ID Type

Configuration	Description
None	The transceiver transmits using either QT/DQT (Conventional) or LTR ID (LTR).
DTMF, MDC-1200, FleetSync	The transceiver transmits according to the configuration for DTMF, MDC-1200 or FleetSync.

● Preset Channel

- If a channel in an Analog Conventional system or GID in an LTR Trunking system is configured for Emergency Zone-Channel:

The transceiver behaves according to the **ID Type** configuration. (Refer to [ID Type](#).)

Table 9-3 ID Type

Configuration	Description
None	The transceiver transmits using either QT/DQT (Conventional) or LTR ID (LTR).
DTMF, MDC-1200, FleetSync	The transceiver transmits according to the configuration for DTMF, MDC-1200 or FleetSync.

Note

- If “Preset Channel” is configured in **Emergency Channel Type**, an “Analog Voting” or “Analog Voting with Signaling” channel cannot be configured in **Emergency Zone-Channel**.

Configuration using KPG-D3/ D3N

Configuring **Emergency Channel Type** ( **See** Radio Configuration > Global Options > Emergency > Profiles > Emergency Channel)

Emergency Zone-Channel

Emergency Zone-Channel is the Zone-channel used in Emergency Mode if “Preset Channel” is configured in **Emergency Channel Type**.

Configuration using KPG-D3/ D3N

Configuring **Emergency Zone-Channel** ( **See** Radio Configuration > Global Options > Emergency > Profiles > Emergency Channel > Emergency Zone-Channel)

9.4**Automatically Transmitting and Receiving in Emergency Mode**

The number of times for which the transceiver toggles between transmission and reception, or the duration for a single session of automatic transmission or reception for emergency in Emergency Mode can be configured. Also, the microphone sensitivity can be changed and the Background Tone (1 beep) can be multiplexed on the audio to be transmitted in Emergency Mode.

Emergency Cycle

Emergency Cycle is the number of times that the transceiver toggles between transmission and reception for an emergency in Emergency Mode.

Table 9-4 Emergency Cycle

Configuration	Description
1 to 200	The transceiver repeats automatic transmission and automatic reception for the configured number of times, and then the transceiver exits Emergency Mode.
Infinite	The transceiver continues to alternate between automatic transmission and reception until the Emergency button is pressed again or the transceiver is turned off.
Off	The transceiver does not automatically transmit and receive in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Cycle** ( **See** Radio Configuration > Global Options > Emergency > Profiles > Options)

Locator Tone at TX-start

Locator Tone at TX-start is the duration to emit an Alert Tone which notifies that the transceiver will start transmission before the transceiver starts automatic transmission in Emergency Mode.

The transceiver automatically repeat transmitting and receiving in Emergency Mode. When the transceiver switches from reception to transmission, an Emergency Locator Tone (2 beeps) sounds from the transceiver for the length of the time configured for **Locator Tone at TX-start**.

When the tone sounds, a user can easily recognize without viewing the transceiver that the transceiver is about to automatically transmit in Emergency Mode. This tone can also be used to locate a user who is in emergency situations.

Note

- This function is enabled if “Audible” is configured for **Emergency Mode Type**.
- For Portable, when a Bluetooth-compatible speaker or an external speaker is connected, an Emergency Locator Tone (2 beeps) is emitted from the transceiver’s speaker regardless of the configurations of **Bluetooth Speaker** and **External Speaker**. Received audio is emitted according to the configurations of **Bluetooth Speaker** and **External Speaker**. (Refer to Common Function Part [Switching the Speaker to Emit Audio \(Bluetooth Speaker\)](#).)
- For Mobile, where an Emergency Locator Tone (2 beeps) and received audio are emitted from depends on the configuration in **External Speaker**.

Configuration using KPG-D3/ D3N

Configuring **Locator Tone at TX-start** ( [See](#) Radio Configuration > Global Options > Emergency > Profiles > Options)

Locator Tone at TX-end

Locator Tone at TX-end is the duration to emit an Alert Tone which notifies that the transceiver has completed an automatic transmission in Emergency Mode, and starts receiving.

The transceiver automatically repeat transmitting and receiving in Emergency Mode. When the transceiver switches from transmission to reception, an Emergency Locator Tone (2 beeps) sounds from the transceiver for the length of the time configured for **Locator Tone at TX-end**.

When the tone sounds, a user can easily recognize without viewing the transceiver that the transceiver ends to automatically transmit in Emergency Mode. This tone can also be used to locate a user who is in emergency situations.

Note

- This function is enabled if “Audible” is configured for **Emergency Mode Type**.
- For Portable, when a Bluetooth-compatible speaker or an external speaker is connected, an Emergency Locator Tone (2 beeps) is emitted from the transceiver’s speaker regardless of the configurations of **Bluetooth Speaker** and **External Speaker**. Received audio is emitted according to the configurations of **Bluetooth Speaker** and **External Speaker**. (Refer to Common Function Part [Switching the Speaker to Emit Audio \(Bluetooth Speaker\)](#).)
- For Mobile, where an Emergency Locator Tone (2 beeps) and received audio are emitted from depends on the configuration in **External Speaker**.

Configuration using KPG-D3/ D3N

Configuring **Locator Tone at TX-end** ( [See](#) Radio Configuration > Global Options > Emergency > Profiles > Options)

Transmit Duration

Transmit Duration is the duration of a single automatic transmission cycle in Emergency Mode.

The transceiver switches to automatic reception for emergency when the time configured in **Transmit Duration** elapses after the transceiver starts automatic transmission for emergency.

When “0” is configured in **Transmit Duration**, the transceiver does not transmit during automatic transmission.

Configuration using KPG-D3/ D3N

Configuring **Transmit Duration** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

Receive Duration

Receive Duration is the duration for a single session of automatic reception for emergency in Emergency Mode.

The transceiver switches to automatic transmission for emergency when the time configured in **Receive Duration** elapses after the transceiver starts automatic reception for emergency.

Configuration using KPG-D3/ D3N

Configuring **Receive Duration** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

Emergency Microphone Sense

Emergency Microphone Sense is the function used to adjust the microphone input sensitivity in Emergency Mode.

In **Emergency Microphone Sense**, the microphone sensitivity can be configured within the following range:

6 dB, 4 dB, 2 dB, 0 dB, -2 dB, -4 dB, -6 dB, -8 dB, -10 dB, -12 dB, -14 dB, -16 dB, -18 dB, -20 dB

The appropriate level of microphone sensitivity for normal operation is 0 dB. Based on this level, the parameter of the microphone sensitivity can be configured.

Note

- The microphone sensitivity of the headset connected via Bluetooth also functions according to the configuration in **Emergency Microphone Sense** while the transceiver is in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Microphone Sense** ( See Radio Configuration > Global Options > Emergency > General > Common)

Background Tone Transmission

Background Tone Transmission is the function to multiplex a Background Tone (1 beep) on the transmitted audio when the transceiver transmits in Emergency Mode. Background Tone (1 beep) is multiplexed every second while the transceiver is transmitting audio data.

The audio signal is not muted since the Background Tone is transmitted with lower deviation than normal. The receiving transceiver can easily recognize that the transmitting transceiver is in Emergency Mode if the tone is multiplexed while initiating a voice call.



- A Background Tone is not emitted from the speaker of the transmitting transceiver.

Configuration using KPG-D3/ D3N

Configuring **Background Tone Transmission** (See Radio Configuration > Global Options > Emergency > General > Common)

9.5 Indication and Sound in Emergency Mode

Functions related to the tone that sounds from the transceiver when the automatic transmission starts or ends in Emergency Mode, and display and the LED notification in Emergency Mode can be configured.

Locator Tone

An Emergency Locator Tone (2 beeps) sounds from the transceiver before the automatic transmission starts or when the automatic transmission completes in Emergency Mode.

In Emergency Mode, the transceiver repeats an automatic communication only the number of times configured in Emergency Cycle. (Refer to [Automatically Transmitting and Receiving in Emergency Mode.](#))

Emergency Display

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Emergency Display is the function to display the channel configured in **Emergency Zone-Channel** when in Emergency Mode or to retain the display appearance before the transceiver enters Emergency Mode.

Table 9-5 Emergency Display

Configuration	Description
Selected Channel	The previously selected channel is retained on the display even if the transceiver enters Emergency Mode.
Emergency Channel	A channel configured in Emergency Zone-Channel appears when the transceiver enters Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Display** (See Radio Configuration > Global Options > Emergency > General > Common)

Emergency Text

Supported Models: Portable (Full Key Model/ Standard Key Model)/ Mobile

Emergency Text is the function to display the text on the transceiver display while in Emergency Mode.

If this function is enabled, the text configured in **Text** appears on the display when the transceiver enters Emergency Mode.

Display example:

Emergency Zone-Channel: Zone 1, Channel 1

Emergency Display: Emergency Channel

Text: "Emergency"



Configuration using KPG-D3/ D3N

- Configuring **Emergency Text** to be enabled or disabled ( See Radio Configuration > Global Options > Emergency > General > Common)
- Configuring **Text** ( See Radio Configuration > Global Options > Emergency > General > Common)

Emergency Mode Type

Emergency Mode Type is the function to determine whether the received audio or various tones are muted while the transceiver is in Emergency Mode.

Table 9-6 Emergency Mode Type

Configuration	Description
Silent	The transceiver mutes the received audio and various tones while in Emergency Mode.
Audible	The transceiver emits the received audio and various tones in the same manner as in normal mode even while in Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Emergency Mode Type** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

LCD Brightness (Emergency Mode)

Supported Models: Mobile

In **LCD Brightness** (Emergency Mode), whether the configuration of **LCD Brightness** and the configuration of **LCD Brightness** changed by operating a **PF** button are applied in Emergency Mode can be configured. (Refer to Common Function Part [Changing the Brightness of the Backlight \(LCD Brightness\)](#))

Table 9-7 LCD Brightness (Emergency Mode)

Configuration	Description
Current	The configuration of LCD Brightness is applied in Emergency Mode as well.
Off	The configuration of LCD Brightness is not applied in Emergency Mode. The backlight of the transceiver goes off in the Emergency Mode. The LCD Brightness configuration of the transceiver is set to "Off".

Configuration using KPG-D3/ D3N

Configuring **LCD Brightness** (Emergency Mode) ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

TX/RX LED in Emergency

TX/RX LED in Emergency is the function to light the Transmit LED when the transceiver transmits in Emergency Mode and light the Busy LED when the transceiver receives in Emergency Mode.

The transceiver behaves as follows depending on the **TX/RX LED in Emergency** configuration.

● If the TX/RX LED in Emergency is enabled:

- While in Emergency Mode, the Transmit LED is on during data transmission, and the Busy LED is on during data receipt.
- For Portable, if "Audible" is configured in **Emergency Mode Type**, the backlight lights while the transceiver is in Emergency Mode.
- The Busy LED lights even though the received audio is not output due to the output of the Locator Tone while the transceiver is on the traffic channel.
- For Portable, if the transceiver enters Emergency Mode while the backlight is lit, the backlight continues to light. However, when "Silent" is configured in **Emergency Mode Type**, the backlight turns off when entering Emergency Mode.
- For mobile transceivers, the state of the backlight upon entering the Emergency Mode is dependent on the configuration of **LCD Brightness**, not the configuration of **TX/RX LED in Emergency**.

● If TX/RX LED in Emergency is disabled:

- While in Emergency Mode, the Transmit LED is off during data transmission, and the Busy LED is off during data receipt.
- For Portable, the backlight does not light while the transceiver is in Emergency Mode.
- For Portable, if the transceiver enters Emergency Mode while the backlight is lit, the backlight turns off.
- For mobile transceivers, the state of the backlight upon entering the Emergency Mode is dependent on the configuration of **LCD Brightness**, not the configuration of **TX/RX LED in Emergency**.

Configuration using KPG-D3/ D3N

Configuring **TX/RX LED in Emergency** ( See Radio Configuration > Global Options > Emergency > Profiles > Options)

Remain Surveillance Mode

Remain Surveillance Mode is the function to continue the Surveillance function as enabled even if the transceiver enters Emergency Mode while the Surveillance function is enabled.

While the Surveillance function is enabled, the transceiver does not emit a tone or light the backlight even when the transceiver functions.

The Surveillance function is used when the change of the transceiver status needs to be kept unnoticed, such as while on a Public Safety operation.

The transceiver behaves as follows according to the configuration in **Remain Surveillance Mode**:

- **If Remain Surveillance Mode is enabled**

Even if the transceiver enters Emergency Mode while the Surveillance function is enabled, the Surveillance function remains enabled, and the transceiver does not emit a tone and the backlight and LED do not light. The Surveillance function remains enabled even if the transceiver exits Emergency Mode.

- **If Remain Surveillance Mode is disabled**

The Surveillance function is disabled if the transceiver enters Emergency Mode while the Surveillance function is enabled. The transceiver behaves according to the configurations in Emergency Mode when the transceiver is placed in Emergency Mode. The Surveillance function remains disabled even if the transceiver exits Emergency Mode.



- While in Emergency Mode, the Surveillance function cannot be toggled between enabled and disabled by operating the transceiver.

Configuration using KPG-D3/ D3N

Configuring **Remain Surveillance Mode** to be enabled or disabled (**See** Radio Configuration > Global Options > Emergency > General > Common)

9.6 ID Sent When Emergency Mode is Activated

The Emergency ID can be sent each time the transceiver starts automatic transmission and reception in Emergency Mode.

ID Type

In an Analog Conventional system or LTR Trunking system, **ID Type** is the type of code to be sent out each time the transceiver starts automatic emergency transmission and reception in the Emergency Mode.

Table 9-8 ID Type

Configuration	Description
None	The transceiver transmits and receives according to the configuration of Zone-channel used for Emergency Mode.
DTMF	The transceiver first sends the DTMF code configured using the following DTMF ID when transmitting in Emergency Mode. • Emergency Button • Man-down • Stationary • Motion • Lone Worker • Bluetooth
MDC-1200	The transceiver first sends the Emergency packet when transmitting in Emergency Mode.
FleetSync	The transceiver first sends the FleetSync ID configured using Fleet and ID when transmitting in the Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring ID Type

( See Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > Emergency)

( See Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Emergency)

( See Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > Emergency)

( See Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Emergency)

( See Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > Emergency)

( See Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Emergency)

( See Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > Emergency)

( See Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Emergency)

( See Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > Emergency)

( See Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Emergency)

DTMF ID

DTMF ID is the DTMF code to be sent first in the Emergency Mode if “DTMF” is configured in **ID Type**.

The DTMF code to be transmitted varies as follows depending on what method the transceiver uses to enter the Emergency Mode.

- **Emergency Button**

This is the DTMF code to be sent first when the transceiver starts transmitting after the transceiver enters the Emergency Mode by pressing the **Emergency** button.

- **Man-down**

This is the DTMF code to be sent first when the transceiver starts transmitting after the transceiver enters the Emergency Mode using the Man-down function.

- **Stationary**

This is the DTMF code to be sent first when the transceiver starts transmitting after the transceiver enters the Emergency Mode using the Stationary function.

- **Motion**

This is the DTMF code to be sent first when the transceiver starts transmitting after the transceiver enters the Emergency Mode using the Motion function.

- **Lone Worker**

This is the DTMF code to be sent first when the transceiver starts transmitting after the transceiver enters the Emergency Mode using the Lone Worker function.

- **Bluetooth**

This is the DTMF code to be sent first when the transceiver starts transmitting after the transceiver enters the Emergency Mode using the Bluetooth function.

Note

- The DTMF code of when the transceiver enters the Emergency Mode using the Man-down function and the DTMF code of when the transceiver enters the Emergency Mode using the Bluetooth function are common.

Configuration using KPG-D3/ D3N

Configuring **Emergency DTMF ID** to be enabled or disabled

( See) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > MDC-1200 > Emergency > DTMF ID)

( See) Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Emergency > DTMF ID)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > MDC-1200 > Emergency > DTMF ID)

( See) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Emergency > DTMF ID)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > MDC-1200 > Emergency > DTMF ID)

( See) Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Emergency > DTMF ID)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > MDC-1200 > Emergency > DTMF ID)

( See) Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Emergency > DTMF ID)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > MDC-1200 > Emergency > DTMF ID)

( See) Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Emergency > DTMF ID)

9.7 Other Functions in Emergency Mode

Emergency Channel Lock and **Suspended Power-off** are other available functions in Emergency Mode.

Emergency Channel Lock

Emergency Channel Lock is the function to disable changing a zone or channel while the transceiver is in Emergency Mode.

If this function is enabled, a zone or channel cannot be changed while the transceiver is in Emergency Mode.

If this function is disabled, a zone or channel can be changed while the transceiver in Emergency Mode is not transmitting.

Configuration using KPG-D3/ D3N

Configuring **Emergency Channel Lock** to be enabled or disabled ( See Radio Configuration > Global Options > Emergency > General > Common)

Suspended Power-off

Suspended Power-off is the function to disable the transceiver to be turned OFF and retain the transceiver to be in Emergency Mode even if the transceiver is operated to be turned OFF while in Emergency Mode.

For Mobile, the transceiver behavior varies as below depending on the configuration in **Emergency Mode Type**:

- **If “Silent” is configured in Emergency Mode Type:**

The transceiver will not be turned OFF and remains in Emergency Mode even if the **Power** switch is pressed while the transceiver is in Emergency Mode. In this case, the LCD is tuned off and the transceiver appears to be turned OFF. The LED behaves according to the configuration in **TX/RX LED in Emergency** while **Suspended Power-off** is enabled.

- **If “Audible” is configured in Emergency Mode Type:**

The transceiver will not be turned OFF and remains in Emergency Mode even if the **Power** switch is pressed while the transceiver is in Emergency Mode. In this case, the LCD display does not change. The LED behaves according to the configuration in **TX/RX LED in Emergency** while **Suspended Power-off** is enabled.

For Portable, the transceiver will not be turned OFF and remains in Emergency Mode even if the transceiver is operated to be turned OFF while in Emergency Mode. In this case, the LCD display does not change. The LED behaves according to the configuration in **TX/RX LED in Emergency** while **Suspended Power-off** is enabled.

If **Suspended Power-off** is enabled, the transceiver cannot be turned OFF until the transceiver exits Emergency Mode.

Note

- If Emergency Mode is activated by the Activity Detection function or Bluetooth function, **Suspended Power-off** does not function.
- If Emergency Mode is activated by the Lone Worker function, **Suspended Power-off** functions.
- If Emergency is activated by the Activity Detection function or Bluetooth function while **Suspended Power-off** functions, the transceiver switches to Emergency Mode while **Suspended Power-off** continues to function.

Configuration using KPG-D3/ D3N

Configuring **Suspended Power-off** to be enabled or disabled ( See Radio Configuration > Global Options > Emergency > General > Common)

9.8 Placing the Transceiver in Emergency Mode Using the Lone Worker Function

Lone Worker is the function that automatically places the transceiver in Emergency Mode if the transceiver is not operated for a certain period of time.

If the transceiver is placed in Lone Worker Mode while the user has a task at a dangerous place, for instance, the transceiver automatically enters Emergency Mode and notifies a base station of the emergency status because a user cannot operate the transceiver due to an accident.

Since the Lone Worker Tone (2 beeps) sounds from the transceiver prior to entering Emergency Mode if the transceiver is in the Lone Worker Mode, the Lone Worker function can also be used to warn a user.

Enabling the Transceiver in Lone Worker Mode/Disabling Lone Worker Mode

The transceiver enters or exits Lone Worker Mode by a user operating the buttons on the transceiver.

Operating the transceiver

● Placing the transceiver in Lone Worker Mode/ Exiting Lone Worker Mode

1 Do either of the following operations while the transceiver is not in Lone Worker Mode:

- Press the **Lone Worker** button.
- Select a channel where **Lone Worker** is enabled.
- Press the **Menu** button to enter Menu Mode, select “Lone Worker”, and then select “On”.



The “” icon appears, the transceiver enters Lone Worker Mode, and then **Lone Worker Interval** is activated. The Button Beep A (1 beep) sounds from the transceiver when the **Lone Worker** button is pressed.

2 Do either of the following operations while the transceiver is in Lone Worker Mode:

- Press the **Lone Worker** button.
- Select a channel where **Lone Worker** is disabled.
- Press the **Menu** button to enter Menu Mode, select “Lone Worker”, and then select “Off”.



The “” icon disappears and the transceiver exits Lone Worker Mode.

The Button Beep B (2 beeps) sounds from the transceiver when the **Lone Worker** button is pressed.

If no button is pressed after **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in **Lone Worker Interval** elapses. The Lone Worker Tone (2 beeps) sounds for the duration configured in **Duration of Lone Worker Tone**. If no button is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, and if the time configured in **Duration of Lone Worker Tone** elapses, the transceiver enters Emergency Mode.

The transceiver behaves according to the configuration of Emergency after the transceiver enters Emergency Mode.

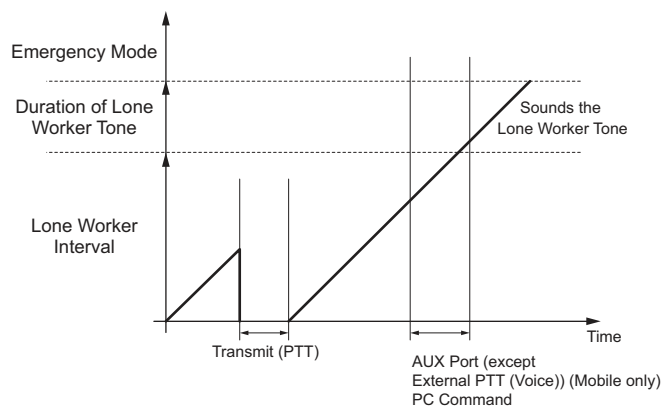


Figure 9-2 Lone Worker Mode

Note

- If “TX/RX Inhibit” is configured in **Lone Worker Type**, Lone Worker cannot be turned On or Off in Menu Mode. (Refer to [Lone Worker Type](#).)
- Lone Worker cannot be activated while the transceiver is in the Stun state or while in Transceiver Password Mode.
- For Mobile, if the AUX Input port to which “Emergency” is assigned becomes active for the time configured in **Emergency Delay Time** while the transceiver is in Lone Worker Mode, the transceiver enters Emergency Mode.
- Lone Worker can be activated even if the Button Lock state is activated while the transceiver is in Lone Worker Mode.
- If the transceiver migrates from Lone Worker Mode to Emergency Mode, the transceiver exits Emergency Mode if the **Emergency** button is pressed for a length of time greater than the length of time configured in **Hold Delay**.
- If a scan initiates while the transceiver is in Lone Worker Mode, the scan initiates with Lone Worker Mode enabled. If the scan starts while the transceiver is in a mode other than Lone Worker mode, the scan starts with Lone Worker Mode disabled.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Lone Worker (Analog Conventional)** to be enabled or disabled
 - ([See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > General > Emergency)
 - ([See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > General > Emergency)
 - ([See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > General > Emergency)

Functions in Lone Worker Mode

The transceiver enters or exits Lone Worker Mode by a user operating the buttons on the transceiver.

The following functions are relevant to Lone Worker Mode.

- Lone Worker Type
- Lone Worker Interval
- Duration of Lone Worker Tone

Lone Worker Type

Lone Worker Type allows you to configure how the transceiver behaves in Lone Worker Mode.

The transceiver behaves as below while in Lone Worker Mode according to the configuration in **Lone Worker Type**:

Table 9-9 Lone Worker Type

Configuration	Description
Normal	Lone Worker Mode can be enabled or disabled by a user pressing the Lone Worker button. A user can transmit and receive using the transceiver in the same manner as normal even if the transceiver enters Lone Worker Mode and while the time configured in Lone Worker Interval is counted. The status of Lone Worker Mode, either enabled or disabled by a user pressing the Lone Worker button, is retained in the transceiver. The status of Lone Worker Mode, either enabled or disabled, is also retained in the transceiver even if the channel is changed or the transceiver is turned ON or OFF.
TX/RX Inhibit	Lone Worker Mode can be enabled or disabled by a user pressing the Lone Worker button. A user cannot transmit or receive using the transceiver while the time configured in Lone Worker Interval is counted after the transceiver enters Lone Worker Mode. Only the following PF buttons can be used while the transceiver is in Lone Worker Mode: • Lone Worker button • Emergency button • Function button • Backlight button • LCD Brightness button • Zeroize button • Battery Status button The status of Lone Worker Mode, either enabled or disabled by a user pressing the Lone Worker button, is retained in the transceiver. The status of Lone Worker Mode, either enabled or disabled, is also retained in the transceiver even if the channel is changed or the transceiver is turned ON or OFF.
Preset	If a channel is selected, Lone Worker Mode is enabled or disabled depending on the configuration in Lone Worker for the selected channel. Also, Lone Worker Mode can be enabled or disabled by a user pressing the Lone Worker button. A user can transmit and receive using the transceiver in the same manner as normal even if the transceiver enters Lone Worker Mode and while the time configured in Lone Worker Interval is counted. The status of Lone Worker Mode, either enabled or disabled by a user pressing the Lone Worker button, is not retained in the transceiver.

Lone Worker Type can be configured using KPG-D3/ D3N depending on the usage of the transceiver. The transceiver behavior varies as below depending on the configuration in **Lone Worker Type**:

Table 9-10 Lone Worker Type

Transceiver Behavior	Configuration in Lone Worker Type		
	Normal	TX/RX Inhibit	Preset
Toggling Lone Worker Mode between enabled and disabled when a channel is changed	No	No	Yes
Toggling the Lone Worker Mode between enabled and disabled by a user pressing the Lone Worker button	Yes	Yes	Yes
Retaining the status of Lone Worker Mode, either enabled or disabled, in the transceiver	Yes	Yes	No
Transmitting and receiving by operating the transceiver in the same manner as normal mode	Yes	No	Yes

Yes: Available

No: Unavailable

Configuration using KPG-D3/ D3N

Configuring **Lone Worker Type** ( See Radio Configuration > Global Options > Emergency > General > Lone Worker)

Lone Worker Interval

Lone Worker Interval is the interval time from when the transceiver enters Lone Worker Mode until the Lone Worker Tone (2 beeps) sounds from the transceiver.

If no button is pressed after the transceiver enters Lone Worker Mode and then **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in **Lone Worker Interval** elapses. For the time configured in **Duration of Lone Worker Tone**, the Lone Worker Tone (2 beeps) sounds from the transceiver.

If any button is pressed before the time configured in **Lone Worker Interval** elapses, **Lone Worker Interval** is reset and then restarts counting down from the beginning. Also, if the **Lone Worker** button is pressed before the time configured in **Lone Worker Interval** elapses, Lone Worker Mode becomes disabled and then the transceiver reverts to the normal mode.

Configuration using KPG-D3/ D3N

Configuring **Lone Worker Interval** ( See Radio Configuration > Global Options > Emergency > General > Lone Worker)

Duration of Lone Worker Tone

Duration of Lone Worker Tone is the length of time that the Lone Worker Tone (2 beeps) sounds from the transceiver.

If no button is pressed after the transceiver enters Lone Worker Mode and then **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in **Lone Worker Interval** elapses. For the time configured in **Duration of Lone Worker Tone**, the Lone Worker Tone (2 beeps) sounds from the transceiver. If no button is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, and if the time configured in **Duration of Lone Worker Tone** elapses, the transceiver enters Emergency Mode.

If any button is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, the Lone Worker Tone (2 beeps) stops sounding, and **Lone Worker Interval** is reset, and then restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

Configuring **Duration of Lone Worker Tone** ( See Radio Configuration > Global Options > Emergency > General > Lone Worker)

9.9

Placing the Transceiver in Emergency Mode by Using the Activity Detection Function

Supported Models: Portable

Activity Detection is the function to detect the status of the transceiver by analyzing the behavior of the transceiver using the acceleration sensor and tilt sensor embedded in the transceiver, and to automatically place the transceiver in Emergency Mode.

Using this function, if the transceiver detects that the transceiver is tilted, remains stationary, or moves vigorously for a certain period of time due to an accident, the transceiver automatically enters Emergency Mode and notifies the base station of the emergency status.

To use this function, **Activity Detection** must be enabled.

Operating the transceiver

● Enabling Activity Detection/ Disabling Activity Detection

1 Do either of the following operations while Activity Detection is disabled:

- Press the **Activity Detection** button.
- Select a channel where **Activity Detection** is enabled.
- Press the **Menu** button to enter Menu Mode, and select “Activity Detection” and then select “On”.

The “” icon appears and **Activity Detection** will be enabled.

If **Activity Detection** is enabled by using the **Activity Detection** button or the **Menu** button, the Button Beep A (1 beep) sounds from the transceiver.

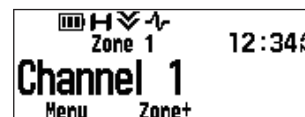


2 Do either of the following operations while Activity Detection is disabled:

- Press the **Activity Detection** button.
- Select a channel where **Activity Detection** is disabled.
- Press the **Menu** button to enter Menu Mode, and select “Activity Detection” and then select “Off”.

The “” icon disappears and Activity Detection will be disabled.

If **Activity Detection** is disabled by using the **Activity Detection** button or the **Menu** button, the Button Beep B (2 beeps) sounds from the transceiver.



Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)
- Configuring **Activity Detection(Analog Conventional)** to be enabled or disabled ( See Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > General > Emergency)
- ( See Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > General > Emergency)
- ( See Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > General > Emergency)

Man-down Detection

Man-down Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver becomes tilted and continues this position even after the time configured in **Man-down Delay Time** elapses.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when a user falls due to an accident.

If **Man-down Pre-alert** is configured, a Man-down Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode. The transceiver does not enter Emergency Mode if the transceiver returns from the tilted position before the time configured in **Man-down Delay Time** elapses.

The threshold value of the tilt angle (**Man-down Angle**) to be used to detect that the transceiver is tilted can be configured to 45 °, 60 °, or 75 °.

Note

- Pressing the **PTT** switch while the time configured in **Man-down Delay Time** elapses pauses the **Man-down Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** button resets the **Man-down Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

- Configuring **Man-down Detection** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > General > Man-down)
- Configuring **Man-down Delay Time** ( [See](#) Radio Configuration > Global Options > Emergency > General > Man-down)
- Configuring **Man-down Pre-alert** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > General > Man-down)
- Configuring **Man-down Angle** ( [See](#) Radio Configuration > Global Options > Emergency > General > Man-down)

Stationary Detection

Stationary Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver becomes stationary and continues this position even after the time configured in **Stationary Delay Time** elapses.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when a user cannot operate the transceiver due to an accident.

If **Stationary Pre-alert** is configured, a Stationary Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode. The transceiver does not enter Emergency Mode if the transceiver returns from the stationary state before the time configured in **Stationary Delay Time** elapses.

Note

- Pressing the **PTT** switch while the time configured in **Stationary Delay Time** elapses pauses the **Stationary Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** button resets the **Stationary Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

- Configuring **Stationary Detection** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > General > Stationary)
- Configuring **Stationary Delay Time** ( [See](#) Radio Configuration > Global Options > Emergency > General > Stationary)
- Configuring **Stationary Pre-alert** ( [See](#) Radio Configuration > Global Options > Emergency > General > Stationary)

Motion Detection

Motion Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver receives strong shocks by being strongly shaken or swung and continues this state for the time configured in **Motion Delay Time**.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when the transceiver repeatedly receives powerful shocks due to an accident.

If **Motion Pre-alert** is configured, a Motion Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode.

The transceiver does not enter Emergency Mode if the severe movement of the transceiver stops before the time configured in **Motion Delay Time** elapses.

Note

- Pressing the **PTT** switch while the time configured in **Motion Delay Time** elapses pauses the **Motion Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** button resets the **Motion Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D3/ D3N

- Configuring **Motion Detection** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > General > Motion)
- Configuring **Motion Delay Time** ( [See](#) Radio Configuration > Global Options > Emergency > General > Motion)
- Configuring **Motion Pre-alert** ( [See](#) Radio Configuration > Global Options > Emergency > General > Motion)

Using Man-down Detection and Stationary Detection Simultaneously (Man-down with Stationary)

Man-down with Stationary is the function to detect emergency using both the **Man-down Detection** and **Stationary Detection** functions.

If this function is enabled, the transceiver detects emergency using both the **Man-down Detection** and **Stationary Detection** functions. If both **Man-down Detection** and **Stationary Detection** enter the detection state, **Man-down Delay Time** is activated. If the time configured in **Man-down Delay Time** elapses while the transceiver continues to be in the state, the transceiver enters Emergency Mode.

Configuration using KPG-D3/ D3N

Configuring **Man-down with Stationary** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Emergency > General > Man-down)

9.10

Transceiver Behavior When the Transceiver Receives an Emergency Status

An Alert Tone can be sounded when the transceiver receives an Emergency Status (Status 95, Status 96, Status 97, Status 98, Status 99) for FleetSync. This behavior can be configured for **Emergency Status Response**.

Refer to “[Emergency Status Response](#)” for details of Emergency Response.

Voice Scrambler is the function to scramble the audio signal so that the contents of communications can be prevented from being intercepted.

The transceiver is equipped with an entry-level speech inversion scrambler. This scrambler has compatibility with the AQUA scrambler installed in the TK-x180 series, TK-x170 series and NX-x20 series transceiver.

10.1 Toggling the Voice Scrambler during Transmission between Enabled and Disabled

Pressing the **Scrambler/ Encryption** button toggles the status of Voice Scrambler during transmission between enabled and disabled.

Or, Voice Scrambler during transmission can be toggled between enabled and disabled by pressing the **Menu** button to enter Menu Mode, and then selecting "Scrambler/Encryption". (Refer to Common Function Part [Using Menu Mode.](#))

Note

- The Voice Scrambler can also be enabled or disabled using KPG-D3/ D3N. The status of Voice Scrambler configured using KPG-D3/ D3N can be changed by a transceiver operation.
- The Voice Scrambler status (to be enabled or disabled) can be configured for each channel, so the configured Voice Scrambler status applies only for the selected channel.
- If the status of Scrambler/ Encryption (to be enabled or disabled) is switched for the channel where "Mixed" is configured in **Channel Type**, the status of Scrambler/ Encryption (to be enabled or disabled) applies for a channel according to the mode (either Analog or NXDN/ DMR) configured in **Transmit Mode** of the channel.

Operating the transceiver

- **Enabling the Voice Scrambler during transmission/ Disabling the Voice Scrambler during transmission**

1 Press the **Scrambler/ Encryption** button while Voice Scrambler is disabled.

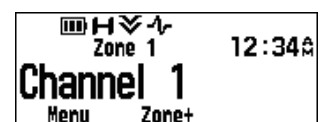
The "◆" icon appears and then Voice Scrambler will be enabled.

Upon pressing the **PTT** switch, the transceiver scrambles and sends the audio signal.



2 Press the **Scrambler/ Encryption** button while Voice Scrambler is enabled.

The "◆" icon disappears and then Voice Scrambler will be disabled.



Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)
- Configuring **Voice Scrambler** to be enabled or disabled
 - ( See Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Analog > Scrambler)
 - ( See Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Analog > Scrambler)
 - ( See Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > General > Scrambler)
 - ( See Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > Analog > Scrambler)

10.2 Configuring the Scrambler Code

The Scrambler Code, which is used for when the transceiver scrambles and sends the audio signal and when the transceiver receives the scrambled audio signal, can be configured for each channel.

The transceiver needs to enter the Scrambler/ Encryption Code Mode in order to configure the Scrambler Code. Pressing and holding the **Scrambler/ Encryption** button causes the transceiver to enter Scrambler/ Encryption Code Mode. Or, the transceiver can also enter Scrambler/Encryption Code Mode by pressing the **Menu** button to place the transceiver in Menu Mode and then selecting “Scrambler/ Encryption Code”. (Refer to Common Function Part [Using Menu Mode.](#))

Note

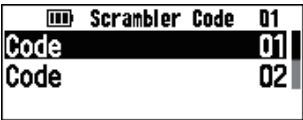
- The Scrambler Code can be configured using KPG-D3/ D3N. The Scrambler Code configured using KPG-D3/ D3N can also be changed by a transceiver operation.

Operating the transceiver

1 Press and hold the **Scrambler/Encryption** button.

The transceiver enters the Scrambler/ Encryption Code Mode and the Scrambler Code configured for the channel appears.

The following operations are identical even if the transceiver enters Scrambler/ Encryption Code Mode by pressing the **Menu** button.



Note

- If Voice Scrambler is disabled, Voice Scrambler will be enabled when the transceiver enters Scrambler/ Encryption Code Mode. Even after the transceiver exits from Scrambler/ Encryption Code Mode, Voice Scrambler remains enabled.

2 Select the Scrambler Code by pressing the [▲] or [▼] button.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

Scrambler Code 02	
Code	01
Code	02

3 Press the Menu ([F]) or [*] button.

The Scrambler Code selected in step 2 is configured for the selected channel.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring the **Scrambler Code**
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > Analog > Scrambler)
 - ( [See](#) Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Personalities > Analog > Scrambler)
 - ( [See](#) Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > General > Scrambler)
 - ( [See](#) Radio Configuration > System Properties > Systems > NXDN Conventional > Personalities > Analog > Scrambler)
 - ( [See](#) Radio Configuration > System Properties > Systems > DMR Conventional > Personalities > Analog > Scrambler)

10.3 Retain Scrambler/Encryption Status

Retain Scrambler/Encryption Status is the function to retain the enabled or disabled status of the Voice Scrambler of each channel and the Scrambler Code configured for each channel in the transceiver.

If **Retain Scrambler/Encryption Status** is enabled, the stored Voice Scrambler function status (enabled or disabled) and Scrambler Code are read as defaults when the data is read from the transceiver by using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

Configuring **Retain Scrambler/Encryption Status** ( [See](#) Radio Configuration > Global Options > Security > Scrambler/Encryption)

Scan is the function to check whether the transceiver receives a call from other transceivers.

The transceiver sequentially searches for availability of signal on each channel, and the transceiver receives on the channel where the signal is detected.

Three methods are available for Scan as shown below.

- **Single Scan**

The transceiver scans target channels in the same zone.

- **List Scan**

The transceiver scans the Zone-channel registered as a member in a Scan List.

- **Multi-Zone Scan**

The transceiver scans all target channels in the target zones.



- As Voting is executed for a channel with “Analog Voting” or “Analog Voting with Signaling” configured in **Protocol**, the configuration in **Scan Type** is disabled. Refer to “[Migrating Automatically to the Site Providing Better Radio Environment \(Voting\)](#)” for Scan by Voting.

11.1 Starting the Scan

Scan can be started by one of the following methods:

- **Operating the PF buttons**

- Pressing the **Scan** button starts or stops scanning.
- Pressing the **Scan Normal** button starts or stops scanning.
- Even if the Priority Channel is configured, pressing the **Scan Normal** button disables the Priority Channel and mandatorily executes Non-Priority Scan.
- Executing “Scan” or “Scan Normal” after pressing the **Menu** button to enter Menu Mode starts or stops scanning.

- **Status changes of the AUX Input port (Mobile only)**

When the AUX Input port where “Scan” is assigned goes low level, the scan starts. When the AUX Input port where “Scan” is assigned goes high level, the scan stops.

- **Turning the transceiver ON**

If **Power-on Scan** is enabled, the scan starts when the transceiver is turned on. (Refer to [Power-on Scan](#).)

- **Selecting a channel**

The scan starts if a channel with **Auto Scan** enabled is selected. (Refer to [Auto Scan](#).)

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)
- Assigning functions to the AUX Input port ([See](#) Radio Configuration > Global Options > External Device > Mobile AUX > Function Settings)

11.2 Scanning in One Zone (Single Scan)

The transceiver scans using Single Scan all the added channels in the zone where the transceiver starts scanning.

If a scan starts in the zone where “Single-Zone” is configured in **Scan Type**, Single Scan is executed. Or, if the transceiver migrates during the scan to the zone where “Single-Zone” is configured in **Scan Type**, Single Scan is executed.

The target channel for scan is either the channel with **Scan Add** enabled by using KPG-D3/ D3N or the channel with **Scan Add** enabled by using the **Scan Delete/Add** button.

Operating the transceiver

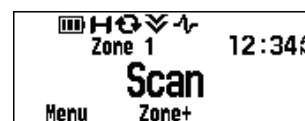
1 Press the **Scan** button.

The scan starts after a Button Beep A (1 beep) sounds from the transceiver.

The “” icon appears.

If **Revert Channel Display** is enabled, Revert Channel is displayed.

On the portable transceiver, the LED flashes according to the configuration of **Non-Priority Scan LED** if it is not a priority scan, and according to the configuration of **Priority Scan LED** if it is a priority scan.

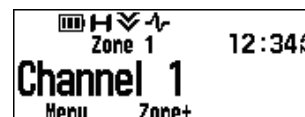


Note

- The transceiver behaves in the same manner even if the scan is started by other method. (Refer to [Starting the Scan](#).)
- **Revert Channel Display** cannot be configured on a portable transceiver (basic model).

2 Press the **Scan** button during the scan.

The scan completes after a Button Beep B (2 beeps) sounds from the transceiver and the “” icon disappears.



Note

- Single Scan functions only in the zone consisting of channels of the same system. However, Single Scan functions even when the zone includes Conventional channels of other systems or channels of an LTR Trunking system.
- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to [Selected Channel Scan](#).)
- For Portable, if a zone is changed by using the **Selector** with “Zone Select” configured during Single Scan and if the zone is not configured, the “” icon blinks and the scan pauses.
- If another zone is selected during the Single Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration> Global Options> Button Assignment)
- Configuring **Scan Add** to be enabled or disabled
( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Individually > Channel Information > Scan)
( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Table > Channel Table)
- Configuring **Scan Type** ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan)
- Configuring **Revert Channel Display** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > General > Indicator)

Conditions to Activate the Scan (Single Scan)

One of the following conditions must be satisfied for the transceiver to start the Single Scan:

- Two or more channels exist in the zone where the transceiver scans.
- A channel to be scanned and a Priority Channel exist in the zone.
- Even if no channel to be scanned exists, Priority Channel 1 and Priority Channel 2 exist in the zone.

Conditions to Resume the Scan (Single Scan)

One of the following conditions must be satisfied to resume the scan while the transceiver pauses the scan:

- Two or more channels exist in the zone where the transceiver scans.
- A channel to be scanned and a Priority Channel to be scanned exist in the zone.
- Even if no channel to be scanned exists, Priority Channel 1 and Priority Channel 2 to be scanned exist in the zone.

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (Single Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the Revert Channel. Upon elapse of the time configured in **Dwell Time** after completion of the transmission, the transceiver reverts to the selected channel, and the scan does not resume.

11.3 Scan by Registering Multiple Target Channels for Scan in the List (List Scan)

Using the List Scan enables the transceiver to scan the Zone-channels registered as a member in a Scan List.

If a scan starts in a zone where “List” is configured in **Scan Type** or on a channel where a Scan List number is configured, List Scan is executed. Or, if the transceiver is in the zone where “List” is configured in **Scan Type** and migrates to the channel where a Scan List number is configured during the scan, List Scan is executed.

Operating the transceiver

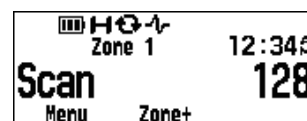
1 Press the **Scan** button.

The scan starts after a Button Beep A (1 beep) sounds from the transceiver.

The “” icon appears.

If **Revert Channel Display** is enabled, Revert Channel is displayed.

On the portable transceiver, the LED flashes according to the configuration of **Non-Priority Scan LED** if it is not a priority scan, and according to the configuration of **Priority Scan LED** if it is a priority scan.

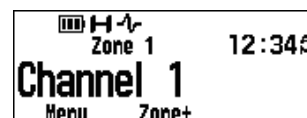


Note

- The transceiver behaves in the same manner even if the scan is started by other method. (Refer to [Starting the Scan.](#))
- **Revert Channel Display** cannot be configured on a portable transceiver (basic model).

2 Press the **Scan** button during the scan.

The scan completes after a Button Beep B (2 beeps) sounds from the transceiver and the “” icon disappears.



Note

- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to [Selected Channel Scan.](#))
- If another zone is selected during the List Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Scan List** ( [See](#) Radio Configuration > Global Options > Scan > List Scan > List)

- Configuring the Scan List Number
( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > List Scan)
( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Individually > Channel Information > Scan)
( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Table > Channel Table)
- Configuring **Scan Type** ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan)
- Configuring **Revert Channel Display** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > General > Indicator)

Conditions to Activate the Scan (List Scan)

For the transceiver to start the List Scan, 2 or more Zone-channels must be registered as members in a Scan List.

Note

- A Priority Channel is always registered as a member in a Scan List. However, if “Selected” is configured for the type of the Priority Channel (**Type**), the selected channel becomes the Priority Channel and target channel for scan, regardless of the configuration in **Selected Channel Scan** or whether the selected channel is registered as a member in a Scan List. (Refer to [Priority Channel Type \(Type\)](#).)
- If **Selected Channel Scan** is enabled, the scan can be initiated even if only a single Zone-channel is configured as a member in a Scan List because the selected channel also becomes the target channel for scan.

Conditions to Resume the Scan (List Scan)

For the transceiver to resume the List Scan, 2 or more Zone-channels to be scanned must be registered as members in a Scan List.

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

Note

- If a channel is temporarily excluded from the target channels for scanning by the **Temporary Delete/Add** function, the channel is not scanned even if the channel is registered as a member in Scan List.
- If **Selected Channel Scan** is enabled, the scan can be resumed even if only a single Zone-channel is configured as a member in a Scan List because the selected channel also becomes the target channel for scan.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (List Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the Revert Channel. Upon elapse of the time configured in **Dwell Time** after completion of the transmission, the transceiver reverts to the selected channel, and the scan does not resume.

Scan List

In order to use List Scan, target members for List Scan must be registered in a Scan List. A maximum of 128 Scan Lists can be configured. In each Scan List, a maximum of 31 Zone-channels can be registered as target members for List Scan.

Scan Type (List Scan)

In order to register a target member for List Scan, **Scan Type (List Scan)** must be configured.

Table 11-1 Scan Type (List Scan)

Configuration	Description
Conventional	A Conventional Zone-Channel can be registered as a member of List Scan. Configuring a Priority Channel enables Priority Scan.
LTR and Conventional	A Zone-channel in a system where “LTR Trunking”, “Analog Conventional”, “NXDN Conventional”, or “DMR Conventional” is configured in Protocol can be registered as a member of List Scan.

Scan List number (Channel)

List Scan is executed according to the Scan List number configured for the channel where scan is initiated. According to the configuration in **Scan List**, List Scan is executed as follows:

Table 11-2 Scan List (Channel)

Configuration	Description
Zone Common	List Scan is executed by referring to the Scan List Number configured for the zone.
1 to 128	List Scan is executed according to the List Number in the corresponding Scan List.
None	List Scan is not executed.

Configuration using KPG-D3/ D3N

- Configuring **Scan List** ( [See](#) Radio Configuration > Global Options > Scan > List Scan > List)
- Configuring a Scan List number (Zone Common) ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > List Scan)
- Configuring the Scan List Number (Channel)
 ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Individually > Channel Information > Scan)
 ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Table > Channel Table)

Changing the Scan List (Scan Program)

A desired Zone-channel can be registered as a member for List Scan in the Scan List by operating the transceiver. Also, a registered member in the Scan List can be deleted from the list.

The Scan List can be edited in Scan Program Mode.

Pressing the **Scan Program** button places the transceiver in Scan Program Mode.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “Scan Program” places the transceiver in Scan Program Mode. (Refer to Common Function Part [Using Menu Mode.](#))

Operating the transceiver

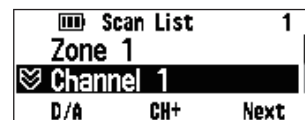
● Adding a member for List Scan

1 Select the channel for which the Scan List to be edited is configured and then press the **Scan Program** button.

A Button Beep A (1 beep) sounds from the transceiver.

The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are the same even if the transceiver enters Scan Program Mode by pressing the **Menu** button.



Note

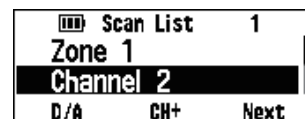
- If the selected channel is registered in the Scan List, the “✓” icon appears on the left of the channel name.

2 Select a Zone-channel to add to the Scan List.

Pressing the [▲] or [▼] button selects a channel.

Pressing the [◀] or [▶] button selects a zone.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.

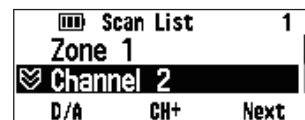


3 Press the **Menu** ([□]) or [*****] button.

A Button Beep A (1 beep) sounds from the transceiver, and then the Zone-channel selected in step 2 is added to the Scan List. The “✓” icon appears on the left of the channel name.

Note

- In the following cases, a member cannot be added to a Scan List:
 - If the zone channel to be added to a Scan List is already configured as a member in the Scan List
 - If a channel which is inappropriate for the configuration in **Scan Type (List Scan)**, such as a channel in an NXDN Trunking system, is selected for the Scan List with “Conventional” configured in **Scan Type (List Scan)**



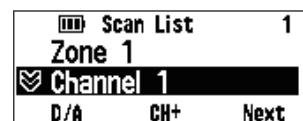
● Deleting a member from List Scan

1 Select the channel for which the Scan List to be edited is configured and then press the **Scan Program** button.

A Button Beep A (1 beep) sounds from the transceiver.

The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are the same even if the transceiver enters Scan Program Mode by pressing the **Menu** button.



Note

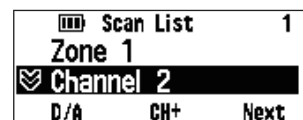
- If the selected channel is registered in the Scan List, the “✓” icon appears on the left of the channel name.

2 Select a Zone-channel to be deleted from the Scan List.

Pressing the [▲] or [▼] button selects a channel.

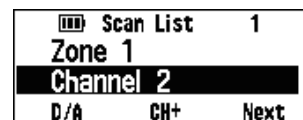
Pressing the [◀] or [▶] button selects a zone.

Refer to Common Function Part “[Selecting or Clearing Data from a List](#)” for selection methods.



3 Press the **Menu** ([□]) or [*] button.

A Button Beep B (2 beeps) sounds from the transceiver, and then the Zone-channel selected in step 2 is deleted from the Scan List. The “✓” icon disappears from the left of the channel name.



Note

- In the following cases, a member cannot be deleted from the Scan List:
 - If the zone channel to be deleted from the Scan List is a Priority Channel
 - If the number of members registered in the Scan List is zero

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ([See](#) Radio Configuration > Global Options > Button Assignment)

11.4

Scanning All Target Zones for Scanning (Multi-Zone Scan)

The transceiver scans using Multi-Zone Scan all the channels to be scanned in the zones to be scanned.

If a scan starts in the zone where “Multi-Zone” is configured in **Scan Type**, Multi-Zone Scan is executed. Or, if the transceiver migrates during the scan to the zone where “Multi-Zone” is configured in **Scan Type**, Multi-Zone Scan is executed.

The target zone for scanning is either the zone with **Zone Add** enabled by using KPG-D3/ D3N or the zone with **Zone Add** enabled by using the **Zone Delete/Add** button.

The target channel for scan is either the channel with **Scan Add** enabled by using KPG-D3/ D3N or the channel with **Scan Add** enabled by using the **Scan Delete/Add** button.

Operating the transceiver

1

Press the **Scan** button.

The scan starts after a Button Beep A (1 beep) sounds from the transceiver.

The “” icon appears.

If **Revert Channel Display** is enabled, Revert Channel is displayed.

On the portable transceiver, the LED flashes according to the configuration of **Non-Priority Scan LED** if it is not a priority scan, and according to the configuration of **Priority Scan LED** if it is a priority scan.



-  **Note**
- The transceiver behaves in the same manner even if the scan is started by other method. (Refer to [Starting the Scan.](#))
 - **Revert Channel Display** cannot be configured on a portable transceiver (basic model).

2

Press the **Scan** button during the scan.

The scan completes after a Button Beep B (2 beeps) sounds from the transceiver and the “” icon disappears.



 Note

- “Multi-Zone” can be configured in **Scan Type** only for the zones structured with the following systems:

- Protocol = Analog Conventional
- Protocol = NXDN Conventional
- Protocol = LTR Trunking
- Protocol = DMR Conventional

Even if these systems exist in the same zone, “Multi-Zone” can be configured in **Scan Type**. In this case, “Single-Zone” can also be configured in **Scan Type**, and starting Multi-Zone Scan can also scan the zones with “Single-Zone” configured in **Scan Type**.

- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to [Selected Channel Scan](#).)
- For Portable, if a zone is changed by using the **Selector** with “Zone Select” configured during Multi-Zone Scan and if the zone is not configured, the “” icon blinks and the scan pauses.
- If another zone is selected during the Multi-Zone Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( [See](#) Radio Configuration > Global Options > Button Assignment)
- Configuring **Scan Add** to be enabled or disabled
( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Channel Information > Scan)
( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone/Channel Information > Table > Channel Table)
- Configuring **Zone Add** to be enabled or disabled ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Multi-Zone Scan)
- Configuring **Scan Type** ( [See](#) Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan)
- Configuring **Revert Channel Display** to be enabled or disabled ( [See](#) Radio Configuration > Global Options > Scan > General > Indicator)

Conditions to Activate the Scan (Multi-Zone Scan)

One of the following conditions must be satisfied for the transceiver to start the Multi-Zone Scan:

- When a total of two or more channels targeted to be scanned exists in the zone targeted to be scanned
- When only one target zone exists, and when one target channel exists in the target zone and a Priority Channel exists in the target zone or another zone
- When Priority Channel 1 and Priority Channel 2 exist in another zone, even if no zone to be scanned exists

Conditions to Resume the Scan (Multi-Zone Scan)

One of the following conditions must be satisfied to resume the Multi-Zone Scan while the transceiver pauses the scan:

- When a total of two or more channels targeted to be scanned exists in the zone targeted to be scanned
- When only one target zone exists, and when one target channel exists in the target zone and a Priority Channel exists in the target zone or another zone
- When Priority Channel 1 and Priority Channel 2 exist in another zone, even if no zone to be scanned exists

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (Multi-Zone Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the Revert Channel. Upon elapse of the time configured in **Dwell Time** after completion of the transmission, the transceiver reverts to the selected channel, and the scan does not resume.

11.5 Scanning the Specific Channel Preferentially (Priority Scan)

Priority Scan is the function to prioritize and scan the target channels.

This function can be used for Single Scan, Multi-Zone Scan, or List Scan in a Conventional channel.

● Single Scan

A maximum of 2 Priority Channels can be configured in each zone.

● Multi-Zone Scan

A maximum of 2 Priority Channels can be configured.

● List Scan

A maximum of 2 Priority Channels can be configured in each Scan List.

● Tactical Zone Scan

A maximum of 2 Priority Channels can be configured in the Tactical Zone.

Even if the original channel is configured as the Priority Channel, the configuration does not apply in the Tactical Zone. Therefore, the Priority Channel needs to be configured in the Tactical Zone.

If a Priority Channel is configured, the transceiver monitors Priority Channel by executing Lookback even when receiving on a normal channel.

On the channel where Priority 1 has the highest priority, Lookback is not executed while receiving on Priority 1.

Priority 2 is the channel prioritized next to Priority 1; therefore, Lookback is executed on Priority 1 while receiving on Priority 2.

Note

- On the portable transceiver, the LED flashes according to the configuration of **Priority Scan LED** when priority scan is running.

Priority Channel Type (Type)

Priority Channel Type can be selected from “None”, “Fixed”, “Selected” and “Operator Selectable”.

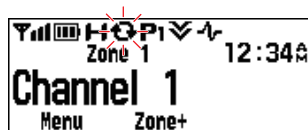
Table 11-3 Type

Configuration	Description
None	No Priority Channel is configured.
Fixed	The channel configured using KPG-D3/ D3N is configured as the Priority Channel. The Priority cannot be changed by operating the transceiver. Note “Fixed” cannot be configured for Tactical Zone Scan.
Selected	The channel selected on the Transceiver is configured as the Priority Channel.
Operator Selectable	The channel configured by a user in Priority-channel Select Mode (Single Scan/ Multi-Zone Scan) or Scan Program (List Scan) is configured as the Priority Channel. (Refer to Changing the Priority Channel , Changing the Scan List (Scan Program) .)

Transceiver behavior

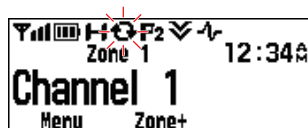
- If the Zone-channel configured for the Priority 1 is selected, or if the scan is paused on the Zone-channel configured for the Priority 1

The “**P1**” icon appears. When Priority Scan is paused, the “” icon blinks.



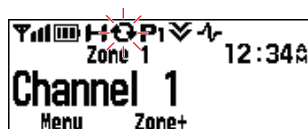
- If the Zone-channel configured for the Priority 2 is selected, or if the scan is paused on the Zone-channel configured for the Priority 2

The “**P2**” icon appears. When Priority Scan is paused, the “” icon blinks.



- If the same Zone-channel is selected for Priority 1 and the Priority 2, or if the scan is paused on the same Zone-channel configured for Priority 1 and the Priority 2

The “**P1**” icon with higher priority appears. When Priority Scan is paused, the “” icon blinks.



 Note

- If **Priority-channel Stop Tone** is enabled, a Priority-channel Tone (1 beep) sounds from the transceiver when the scan is paused and the speaker is unmuted on the Priority Channel.
- The Priority Channel is scanned even if the Priority Channel is excluded from the target channels for scan. However, the Priority Channel can be temporarily excluded from the target channels for scan by using the **Temporary Delete/Add** function.
- If the same channel is selected for **Priority 1** and **Priority 2**, and if **Temporary Delete/Add** of either **Priority 1** or **Priority 2** is permitted, **Temporary Delete/Add** is executed only on the permitted Priority Channel when the **Scan Delete/Add** button is pressed.
- Pressing the **Home Channel** button during the scan does not change the Priority Channel even if “Selected” is configured in **Type**.
- If “Selected” is configured in **Type**, the transceiver behaves as follows if one of the **Direct Channel 1** to **Direct Channel 5** buttons is pressed during the scan.
 - If **Return** is disabled, Direct Channel 1 to Direct Channel 5 become the Priority Channels if Direct Channel 1 to Direct Channel 5 are Conventional channels.
 - If **Return** is enabled, the Priority Channel does not change.

Configuration using KPG-D3/ D3N

- Configuring **Priority Scan** (Single Scan) ( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan > Priority Scan > Priority1,2)
- Configuring **Priority Scan** (Multi-Zone Scan) ( **See** Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters > Priority Scan > Priority 1,2)
- Configuring **Priority Scan** (List Scan) ( **See** Radio Configuration > Global Options > Scan > List Scan > Parameters > Priority Scan > Priority 1,2)
- Configuring **Priority-channel Stop Tone** to be enabled or disabled ( **See** Radio Configuration > Global Options > Scan > General > Indicator)

Changing the Priority Channel

The Priority Channel can be changed by operating the transceiver.

● Single Scan/ Multi-Zone Scan/ Tactical Zone Scan

The Priority Channel can be changed in Priority-channel Select Mode.

Pressing the **Priority-channel Select** button places the transceiver in Priority-channel Select Mode.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “Priority-channel Select” places the transceiver in Priority-channel Select Mode. (Refer to Common Function Part [Using Menu Mode.](#))

The transceiver can enter Priority-channel Select Mode only if “Operator Selectable” is configured in either **Priority 1** or **Priority 2**.

● List Scan

The Priority Channel can be changed on the Priority Channel edit screen in Scan Program Mode.

Pressing the **Scan Program** button places the transceiver in Scan Program Mode.

Or, pressing the **Menu** button to enter Menu Mode and then selecting “Scan Program” places the transceiver in Scan Program Mode. (Refer to Common Function Part [Using Menu Mode.](#))

Pressing the **Back** (**[↩]**) or **[#]** button in the Scan Program Mode displays the Priority Channel edit screen.

The transceiver can enter the Priority Channel edit screen only if “Operator Selectable” is configured in either **Priority 1** or **Priority 2**.

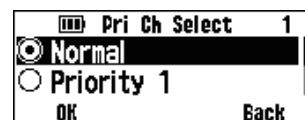
Operating the transceiver

● Changing the Priority Channel in Priority-channel Select Mode (Single Scan/ Multi-Zone Scan/ Tactical Zone Scan)

1 Press the **Priority-channel Select** button after selecting the channel to be configured as the Priority Channel.

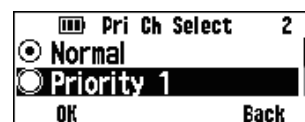
The transceiver enters Priority-channel Select Mode.

The following operations are identical even if the transceiver enters Priority-channel Select Mode by pressing the **Menu** button.



2 Select the priority of a channel by pressing the **[▲]** or **[▼]** button.

Priority can be selected from “Normal”, “Priority 1”, “Priority 2”, and “Priority 1&2”.



3 Press the **Menu** (**[□]**) or **[*]** button.

After a Button Beep B (2 beeps) sounds from the transceiver, the transceiver exits Priority-channel Select Mode and restores the previous channel display.



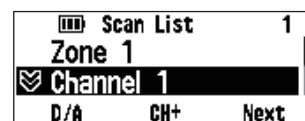
● Changing the Priority Channel in Scan Program Mode (List Scan)

1 Press the **Scan Program** button after selecting the channel to be configured as the Priority Channel.

A Button Beep A (1 beep) sounds from the transceiver.

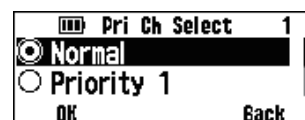
The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are the same even if the transceiver enters Scan Program Mode by pressing the **Menu** button.



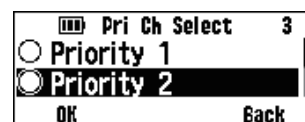
2 Press the **Back** ([↩]) or **[#]** button.

The transceiver enters the Priority Channel edit screen.



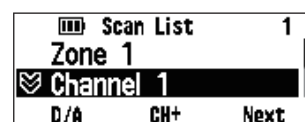
3 Select the priority of a channel by pressing the **[▲]** or **[▼]** button.

Priority can be selected from "Normal", "Priority 1", "Priority 2", and "Priority 1&2".



4 Press the **Menu** ([□]) or **[*]** button.

After a Button Beep C (3 beeps) sounds from the transceiver, the transceiver exits Scan Program Mode and restores the previous channel display.



Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Lookback

Lookback is the function to periodically checks for a Priority Channel if a Priority Channel is configured for the transceiver and the transceiver receives on a normal channel (a channel which is not Primary Channel).

Either **Lookback Time A** or **Lookback Time B** is applied for the interval to initiate checking for a signal on a Priority Channel according to the receiving status of the Priority Channel.

Lookback Time A

Lookback Time A is the interval time to check during a Priority Scan for a signal on a Priority Channel without a carrier while the transceiver receives a signal on a normal channel whose carrier is different from the carrier of the Priority Channel. Since the transceiver may receive a call on the Priority Channel, the time configured in **Lookback Time A** must be shorter than the time configured in **Lookback Time B**.

Lookback Time B

Lookback Time B is the interval time during a Priority Scan to check a Priority Channel with a carrier that contains a QT/DQT that does not match that of the own transceiver while the transceiver receives a signal on a normal channel whose carrier is different from the carrier of the Priority Channel.

Note

- The transceiver does not execute Lookback of the Priority Channel while 5-tone Encode Format or Digital Encode Format is being executed.

Configuration using KPG-D3/ D3N

- Configuring **Lookback Time A/ Lookback Time B** (Single Scan) ( See Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan)
- Configuring **Lookback Time A/ Lookback Time B** (Multi-Zone Scan) ( See Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters)
- Configuring **Lookback Time A/ Lookback Time B** (List Scan) ( See Radio Configuration > Global Options > Scan > List Scan > Parameters)

Temporary Delete/Add

A Priority Channel is always scanned regardless of the Scan Delete/Add configuration. If this function is enabled, pressing the **Scan Delete/Add** button temporarily deletes a Priority Channel from the target channels for scan when the scan pauses on the Priority Channel during the scan.

Configuration using KPG-D3/ D3N

- Configuring **Temporary Delete/Add** (Single Scan) to be enabled or disabled ( See Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan > Priority Scan > Priority 1,2)
- Configuring **Temporary Delete/Add** (Multi-Zone Scan) to be enabled or disabled ( See Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters > Priority Scan > Priority 1,2)
- Configuring **Temporary Delete/Add** (List Scan) to be enabled or disabled ( See Radio Configuration > Global Options > Scan > List Scan > Parameters > Priority Scan > Priority 1,2)

Scan Normal Channel

Scan Normal Channel is the function to execute the scan by disabling the Priority Channel configuration even if a Priority Channel is configured.

Even if the Priority Channel is configured, pressing the **Scan Normal** button disables the configuration and mandatorily executes Scan Normal Channel.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

11.6 Scanning the Tactical Zone (Tactical Zone Scan)

Tactical Zone Scan is the function to scan the channels in the Tactical Zone.

Only Single Scan is available as the scan function in the Tactical Zone. If a scan starts in the Tactical Zone where “Single-Zone” is configured in **Scan Type**, Single Scan is executed. A scan can be started in the Tactical Zone where two or more channels are registered.

For the channels registered in the Tactical Zone, **Scan Add** is always enabled and the “” icon appears regardless of the configuration in **Scan Add** of the original channel.

Operating the transceiver

1 Press the **Scan** button in the Tactical Zone.

The scan starts after a Button Beep A (1 beep) sounds from the transceiver.

The “” icon appears.

If **Revert Channel Display** is enabled, Revert Channel is displayed.

On the portable transceiver, the LED flashes according to the configuration of **Non-Priority Scan LED** if it is not a priority scan, and according to the configuration of **Priority Scan LED** if it is a priority scan.



2 Press the **Scan** button during the scan.

The scan completes after a Button Beep B (2 beeps) sounds from the transceiver and the “” icon disappears.



 Note

- The scan starts automatically if **Auto Scan** has already been enabled for the channel selected in the Tactical Zone. However, if “None” is configured in **Scan Type**, the scan does not start automatically even if **Auto Scan** has already been enabled for the channel selected in the Tactical Zone.
- The button operations related to the following scan functions do not work in the Tactical Zone:
 - Scan Delete/Add
 - Zone Delete/Add
 - Scan Program
- The Tactical Zone channels can be deregistered by operating the **Tactical Zone** button while the scan is paused. However, if the number of channels registered in the Tactical Zone is 2 channels, the deregistration cannot be executed because the condition for starting the scan cannot be satisfied when further deregistration occurs.
- For Portable, the scan is paused if an unprogrammed zone is selected by operating the **Selector** with “Zone Select” configured while Tactical Zone Scan is executed.
- If the zone is changed during Tactical Zone Scan, the scan starts according to the configuration in **Scan Type** of the new zone.

Configuration using KPG-D3/ D3N

- Assigning functions to the **PF** buttons on the transceiver ( **See** Radio Configuration > Global Options > Button Assignment)
- Configuring **Scan Type** ( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan)

Behavior of the Transceiver Migrating to the Home Channel during the Scan

If the transceiver migrates to the Home Channel from the Tactical Zone by pressing the **Home Channel** button during the scan, the scan is paused in the Home Channel.

If the transceiver returns to the original channel by pressing the **Home Channel** button again, the scan resumes. If the scan is started after the transceiver migrates to the Home Channel from the Tactical Zone, the scan starts after the transceiver returns to the previous Tactical Zone channel.

Behavior of the Transceiver Migrating to the Direct Channel during the Scan

The transceiver behaves as follows according to the configuration in **Return** if the transceiver migrates to the Direct Channel by pressing one of the **Direct Channel 1** button to **Direct Channel 5** button during the scan:

- **If Return is enabled**

The transceiver migrates to the Direct Channel and the scan is paused. If the transceiver returns to the original channel by pressing one of the **Direct Channel 1** button to **Direct Channel 5** button again, the scan resumes.

- **If Return is disabled**

The transceiver migrates to the Direct Channel and the scan starts.

The transceiver behaves as follows according to the configuration in **Return** if the scan starts after the transceiver migrates to the Direct Channel:

- **If Return is enabled**

The scan starts after the transceiver returns to the previous Tactical Zone channel.

- **If Return is disabled**

The scan starts on the Direct Channel to which the transceiver migrates.

11.7 Scanning the Target Group IDs for Scanning Automatically (LTR Background Scan) (LTR Trunking System Only)

LTR Background Scan is a function that automatically scans all target Group IDs for scanning in the selected LTR Trunking system.

It automatically scans, within the same zone, all target Group IDs for scanning within the same system as the selected Group ID. For example, if GID 4 is selected in a zone that is configured as follows, the Group IDs (GID 1, GID 4, GID 5) within the same system (LTR Sys 1) will be the targets for scanning.

Zone 1		
GID 1	LTR Sys 1	GR 11
GID 2	LTR Sys 2	GR 21
GID 3	LTR Sys 2	GR 22
GID 4	LTR Sys 1	GR 12
GID 5	LTR Sys 1	GR 13
GID 6	LTR Sys 2	GR 23

The following Group IDs are targeted to be scanned:

- The Group ID registered to be scanned using KPG-D3/ D3N
- Group ID added using the **Scan Delete/Add** button

Note

- To use **LTR Background Scan**, **LTR Background Scan** needs to be enabled using the KPG-D3/ D3N.
- **LTR Background Scan** does not function if “None” or “List” is configured in **Scan Type** (Zone Edit).
- It is not necessary to press the **Scan** button to initiate **LTR Background Scan**.
- The behavior of the transceiver varies as follows in the case of **LTR Background Scan** as compared to scanning that is executed by pressing the **Scan** button.
 - During **LTR Background Scan**, the Group ID displayed becomes the Revert Channel of the transceiver. During scanning by pressing the **Scan** button, the transceiver follows the configuration of Revert Channel configured using the KPG-D3/ D3N. (Refer to [Revert Channel](#).)
 - Priority channels are not scanned while **LTR Background Scan** is in progress. Priority channels are also scanned when scanning is executed by pressing the **Scan** button.

Configuration using KPG-D3/ D3N

Configuring **LTR Background Scan** to be enabled or disabled ( **See** Radio Configuration > Global Options > Scan > General > Option)

11.8 Transceiver Behavior during the Scan

This section describes various behaviors of the transceiver during the scan.

Note

- The length of time from when the transceiver pauses the scan for transmission or reception until the transceiver resumes the scan can be configured using **Dropout Delay Time** and **Dwell Time**. (Refer to [Dropout Delay Time](#), [Dwell Time](#).)

Transceiver Behavior When a Zone-channel Is Changed during the Scan

- If the zone-channel is changed using the following button operation during a scan, the transceiver behaves as described in a) or b) according to the configuration of **Revert Channel Display**.
 - Channel Up** button
 - Channel Down** button
 - Zone Up** button
 - Zone Down** button
 - Channel Up/Down** button
 - Zone Up/Down** button
 - When **Revert Channel Display** is disabled and “Scan” appears on the display
 - Scan pauses on the selected zone-channel.
 - After a second elapses, the scan resumes.
 - When **Revert Channel Display** is enabled and the Revert Channel appears on the display
 - Scan pauses on the selected channel if the Revert Channel is different from the selected channel.
 - If Revert Channel is the same as the selected channel, the zone-channel is changed and scan pauses on the migrated zone-channel.
 - After a second elapses, the scan resumes.
- If the Zone-channel is changed during the scan by the following button operations, the Zone-Channel is changed according to the **Selector** position regardless of the configuration of **Revert Channel Display**:
 - Channel Select** button
 - Zone Select** button
 - Zone-Channel** button
- If a Zone-channel is changed manually while the scan pauses for reception, and if the channel where the scan is paused is different from the selected channel, the scan pauses on the selected channel.

Note

- As the **Revert Channel Display** configuration does not exist on a portable transceiver (basic model), the transceiver always behaves as described in b).

Reception Behavior during the Scan in an Analog Conventional System

The following are the reception behaviors during the scan in an Analog Conventional system:

● QT/DQT Behavior

The transceiver receives the QT tone or DQT code at each channel, and if it matches the QT tone or DQT code preconfigured for the transceiver, the transceiver pauses scanning. **Dropout Delay Time** is activated if the QT tone or DQT code does not match. After the time configured in **Dropout Delay Time** elapses, the transceiver resumes the scan.

● QT/DQT - Optional Signaling OR behavior

If the transceiver receives the QT tone or DQT code and it matches the QT tone or DQT code preconfigured for the transceiver, the transceiver pauses scanning. The transceiver emits the received audio from the speaker and then waits to receive Optional Signaling.

The transceiver stops emitting the received audio and resumes scanning after the amount of time configured in **Dropout Delay Time** elapses if the QT tone or DQT code matching state becomes inconsistent while waiting to receive the Optional Signaling.

If the scan pauses when the Optional Signaling is received and it matches the Optional Signaling configured for the transceiver, the pause status continues even if the Optional Signaling is reset.

Reception Behavior during the Scan in an LTR Trunking System

While the transceiver scans in an LTR Trunking system, the transceiver will receive as follows:

Transceiver Behavior by Group ID

The transceiver pauses scanning when the decoded Group ID matches the Group ID to be scanned. **Dropout Delay Time** is activated if the decoded Group ID does not match the Group ID preconfigured for the transceiver. After the time configured in **Dropout Delay Time** elapses, the transceiver resumes the scan.

LTR ID - Optional Signaling AND behavior

The transceiver pauses scanning when the decoded LTR ID matches the LTR ID to be scanned. The transceiver does not emit the received audio and then waits to receive an Optional Signaling.

The transceiver resumes scanning after the amount of time configured for **Dropout Delay Time** elapses if the decoded LTR ID matching state is reset while waiting to receive the Optional Signaling.

The transceiver starts up Alert, Transpond or others and sounds the received audio from the speaker when the received Optional Signaling matches the Optional Signaling preconfigured for the transceiver while waiting to receive Optional Signaling.

The transceiver stands by for the LTR ID after the Optional Signaling matches.

Note

- The transceiver will migrate to the LTR ID having the higher priority level when the transceiver receives an LTR ID having a higher priority level than the current LTR ID in an LTR Trunking system.

11.9 Scan Function

The following functions are relevant to the scan.

- Scan Delete/Add
- Zone Delete/Add
- Revert Channel
- Dropout Delay Time
- Dwell Time
- Channel Recall
- Priority-channel Stop Tone
- Auto Scan
- Selected Channel Scan
- Power-on Scan
- Off-hook Scan (Mobile Only)
- Scan Stop Tone

Adding or Deleting a Channel to/from the Target Channels for Scan (Scan Delete/Add)

Scan Delete/Add is the function to add a channel to be scanned to the Scan List or delete a channel to be scanned from the Scan List.

This function is used to reliably receive a call from a primary channel by deleting unnecessary channels to increase the scan speed.

The following are the transceiver behavior:

● When Scan is disabled

For a zone with “Single-Zone” or “Multi-Zone” configured in Scan Type:

Pressing the **Scan Delete/Add** button can add the selected channel to the target channels for scan or delete the selected channel from the target channels for scan. The Scan Delete/ Add information is retained in the transceiver.

For a zone with “List” configured in Scan Type:

Pressing the **Scan Delete/Add** button can add the selected channel as a member to the Scan List configured for the selected channel, or delete the channel from the Scan List configured for the selected channel. The Scan Delete/ Add information is retained in the transceiver.

● When the scan is paused

For a zone with “Single-Zone” or “Multi-Zone” configured in Scan Type:

Pressing the **Scan Delete/Add** button can add the selected channel temporarily to the target channels for scan or delete the selected channel temporarily from the target channels for scan (Temporary Delete/ Add). This status is retained until the scan is terminated by operations such as pressing the **Scan** button, and the status is cleared when the scan completes.

For a zone with “List” configured in Scan Type:

Pressing the **Scan Delete/Add** button temporarily deletes a selected channel if the selected channel is registered as a member of Scan List, and pressing the **Scan Delete/Add** button again restores the selected channel (Temporary Delete/ Add). This status is retained until the scan is terminated by operations such as pressing the **Scan** button, and the status is cleared when the scan completes.

● During the scan

Pressing the **Scan Delete/Add** button causes a Button-entry Error Tone (1 beep) to sound from the transceiver but the transceiver does not respond at all.

 Note

- The operation above is enabled even if the transceiver enters Menu Mode by pressing the **Menu** button and then executes “Scan Delete/Add”. (Refer to Common Function Part [Using Menu Mode.](#))
- For the zone with “List” configured in Scan Type, a target channel for scan can be added or deleted in Scan Program Mode. (Refer to [Changing the Scan List \(Scan Program\).](#))

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( **See** Radio Configuration > Global Options > Button Assignment)

Adding or Deleting a Zone to or from the Target Zones for Scanning (Zone Delete/Add)

Zone Delete/Add is the function to add a zone to the target zones for scanning or delete a zone from the target zones for scanning when using Single Scan or Multi-Zone Scan.

For Multi-Zone Scan, this function is used to increase the scan speed and reliably receive a call from a primary zone by deleting unnecessary zones.

Pressing the **Zone Delete/Add** button adds or deletes a zone to or from the target zones for scanning.

Or, a zone can be added to or deleted from the target zones for scanning by executing “Zone Delete/Add” after entering Menu Mode by pressing the **Menu** button. (Refer to Common Function Part [Using Menu Mode.](#))

 Note

- For Single Scan, only zones structured with a Conventional system or an LTR Trunking system can be added to or deleted from the target zones for scanning.
- If there is only one target zone left while Multi-Zone Scan pauses, the zone cannot be deleted from the target zones even if Zone Delete/Add is executed.
- Even if Zone Delete/Add is executed while the scan other than Multi-Zone Scan pauses, the selected zone cannot be deleted from the target zones.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( **See** Radio Configuration > Global Options > Button Assignment)

Revert Channel

Revert Channel is the Zone-channel which is used when the transceiver transmits by pressing the **PTT** switch during the scan.

Table 11-4 Revert Channel

Configuration	Description
Last Called + Selected	The transceiver transmits on the last-called Zone-channel by pressing the PTT switch during the scan. The transceiver transmits on the Zone-channel where the transceiver pauses the scan by pressing the PTT switch during the scan. If the Zone-channel is changed, the transceiver transmits using the new channel after the Zone-channel is changed until the transceiver receives another call.
Selected	The transceiver transmits on the new channel after the Zone-channel is changed regardless of the scan status.
Selected + Talkback	During the scan, the transceiver transmits on the new Zone-channel after the zone-channel is changed. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.
Priority 1	The transceiver transmits on a Priority 1 regardless of the scanning status.
Priority 1 + Talkback	The transceiver transmits on a Priority 1 during the scan. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.
Priority 2	The transceiver transmits on a Priority 2 regardless of the scanning status.
Priority 2 + Talkback	The transceiver transmits on a Priority 2 during the scan. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.

Note

- Revert Channel is displayed according to the configuration of **Revert Channel Display**. **Revert Channel Display** cannot be configured on a portable transceiver (basic model).
- If Home Channel is activated, the transceiver transmits on the Home Channel regardless of the configuration in **Revert Channel**.
- If the Direct Channel function (Return = Check) is activated, the transceiver transmits on the Direct Zone-Channel regardless of the configuration in **Revert Channel**.

Configuration using KPG-D3/ D3N

- Configuring **Revert Channel** (Single Scan) ( **See** Radio Configuration > Zone/Channel > Zone/Channel > Zone Parameters > Scan > Single-Zone Scan)
- Configuring **Revert Channel** (Multi-Zone Scan) ( **See** Radio Configuration > Global Options > Scan > Multi-Zone Scan > Parameters)
- Configuring **Revert Channel** (List Scan) ( **See** Radio Configuration > Global Options > Scan > List Scan > Parameters)

Dropout Delay Time

Dropout Delay Time is the time from when the transceiver finishes receiving signals until the transceiver resumes scanning. The transceiver pauses scanning when the transceiver receives a call during the scan. The transceiver resumes the scan when the time configured in **Dropout Delay Time** elapses after the transceiver finishes receiving.

The following are conditions to resume scanning:

- There is no signal to receive.
- The matching state of the QT/DQT becoming inconsistent

The transceiver activates Talkback according to the configuration in **Revert Channel** while the time configured in **Dropout Delay Time** elapses.

If the scan is paused while the time configured in **Dropout Delay Time** elapses, and if the channel is not the Priority Channel 1 or Priority Channel 2, the Priority Channel 1 and Priority Channel 2 are monitored by executing Lookback.

Configuration using KPG-D3/ D3N

Configuring **Dropout Delay Time** ( See Radio Configuration > Global Options > Scan > General > Timer)

Dwell Time

During the scan, the scan pauses when the **PTT** switch is pressed to transmit. **Dwell Time** is the time from when the transceiver completes transmitting until the transceiver resumes scanning.

The transceiver activates Talkback according to the configuration in **Revert Channel** while the time configured in **Dwell Time** elapses.

If the scan is paused while the time configured in **Dwell Time** elapses, and if the channel is not the Priority Channel 1 or Priority Channel 2, the Priority Channel 1 and Priority Channel 2 are monitored by executing Lookback.

Configuration using KPG-D3/ D3N

Configuring **Dwell Time** ( See Radio Configuration > Global Options > Scan > General > Timer)

Channel Recall

Channel Recall is the function to migrate to the last called Zone-channel by pressing the **Channel Recall** button during the scan.

Even if a user is away from the transceiver, the user can notice later that the transceiver has received a call during the scan.

Note

- If the **Channel Recall** button is pressed while no signal is received after scan starts, the transceiver migrates to the channel from which the transceiver started scanning.
- If **Channel Recall** is enabled, the transceiver does not resume the scan even if the time configured in **Dropout Delay Time** or **Dwell Time** elapses.
- **Channel Recall** is disabled if the channel is changed while **Channel Recall** is enabled. The transceiver resumes scanning after the Key Delay Time elapses (1 sec).
- The transceiver does not execute Lookback while **Channel Recall** is enabled.
- If the scan is paused with **Channel Recall** and **Scan Stop Tone** enabled, the Scan Stop Tone (2 beeps) sounds from the transceiver at 30-sec intervals.
- The channel to which the transceiver migrated using **Channel Recall** is not configured as the Selected Channel.
- Even if **Channel Recall** is enabled, the transmission using GPS Auto is executed by **Revert Channel**.

Configuration using KPG-D3/ D3N

Assigning functions to the **PF** buttons on the transceiver ( See Radio Configuration > Global Options > Button Assignment)

Priority-channel Stop Tone

Priority-channel Stop Tone is the function to emit a Priority-channel Tone (1 beep) from the transceiver when the scan pauses upon receipt of a signal and the speaker is unmuted on a Priority Channel during the scan.

Configuration using KPG-D3/ D3N

Configuring **Priority-channel Stop Tone** to be enabled or disabled ( See Radio Configuration > Global Options > Scan > General > Indicator)

Auto Scan

Auto Scan is the function to start the scan automatically by selecting the channel with **Auto Scan** enabled.

Whether to enable or disable **Auto Scan** can be configured for each channel. The scan on a channel where **Auto Scan** is enabled cannot be stopped. The scan starts unconditionally if the transceiver migrates to a channel with **Auto Scan** enabled.

Note

- Whether to enable or disable **Auto Scan** can be configured for each Personality.
- When the transceiver migrates to a channel where **Auto Scan** is enabled, the scan pauses if the conditions for starting the scan are not satisfied.
- If the transceiver migrates to a channel where **Auto Scan** is enabled after the scan is started by pressing the **Scan** button, the scan cannot be terminated even if the **Scan** button is pressed.
- In a zone where “None” is configured in Scan Type, the scan does not start even if the transceiver migrates to a channel with **Auto Scan** enabled.

Configuration using KPG-D3/ D3N

Configuring **Auto Scan** (Analog Conventional) to be enabled or disabled

( **See**) Radio Configuration > System Properties > Systems > Analog Conventional > Personalities > General)

( **See**) Radio Configuration > System Properties > Systems > LTR Trunking > Personalities > General)

Selected Channel Scan

Selected Channel Scan is the function to add the selected channel to the target channels for scan even if the channel is excluded from the target.

Configuration using KPG-D3/ D3N

Configuring **Selected Channel Scan** to be enabled or disabled ( **See**) Radio Configuration > Global Options > Scan > General > Option)

Power-on Scan

Power-on Scan is the function to start the scan automatically when the transceiver is turned ON.

Portable

If “Zone Select” is configured in **Selector**, the transceiver starts the scan according to the configuration in **Scan Type** for the zone number indicated by the pointer of **Selector** when the transceiver is turned ON. If the zone number indicated by the pointer of the **Selector** is not configured for the transceiver, the scan does not start.

If anything other than “Zone Select” is configured in **Selector**, the transceiver starts the scan according to the configuration in **Scan Type** for the zone selected when the transceiver is turned ON.

Mobile

The transceiver starts the scan according to the configuration in **Scan Type** for the zone selected when the transceiver is turned ON.

Configuration using KPG-D3/ D3N

Configuring **Power-on Scan** to be enabled or disabled ( **See**) Radio Configuration > Global Options > Scan > General > Option)

Starting Scanning by Linking with the Microphone (Off-hook Scan)

Supported Models: Mobile

Off-hook Scan is the function to start scanning regardless of the microphone hook status.

The transceiver scans as follows according to the configuration in **Off-hook Scan**:

Table 11-5 Off-hook Scan

Configuration	Description
Enabled	Pressing the Scan button causes the transceiver to start scanning regardless of the microphone on- or off-hook state.
Disabled	If the microphone is in the on-hook state, pressing the Scan button causes the transceiver to start scanning; however if the microphone is in the off-hook state, the transceiver cannot start scanning. If the microphone changes from the on-hook state to off-hook state in Scan Mode, the scan pauses on the Revert Channel. When the microphone goes to on-hook state, the transceiver resumes scanning. However, if the microphone goes to on-hook state when the audio sounds, the transceiver continues the audio output status without resuming the scan. Thereafter, the transceiver resumes the scan when the signal disappears and the time configured in Dropout Delay Time elapses.

Note

- On-hook indicates the state that the microphone is hooked. Off-hook indicates the state that the microphone is not hooked.

Configuration using KPG-D3/ D3N

Configuring **Off-hook Scan** to be enabled or disabled ( See Radio Configuration > Global Options > Scan > General > Option)

Scan Stop Tone

Scan Stop Tone is a function that emits the Scan Stop Tone (2 beeps) from the transceiver if the scan pauses and is unable to resume, such as when the transceiver migrates to a Home Channel or Direct Channel.

The transceiver pauses scanning if the conditions to start the scan are not satisfied, such as while the transceiver is migrating to a Home Channel or Direct Channel, and then a Scan Stop Tone (2 beeps) sounds from the transceiver at 30-sec intervals.

Note

- The Scan Stop Tone (2 beeps) does not sound while the transceiver is transmitting or while the speaker is unmuted for reception.

Configuration using KPG-D3/ D3N

Configuring **Scan Stop Tone** to be enabled or disabled ( See Radio Configuration > Global Options > Scan > General > Indicator)

Data communications are available for the transceiver by using the various functions of FleetSync, or using an external device connected to the transceiver.

12.1 Prioritizing Data Communications Using an External Device (Data Override)

Data Override is the function that allows prioritization of data communication using an external device even if the communication is made by a user operating the transceiver.

This function is used to send GPS data periodically even during reception.

The transceiver behaves as follows according to the configuration in **Data Override**:

Table 12-1 Data Override

Configuration	Description
Enabled	Data communications using an external device has a high priority level. Data Override is activated when the following AUX Input ports (Mobile only) are activated and when the transceiver receives a PC command from the serial port: • External PTT (Data) • Data PTT • DTC • Channel Select A to Channel Select D When Data Override is activated, the transceiver automatically exits the following statuses: • Function Mode • Public Address Mode (Mobile only) • The state when the transceiver temporarily migrates to a channel by pressing one of the Direct Channel 1 to Direct Channel 5 buttons, Home Channel button, or Channel Recall button
Disabled	The transceiver key control has the priority. The transceiver suspends the transmission even if the transceiver receives the above data transmission request from an external device.

Note

- While the transceiver is under the following conditions, **Data Override** is not activated:
 - While the transceiver is transmitting (including while a link is established in an LTR Trunking system)
 - While transmitting with the Public Address function (Mobile only)
 - While External PTT (PA) is active (Mobile only)
 - While the transceiver is in Emergency Mode
 - In Transceiver Password Mode
 - In the Stun state

Configuration using KPG-D3/ D3N

- Configuring **Data Override** to be enabled or disabled ( See Radio Configuration > Global Options > External Device > General > Serial Interface)
- Configuring **Data Override** to be enabled or disabled ( See Radio Configuration > Global Options > External Device > Mobile AUX > AUX Input)

12.2 Overlaying QT/DQT during Data Transmission (Data Transmit with QT/DQT)

Data Transmit with QT/DQT is a function for overlaying the QT tone or DQT code configured for the channel during data transmission.

This function is available on the channels that send a Status Message, Short Message or Long Message. It is also used during data transmission using an external device.

When a QT tone or DQT code is used, such as on a repeater, enabling this function makes it possible to transmit data by overlaying the QT tone or DQT code.

When audio and data transmission are carried out concurrently on the same channel, you can disable this function to transmit data without overlaying the QT tone or DQT code to make the audio sound transmitted inaudible during data transmission.

Configuration using KPG-D3/ D3N

Configuring **Data Transmit with QT/DQT** to be enabled or disabled

( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications)

( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications)

( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications)

( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications)

( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications)

12.3 Restricting the Warning Display during Data Communications (Silent Report)

Silent Report is the function to configure whether the transceiver transmits in standby display state without emitting the Alert Tone and flashing or lighting the LED, when sending and receiving the status and GPS data.

This function is used to keep a user from noticing the data communication request from a base station and GPS data transmission.

If this function is enabled, the LCD display, the LED display, and emitting the Alert Tone during data communications can be restricted as follows:

- The display during data communications (such as “Send Data”, “Complete”, “Busy”, and “No Reply”) is not displayed.
- The LED does not light or flash during data transmission.
- The Alert Tone, Control Tone, or Warning Tone is not emitted.

This function can be used for the following communications in a FleetSync system:

- AUX Input Status Message transmission (Mobile Only)
- Status transmission on receipt of Status Request
- GPS transmission by GPS Combination (Status)
- Automatic GPS data transmission
- GPS transmission by GPS Polling reception
- GPS transmission by GPS Distance Change (Automatic GPS transmission, GPS Combination (Status))



- **Silent Report** is not applied when the transceiver receives a Status Request or receives GPS Polling.

Configuration using KPG-D3/ D3N

Configuring **Silent Report** to be enabled or disabled (See Radio Configuration > Global Options > Basics > General > Data Communications)

12.4 Transparent

Transparent is the function that allows data communications using the FleetSync protocol. This function can be used by connecting a PC, card reader or telemetry devices to the transceiver. Using this function, the transceiver can send or receive data without limiting the data type. This function can be used without operating the transceiver. All operations are controlled by data from other devices.

Using this function, a PC connected to the receiving transceiver can decode the transmitted bar-code data, for instance, while the bar-code reader is connected to a PC on the transmitting transceiver to transmit the bar-code data.

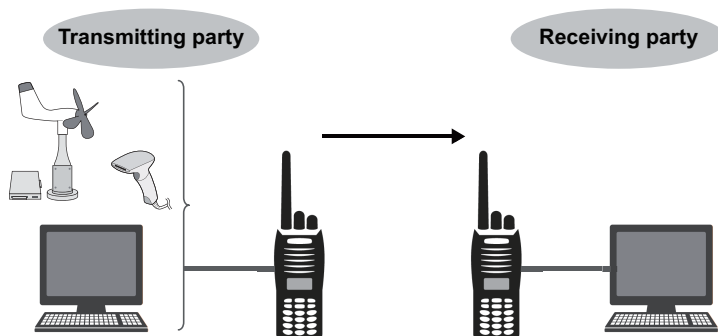


Figure 12-1 Image of Transparent

Data communications using Transparent can be used to send or receive the ASCII characters of 0x00 to 0xFF without any restriction.

In addition, data communications using Transparent supports baud rates of 1200 bps, 2400 bps, 4800 bps, 9600 bps and 19200 bps. (Refer to Common Function Part [COM Port Functions](#).)

Note

- To use this function, "Transparent" must be assigned to the communication port connecting the transceiver and an external device by using KPG-D3/ D3N.

Behavior of the transmitting transceiver

The ASCII characters from 0x00 to 0xFF can be sent or received.

The communication port of the transceiver assigned “Transparent” sends the received data automatically using the FleetSync protocol if the received data size exceeds 80 bytes upon the receipt of data from an external device.

The transceiver automatically sends the received data if the transceiver does not receive any data for a duration sufficient to receive 16 characters after receiving the last data.

The transmitting transceiver transmits over the Air when the data time elapses in the following way:

- **If a baud rate of 19200 and 1 stop bit are configured for the PC and transmitting transceiver:**

When a duration equal to or more than $1/19200 \times 10 \times 16 = 8.3$ ms elapses

- **If a baud rate of 9600 and 2 stop bit are configured for the PC and transmitting transceiver:**

When a duration equal to or more than $1/9600 \times 11 \times 16 = 18.3$ ms elapses

The maximum data capacity for the receive buffer of the transmitting transceiver in order to receive data from a PC is limited to 1024 bytes. If transmit speed and reception from a PC is unbalanced and the overflowing received data exceeds 1024 bytes, the excessive data will be ignored.

If the transceiver receives the 1024 bytes of data while the transceiver is configured for which the RTS and CTS ports are available, the transceiver starts the flow control to an external device. (Refer to Common Function Part [Available Functions for COM Port.](#))

The transceiver can control not to overflow from the buffer the data sent from the external device as soon as the transceiver has started the flow control, so that the transceiver can receive the 2048 bytes of data. In the RTS and CTS ports, the data communications with an external device are controlled as follows.

RTS:

When the buffer of the transceiver for serial communications becomes full, the status of the RTS port will be the low level (-8 V). Pin No. 8 (15-pin connector on the rear panel)

CTS:

When the status of the CTS port becomes the low level (-8 V), the serial data will not be sent from the transceiver. Pin No. 9 (15-pin connector on the rear panel)

Note

- Portable does not support the RTS/ CTS flow control.

Transceiver behavior

A device sends data to the transceiver.

The communication port of the transceiver assigned “Transparent” automatically starts transmitting if the received data size reaches 80 bytes.



“Complete” appears for 1 sec when the transmission completes, and the transceiver restores the previous display.



If the transceiver cannot send data since the channel is busy, the Busy Tone 2 (3 beeps) sounds and “Busy” appears for 1 sec, and then the transceiver restores the previous display.



Behavior of the receiving transceiver

The transceiver which receives the Transparent data from the transceiver for which “Transparent” is assigned to its communication port sends the data received from the communication port to which “Transparent” is assigned.

If the Header function is enabled using KPG-D3/ D3N, the transmitting transceiver’s ID information is automatically added to the beginning of the transmission data. When another transceiver receives the data, the ID information can easily be identified. (Refer to [Transparent Header](#).)

Transceiver behavior

The transceiver receives data.



“Complete” appears for 1 sec when the reception completes, and then the transceiver restores the previous display.



Timing for Sending and Receiving Data

The following assumes that 250 bytes of Transparent Data are sent from a PC to the transmitting transceiver. The following is the block diagram if the parameters are configured as below.

- Transmit Delay Time: 100 ms
- Data Transmit Modulation Delay Time: 400 ms
- Data Preamble Extension Time: 50 ms
- Transparent Header: Enable

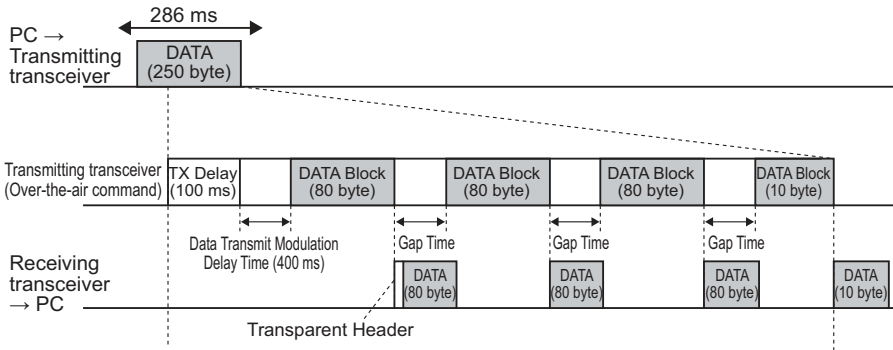


Figure 12-2 Timing for Sending and Receiving Data

The length of time configured for **Data Transmit Modulation Delay Time** applies to the Gap Time in an Analog Conventional system. However, if the time configured for **Data Transmit Modulation Delay Time** is equal to or less than 10 ms, the Gap Time is a fixed value (10 ms).

Transparent

The following functions are relevant to data communications using Transparent:

- Transparent Header
- COM port Priority
- Transparent on Data System-personality

Transparent Header

Transparent Header is the function to send the KENWOOD proprietary sentence to an application which is used during data communications using Transparent.

The Header is sent for data sent first. Transparent Data is sent after sending the Header.

The application software may be able to recognize from where the data is sent by analyzing this Header information.

Configuration using KPG-D3/ D3N

Configuring **Transparent Header** ( See Radio Configuration > Protocol Options > FleetSync > General > RX Options > Serial Output)

COM port Priority

The transceiver can make data communications if “Data”, “Data + GPS Data Output”, “Data + Location Data Output”, “Transparent”, or “Transparent (Digital)” is assigned to its communication port. COM port Priority can be used to improve the reliability of the communication between a PC and the transceiver.

Table 12-2 COM port priority

Configuration	Description
Serial Data	Transparent Data sent from a PC has the higher priority level. If the PC that is connected using a serial port sends Transparent data while the transceiver is receiving data over the Air, the transceiver stops receiving data over the Air and then immediately start sending Transparent data.
Receiving Data	Receiving over the Air has the higher priority level. If the PC that is connected using a serial port sends Transparent data while the transceiver is receiving data over the Air, the transceiver does not send Transparent data until the transceiver completes receiving data over the Air.

Configuration using KPG-D3/ D3N

Configuring **COM port Priority** ( See Radio Configuration > Global Options > External Device > General > Serial Interface)

Transparent on Data System-personality

Transparent on Data System-personality is the function that allows the transceiver to automatically change the channel to **Data System-personality** to send Transparent data.

The transceiver automatically changes the transmission channel to the channel configured in **Data System-personality** when transmitting Transparent data. When the transmission ends, the transceiver restores the Zone-channel used before sending the Transparent data. **Transparent on Data System-personality** can be used for data communications on a specific dedicated channel.

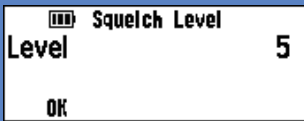
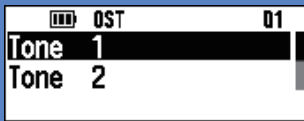
Note

- This function is enabled if “Personality” is configured in **Zone-channel Format** by using KPG-D3/ D3N.

Configuration using KPG-D3/ D3N

- Configuring **Transparent on Data System-personality** to be enabled or disabled
- Configuring **Data System-personality**
 - ( **See** Radio Configuration > System Properties > Systems > Analog Conventional > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > Analog Voting/Analog Voting with Signaling > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > LTR Trunking > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > NXDN Conventional > Analog > FleetSync > Data Communications > Data System-personality)
 - ( **See** Radio Configuration > System Properties > Systems > DMR Conventional > Analog > FleetSync > Data Communications > Data System-personality)

Button operations for selecting a list or entering characters are described for each mode in this chapter. Refer to Common Function Part “[Operating the Transceiver in Each Mode \(Common Operation\)](#)” for instruction.

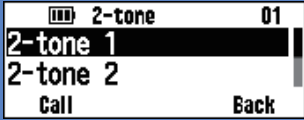
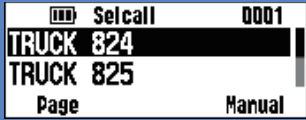
Button		Squelch Level	OST Mode
		Configuring the Level	Selecting a list
			
Menu ([M]) ^{*1}	Press	Determines the Squelch Level and then aborts the current mode.	-
	Hold Down	-	-
Back ([B]) ^{*1}	Press	-	-
	Hold Down	-	-
Function ([F]) ^{*2}	Press	The configured function functions.	
	Hold Down	-	
Home ([H]) ^{*1}	Press	Determines the Squelch Level and then aborts the current mode.	Aborts the current mode.
	Hold Down	Determines the Squelch Level and then restores the previous display (if the transceiver enters this mode by a user pressing the Menu button).	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
Side 1 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
Side 2 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
[▲]/[▼] ^{*1}	Press	Selects Squelch Level one at a time.	Selects QT/DQT Decode/ Encode pairs from those configured in the OST List one at a time.
	Hold Down	Selects Squelch Level continuously.	Selects multiple QT/DQT Decode/ Encode pairs in succession from those configured in the OST List.
[◀] ^{*1}	Press	-	-
	Hold Down	-	-
[▶] ^{*1}	Press	-	-
	Hold Down	-	-
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	-	Selects QT/DQT Decode/ Encode pairs from the OST List directly.
[*] ^{*4}	Press	Determines the Squelch Level and then aborts the current mode.	-
	Hold Down	-	-
[#] ^{*4}	Press	-	-
	Hold Down	-	-
PTT Switch	Press	Transmits after aborting the current mode.	

^{*1} Portable (Full Key Model/ Standard Key Model)/ Mobile only

^{*2} Portable (Full Key Model/ Standard Key Model) only

^{*3} Portable only

^{*4} Portable (Full Key Model)/ Mobile only

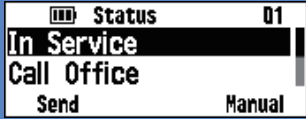
Button		2-tone Mode	Selcall Mode (FleetSync)
			Selecting a list 
Menu ([M]) ^{*1}	Press	Transmits after aborting the current mode.	Initiates a Paging Call after aborting the current mode.
	Hold Down	-	-
Back ([B]) ^{*1}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Migrates to the code entry mode (only if Manual Dialing is enabled).
	Hold Down	-	-
Function ([F]) ^{*2}	Press	The configured function functions.	
	Hold Down	-	
Home ([H]) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
Side 2 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
[▲]/[▼] ^{*1}	Press	Selects a 2-tone code one at a time.	Selects Fleets/ IDs configured in the ID List one at a time.
	Hold Down	Selects 2-tone codes in succession.	Selects multiple Fleets/ IDs configured in the ID List in succession.
[◀] ^{*1}	Press	-	
	Hold Down	-	
[▶] ^{*1}	Press	-	Migrates to Status Mode or Short Message Mode.
	Hold Down	-	
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Directly selects a 2-tone code registered in the list.	Directly selects a Fleet/ ID registered in the ID List.
[*] ^{*4}	Press	Transmits after aborting the current mode.	Initiates a Paging Call after aborting the current mode.
	Hold Down	-	
[#] ^{*4}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Migrates to the code entry mode (only if Manual Dialing is enabled).
	Hold Down	-	
PTT Switch	Press	Transmits after aborting the current mode.	

*1 Portable only (Full Key Model/ Standard Key Model)/ Mobile only

*2 Portable only (Full Key Model/ Standard Key Model) only

*3 Portable only

*4 Portable only (Full Key Model)/ Mobile only

Button		Selcall Mode (FleetSync)	Status Mode
		Manual entry 	Selecting a list 
Menu ([) ^{*1}	Press	Initiates a Paging Call after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)	Transmits the status after aborting the current mode.
	Hold Down	-	-
Back ([) ^{*1}	Press	Deletes one character. Migrates to the list selection mode. (Before entering Digit No.)	Migrates to the status entry mode (only if Manual Dialing is enabled).
	Hold Down	Deletes all characters.	-
Function ([) ^{*2}	Press	The configured function functions.	
	Hold Down	-	
Home ([) ^{*1}	Press	Aborts the current mode after determining the Digit No.	Aborts the current mode.
	Hold Down	Confirms the Digit No. and returns to the menu (if the transceiver enters this mode by a user pressing the Menu button).	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
Side 1 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
Side 2 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
[ *1	Press	Selects Digit No. one at a time.	Selects statuses registered in the Status ID List one at a time.
	Hold Down	Selects Digit No. continuously.	Selects statuses registered in the Status ID List continuously.
[ *1	Press	-	Migrates to Selcall Mode.
	Hold Down	-	
[ *1	Press	Migrates to Status Mode or Short Message Mode.	-
	Hold Down	-	
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Enter a Fleet/ ID.	Directly selects a status registered in the list.
[*] ^{*4}	Press	Initiates a Paging Call after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)	Transmits the status after aborting the current mode.
	Hold Down	-	
[#] ^{*4}	Press	Deletes one character. Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the Menu button).	Migrates to the status entry mode (only if Manual Dialing is enabled).
	Hold Down	Deletes all characters.	-
PTT Switch	Press	Transmits after aborting the current mode.	Transmits the status after aborting the current mode.

^{*1} Portable only (Full Key Model/ Standard Key Model)/ Mobile only

^{*2} Portable only (Full Key Model/ Standard Key Model) only

^{*3} Portable only

^{*4} Portable only (Full Key Model)/ Mobile only

Button		Status Mode	Short Message Mode
		Manual entry 	Manual entry
Menu () ^{*1}	Press	Transmits the status after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)	Sends the message after aborting the current mode (after finalizing the characters). Finalizes the characters. (While the characters are flashing)
	Hold Down	-	
Back () ^{*1}	Press	Deletes one character. Migrates to the list selection mode. (Before entering Digit No.)	Deletes one character (While entering or after confirming the character). Returns to the menu (if the transceiver enters this mode by pressing the Menu button (before entering the character)).
	Hold Down	Deletes all characters.	
Function () ^{*2}	Press	Deletes all characters.	
	Hold Down	-	
Home () ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
Side 2 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
 /  ^{*1}	Press	Selects Digit No. one at a time.	If “ Characters ” is configured in Up/Down: Selects characters one at a time. If “ Line Up/Down ” is configured in Up/Down: Shifts the cursor up and down.
	Hold Down	Selects Digit No. continuously.	If “ Characters ” is configured in Up/Down: Selects characters continuously. If “ Line Up/Down ” is configured in Up/Down: Shifts the cursor up and down continuously.

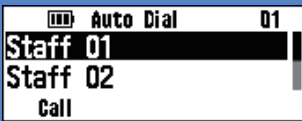
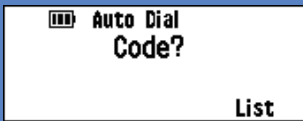
Button		Status Mode	Short Message Mode
		Manual entry 	Manual entry 
 ^{*1}	Press	Migrates to Selcall Mode.	Shifts the cursor to the left. Migrates to Selcall Mode if no character is entered.
	Hold Down	-	Shifts the cursor to the left continuously.
 ^{*1}	Press	-	Shifts the cursor to the right.
	Hold Down	-	Shifts the cursor to the right continuously.
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Enters a status.	Enters characters.
[*] ^{*4}	Press	Transmits the status after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)	Switches character types (upper case/lower case/figure) (after finalizing the characters). Confirms the characters that have been entered (characters appear blinking).
	Hold Down	-	
[#] ^{*4}	Press	Deletes one character. Migrates to the list selection mode if no character is entered.	Deletes one character (While entering or after confirming the character). Returns to the menu (if the transceiver enters this mode by pressing the Menu button (before entering the character)).
	Hold Down	Deletes all characters.	
PTT Switch	Press	Transmits the status after aborting the current mode.	Sends the message after aborting the current mode.

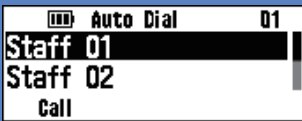
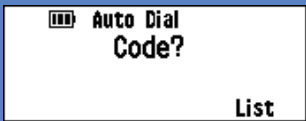
*1 Portable (Full Key Model/ Standard Key Model)/ Mobile only

*2 Portable (Full Key Model/ Standard Key Model) only

*3 Portable only

*4 Portable (Full Key Model)/ Mobile only

Button		Autodial Mode	
		Selecting a list	Manual entry
			
Menu ([)]* ¹	Press	Transmits after aborting the current mode.	Transmits after aborting the current mode (after finalizing the DTMF code). Confirms the DTMF code (while the DTMF code blinks).
	Hold Down	-	
Back ([)]* ¹	Press	Migrates to the DTMF code entry mode (only if Store and Send is enabled).	Migrates to the list selection mode (before entering the DTMF code). Deletes one character (while the DTMF code blinks/ after the DTMF code is confirmed).
	Hold Down	-	Deletes all characters (while the DTMF code blinks/ after the DTMF code is confirmed).
Function ([)]* ²	Press	The configured function functions.	
	Hold Down	-	
Home ([)]* ¹	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1* ³	Press	The configured function functions.	
	Hold Down	-	
Side 2* ³	Press	The configured function functions.	
	Hold Down	-	
[]/ [ * ¹	Press	Selects DTMF codes registered in Autodial List one at a time.	Selects DTMF codes one at a time.
	Hold Down	Selects DTMF codes registered in Autodial List continuously.	Selects DTMF codes continuously.
[ * ¹	Press	-	
	Hold Down	-	
[ * ¹	Press	-	
	Hold Down	-	
Selector* ³	-	The configured function functions after aborting the current mode.	
[0] to [9]* ⁴	Press	Selects a DTMF code directly from the list.	Enters a DTMF code.

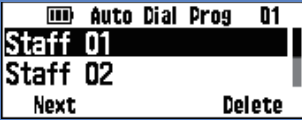
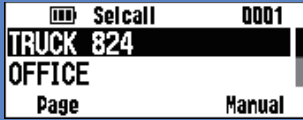
Button		Autodial Mode	
		Selecting a list	Manual entry
			
[*] ^{*4}	Press	Migrates to the state that a DTMF code is entered. Then, press one of the following buttons: [0]: Redial [*]: BOT [#]: EOT	When “Function Key” is configured in * and # Buttons: Migrates to the state that a DTMF code is entered. Pressing the [0] button in this case enables redialing. Pressing the [7], [*] or [#] button in this case enters the character “P”, “*” or “#”. When “Direct Entry” is configured in * and # Buttons: Enters “*”.
	Hold Down	-	When “Function Key” is configured in * and # Buttons: Then, pressing the [2], [5], [8] or [0] button enters “A”, “B”, “C”, or “D” respectively.
[#] ^{*4}	Press	Migrates to the DTMF code entry mode (only if Store and Send is enabled).	When “Function Key” is configured in * and # Buttons: Returns to the menu (if the transceiver enters this mode by pressing the Menu button). When “Direct Entry” is configured in * and # Buttons: Enters “#”.
	Hold Down	-	-
PTT Switch	Press	Transmits after aborting the current mode.	

*1 Portable (Full Key Model/ Standard Key Model)/ Mobile only

*2 Portable (Full Key Model/ Standard Key Model) only

*3 Portable only

*4 Portable (Full Key Model)/ Mobile only

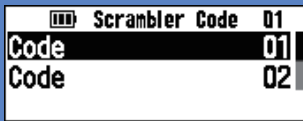
Button		Autodial Programming Mode	Selcall Mode (MDC-1200)
		Selecting a list 	Selecting a list 
Menu ([M]) ^{*1}	Press	Migrates to the DTMF Name entry mode.	Transmits the Call Alert after aborting the current mode.
	Hold Down	-	-
Back ([←]) ^{*1}	Press	Clears one data entry from the Autodial List.	Migrates to the code entry mode (only if Manual Dialing is enabled).
	Hold Down	Clears all data from the Autodial List.	-
Function ([F]) ^{*2}	Press	The configured function functions.	
	Hold Down	-	
Home ([H]) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
Side 2 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
[▲]/[▼] ^{*1}	Press	Selects DTMF codes registered in Autodial List one at a time.	Selects MDC-1200 IDs registered in the ID List one at a time.
	Hold Down	Selects DTMF codes registered in Autodial List continuously.	Selects MDC-1200 IDs registered in the ID List continuously.
[◀] ^{*1}	Press	-	
	Hold Down	-	
[▶] ^{*1}	Press	-	
	Hold Down	-	
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Directly selects a DTMF code registered in Autodial List.	Directly selects an MDC-1200 ID registered in the ID List.
[*] ^{*4}	Press	Migrates to the DTMF Name entry mode.	Transmits the Call Alert after aborting the current mode.
	Hold Down	-	
[#] ^{*4}	Press	Clears one data entry from the Autodial List.	Migrates to the code entry mode (only if Manual Dialing is enabled).
	Hold Down	Clears all data from the Autodial List.	-
PTT Switch	Press	Transmits after aborting the current mode.	

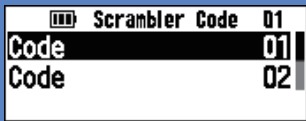
^{*1} Portable (Full Key Model/ Standard Key Model)/ Mobile only

^{*2} Portable (Full Key Model/ Standard Key Model) only

^{*3} Portable only

^{*4} Portable (Full Key Model)/ Mobile only

Button		Selcall Mode (MDC-1200)	Scrambler/ Encryption Code Mode
		Manual entry 	Selecting a list 
Menu ([M]) ^{*1}	Press	Transmits a Call Alert after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)	-
	Hold Down	-	-
Back ([B]) ^{*1}	Press	Deletes one character. Migrates to the list selection mode if no character is entered.	-
	Hold Down	Deletes all characters.	-
Function ([F]) ^{*2}	Press	The configured function functions.	
	Hold Down	-	
Home ([H]) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
Side 2 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
[▲]/[▼] ^{*1}	Press	Selects Digit No. one at a time.	Selects Scrambler Codes registered in the Scrambler Code List one at a time.
	Hold Down	Selects Digit No. continuously.	Selects multiple Scrambler Codes registered in the Scrambler Code List in succession.
[◀] ^{*1}	Press	-	-
	Hold Down	-	-
[▶] ^{*1}	Press	-	-
	Hold Down	-	-

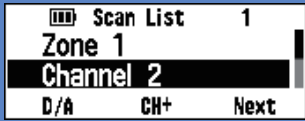
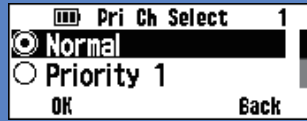
Button		Selcall Mode (MDC-1200)	Scrambler/ Encryption Code Mode
		Manual entry 	Selecting a list 
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Enters an MDC-1200 ID.	Directly selects Scrambler Codes registered in the Scrambler Code List.
[*] ^{*4}	Press	Pressing the following buttons after pressing the [*] button inputs the corresponding characters. [2] button: A [5] button: B [8] button: C [0] button: D [*] button: E [#] button: F	-
	Hold Down	-	-
[#] ^{*4}	Press	Migrates to the list selection mode (before entering the Digit No.). Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the Menu button).	-
	Hold Down	Deletes all characters.	-
PTT Switch	Press	Transmits after aborting the current mode.	

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*2 Portable (Full Key Model/ Standard Key Model) only

*3 Portable only

*4 Portable (Full Key Model)/ Mobile only

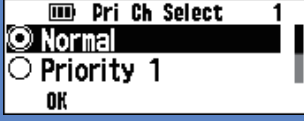
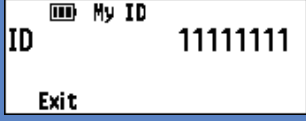
Button		Scan Program Mode	Priority-Channel
			
Menu ([M]) ^{*1}	Press	Confirms addition or deletion.	Confirms the configuration and then restores the Scan List edit screen.
	Hold Down	-	
Back ([B]) ^{*1}	Press	The transceiver migrates to the Priority Channel edit screen.	Restores the Scan List edit screen.
	Hold Down	-	
Function ([F]) ^{*2}	Press	The configured function functions.	
	Hold Down	-	
Home ([H]) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
Side 2 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
[▲]/[▼] ^{*1}	Press	Selects channels one at a time.	Selects configuration items one at a time.
	Hold Down	Selects channels continuously.	Selects configuration items continuously.
[◀]/[▶] ^{*1}	Press	Selects zones one at a time.	-
	Hold Down	Selects zones continuously.	-
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	-	Selects a configuration item from the list.
[*] ^{*4}	Press	Confirms addition or deletion.	Confirms the configuration and then restores the Scan List edit screen.
	Hold Down	-	
[#] ^{*4}	Press	The transceiver enters the Priority Channel edit screen.	Restores the Scan List edit screen.
	Hold Down	-	
PTT Switch	Press	-	

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Button		Priority-channel Select Mode	My ID Mode
			
Menu ([M]) ^{*1}	Press	Confirms the configuration and then aborts the current mode.	Aborts the current mode.
	Hold Down	-	-
Back ([B]) ^{*1}	Press	-	-
	Hold Down	-	-
Function ([F]) ^{*2 *5}	Press	-	-
	Hold Down	-	-
Home ([H]) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	-
Side 1 ^{*3 *5}	Press	The configured function functions.	-
	Hold Down	-	-
Side 2 ^{*3 *5}	Press	The configured function functions.	-
	Hold Down	-	-
[▲]/[▼] ^{*1}	Press	Selects configuration items one at a time.	Selects Digit No. one at a time.
	Hold Down	Selects configuration items continuously.	Selects Digit No. continuously.
[◀]/[▶] ^{*1}	Press	-	Shifts the cursor to the left or right.
	Hold Down	-	Shifts the cursor to the left or right continuously.
Selector ^{*3}	-	The configured function functions after aborting the current mode.	-
[0] to [9] ^{*4}	Press	Selects a configuration item from the list.	Enters a Digit No.
[*] ^{*4}	Press	Confirms the configuration and then aborts the current mode.	Aborts the current mode.
	Hold Down	-	-
[#] ^{*4}	Press	-	-
	Hold Down	-	-
PTT Switch	Press	Transmits after aborting the current mode.	-

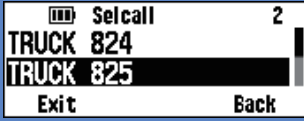
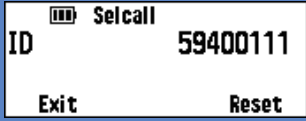
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^{*5} If **Backlight**, **Function**, **Volume Up**, or **Volume Down** is assigned to the **PF** button, the corresponding function is activated by pressing the **PF** button. If a function other than those functions is assigned, a Button-entry Error Tone (1 beep) sounds from the transceiver and the transceiver does not respond at all even if the **PF** button is pressed.

Button		Selcall Mode	
		Selecting a list	Manual entry
			
Menu ([) ^{*1}	Press	Aborts the current mode. Migrates to Status Mode or Short Message Mode.	
	Hold Down	Migrates to the mode for entering a Selcall code.	Migrates to the list selection mode.
Back ([) ^{*1}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Selcall codes are restored to defaults.
	Hold Down	-	
Function ([) ^{*2}	Press	The configured function functions.	
	Hold Down	-	
Home ([) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
Side 2 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
[ *1	Press	Selects Selcall codes registered in Selcall List one at a time.	Selects Digit No. one at a time.
	Hold Down	Selects Selcall codes registered in Selcall List continuously.	Selects Digit No. continuously.
[ *1	Press	-	Shifts the cursor to the left.
	Hold Down	-	Shifts the cursor to the left continuously.
[ *1	Press	Migrates to Status Mode or Short Message Mode.	Shifts the cursor to the right.
	Hold Down	-	Shifts the cursor to the right continuously.
Selector ^{*3}	-	The configured function functions after aborting the current mode.	
[0] to [9] ^{*4}	Press	Directly selects a Selcall code registered in Selcall List.	Enters a Digit No.
[*] ^{*4}	Press	Aborts the current mode.	
		Migrates to Status Mode or Short Message Mode.	
[#] ^{*4}	Press	Migrates to the mode for entering a Selcall code.	Migrates to the list selection mode.
		Migrates to the mode for entering a Selcall code.	Migrates to the list selection mode.
[ *4	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Selcall codes are restored to defaults.
	Hold Down	-	
PTT Switch	Press	The configured function functions after aborting the current mode.	

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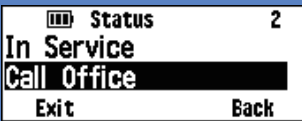
Button		Receive Entry Mode
		
Menu ([M]) ^{*1}	Press	Aborts the current mode.
	Hold Down	-
Back ([←]) ^{*1}	Press	Receive codes are restored to defaults.
	Hold Down	-
Function ([F]) ^{*2}	Press	The configured function functions.
	Hold Down	-
Home ([H]) ^{*1}	Press	Aborts the current mode.
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).
Side 1 ^{*3}	Press	The configured function functions.
	Hold Down	-
Side 2 ^{*3}	Press	The configured function functions.
	Hold Down	-
[▲]/[▼] ^{*1}	Press	Selects Digit No. one at a time.
	Hold Down	Selects Digit No. continuously.
[◀] ^{*1}	Press	Shifts the cursor to the left.
	Hold Down	Shifts the cursor to the left continuously.
[▶] ^{*1}	Press	Shifts the cursor to the right.
	Hold Down	Shifts the cursor to the right continuously.
Selector ^{*3}	-	The configured function functions after aborting the current mode.
[0] to [9] ^{*4}	Press	Enters a Digit No.
[*] ^{*4}	Press	Confirms the configuration and then aborts the current mode.
	Hold Down	-
[#] ^{*4}	Press	Receive codes are restored to defaults.
	Hold Down	-
PTT Switch	Press	The configured function functions after aborting the current mode.

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Button		Status Mode	
		Selecting a list	Manual entry
			
Menu ([M]) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Migrates to the mode for entering a Status code.	Migrates to the list selection mode.
Back ([B]) ^{*1}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Status codes are restored to defaults.
	Hold Down	-	
Function ([F]) ^{*2}	Press	The configured function functions.	
	Hold Down	-	
Home ([H]) ^{*1}	Press	Aborts the current mode.	
	Hold Down	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	
Side 1 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
Side 2 ^{*3}	Press	The configured function functions.	
	Hold Down	-	
[▲]/[▼] ^{*1}	Press	Selects Status codes registered in Status List one at a time.	Selects Digit No. one at a time.
	Hold Down	Selects Status codes registered in Status List continuously.	Selects Digit No. continuously.
[◀] ^{*1}	Press	Migrates to Selcall Mode.	Shifts the cursor to the left.
	Hold Down	-	Shifts the cursor to the left continuously.
[▶] ^{*1}	Press	-	Shifts the cursor to the right.
	Hold Down	-	Shifts the cursor to the right continuously.
Selector ^{*3}	-	The configured function functions after aborting the current mode.	The configured function functions after aborting the current mode.
[0] to [9] ^{*4}	Press	Directly selects a Status code registered in Status List.	Enters a Digit No.
[*] ^{*4}	Press	Aborts the current mode.	
	Hold Down	Migrates to the mode for entering a Status code.	Migrates to the list selection mode.
[#] ^{*4}	Press	Returns to the menu (if the transceiver enters this mode by pressing the Menu button).	Status codes are restored to defaults.
	Hold Down	-	
PTT Switch	Press	The configured function functions after aborting the current mode.	

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Button		Free-dial Entry Mode
		
Menu ([) ^{*1}	Press	Aborts the current mode. Confirms the entered DTMF code (while the code is blinking).
	Hold Down	-
Back ([) ^{*1}	Press	Deletes one character.
	Hold Down	Deletes all characters.
Function ([) ^{*2}	Press	The configured function functions.
	Hold Down	-
Home ([) ^{*1}	Press	Aborts the current mode.
	Hold Down	-
Side 1 ^{*3}	Press	The configured function functions.
	Hold Down	-
Side 2 ^{*3}	Press	The configured function functions.
	Hold Down	-
[]/ [ ^{*1}	Press	Selects DTMF codes one at a time.
	Hold Down	Selects DTMF codes continuously.
[ ^{*1}	Press	-
	Hold Down	-
[ ^{*1}	Press	-
	Hold Down	-
Selector ^{*3}	-	The configured function functions after aborting the current mode.
[0] to [9] ^{*4}	Press	Enters a DTMF code.
[*] ^{*4}	Press	Migrates to the state that a DTMF code is entered. Then, press one of the following buttons: [*]: * [#]: #
	Hold Down	Migrates to the state that a DTMF code is entered. Then, pressing the [2], [5], [8] or [0] button enters "A", "B", "C", or "D" respectively.
[#] ^{*4}	Press	Deletes one character.
	Hold Down	Deletes all characters.
PTT Switch	Press	The configured function functions after aborting the current mode.

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● Power-on Tone

Tone Name	Pattern	Reference
Power-on Tone A	1 beep  1480 Hz (500 ms)	Power-on My ID Edit

● Control Tone

Tone Name	Pattern	Reference
Button Beep A	1 beep  1630 Hz (50 ms)	Tactical Zone AUX Output ID Power-on My ID Edit Selcall Mode Receive Entry Mode Digit 1x/ Digit 10x Up/ Down Status Mode Short Message Mode Free-dial Entry Monitor Transfer
Button Beep B	2 beeps  1630 Hz (50 ms)	Tactical Zone AUX Output ID Power-on My ID Edit Selcall Mode Receive Entry Mode Status Mode Short Message Mode Monitor Transfer
Button-entry Error Tone	1 beep  700 Hz (50 ms)	Selectable Group Tone Power-on My ID Edit Selcall Mode Receive Entry Mode Digit 1x/ Digit 10x Up/ Down Status Mode Short Message Mode Free-dial Entry Monitor
Rollover Tone	1 beep  1630 Hz (200 ms)	Power-on My ID Edit Selcall Mode Receive Entry Mode Digit 1x/ Digit 10x Up/ Down Status Mode Short Message Mode Free-dial Entry

Tone Name	Pattern	Reference
Free System Ringback Mode Tone	1 beep  770 Hz (400 ms)	Free System Ringback
Rollover Tone	1 beep  1630 Hz (200 ms)	Tactical Zone
Ringer Tone	1 beep  940 Hz (50 ms)	Free System Ringback
Individual Call Tone	6 beeps  1630 Hz (30 ms) 940 Hz (30 ms) 1630 Hz (30 ms) 940 Hz (30 ms) 1630 Hz (30 ms) 940 Hz (30 ms)	Selective Call
Group Call Tone	5 beeps  640 Hz (50 ms) 940 Hz (50 ms) 1340 Hz (50 ms) 1630 Hz (50 ms) 1920 Hz (50 ms)	Selective Call
Fleet Call Tone	3 beeps  940 Hz (50 ms) 1340 Hz (50 ms) 1630 Hz (50 ms)	Selective Call
Priority-channel Tone	1 beep  2000 Hz (50 ms)	Priority Scan Priority-channel Stop Tone
Scan Stop Tone	2 beeps  700 Hz (50 ms)	Channel Recall Scan Stop Tone
Complete Tone	5 beeps  980 Hz (20 ms)	Radio Check

● Warning Tone

Tone Name	Pattern	Reference
Warning Tone A	continuous beep  700 Hz (until the PTT switch is released)	Busy Channel Lockout (Analog) Time-out Timer
TOT Pre-alert Tone	3 beeps  1630 Hz (50 ms)	Time-out Timer
Busy Tone	continuous beep  940 Hz (150 ms)	Talk Around Free System Ringback Clear to Talk
System Search Tone	1 beep  1630 Hz (50 ms)	System Search
System Search End Tone	3 beeps  940 Hz (150 ms) 770 Hz (150 ms) 940 Hz (150 ms)	System Search
No Reply Tone	4 beeps  440 Hz (50 ms) 440 Hz (1 sec)	Selective Call Radio Check
Lone Worker Tone	2 beeps  1630 Hz (150 ms) 940 Hz (150 ms)	Lone Worker
Man-down Pre-alert Tone	1 beep  1630 Hz (50 ms)	Man-down Detection
Stationary Pre-alert Tone	1 beep  770 Hz (50 ms)	Stationary Detection

Tone Name	Pattern	Reference
Motion Pre-alert Tone	1 beep  1210 Hz (50 ms)	Motion Detection
Intercept Tone	2 beeps  940 Hz (200 ms) 770 Hz (200 ms)	System Search
Deny Tone	3 beeps  940 Hz (150 ms) 770 Hz (150 ms) 940 Hz (150 ms)	Auto Telephone Search

● Locator Tone

Tone Name	Pattern	Reference
Emergency Locator Tone	2 beeps  1630 Hz (90 ms) 940 Hz (90 ms)	Emergency Mode

● Transmit Tone

Tone Name	Pattern	Reference
Background Tone	1 beep  1630 Hz (50 ms)	Background Tone Transmission

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