

Application Note

KAIROS DMR System

OTAP Manager KPG-180AP Version 3.00 / IP Direct Connection

Last Updated: July. 21. 2021

Language: English

Document No. AN-19-0009

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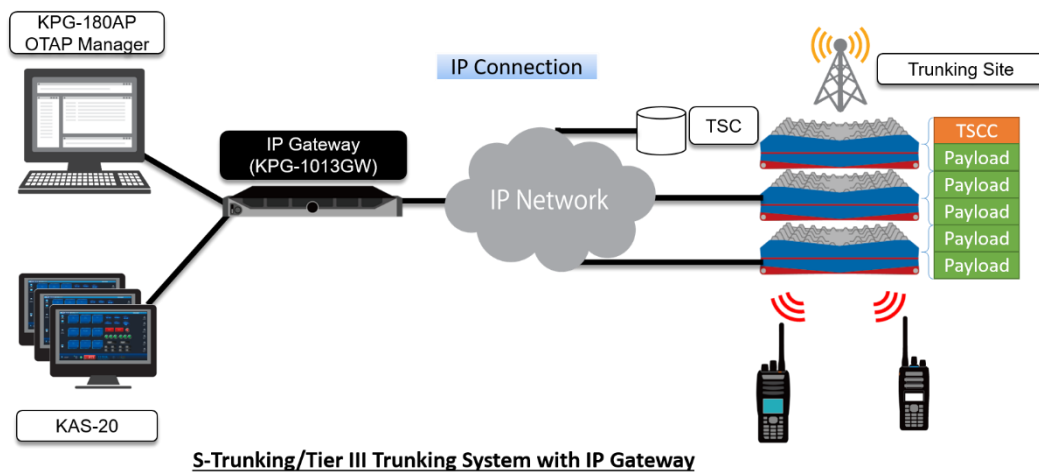
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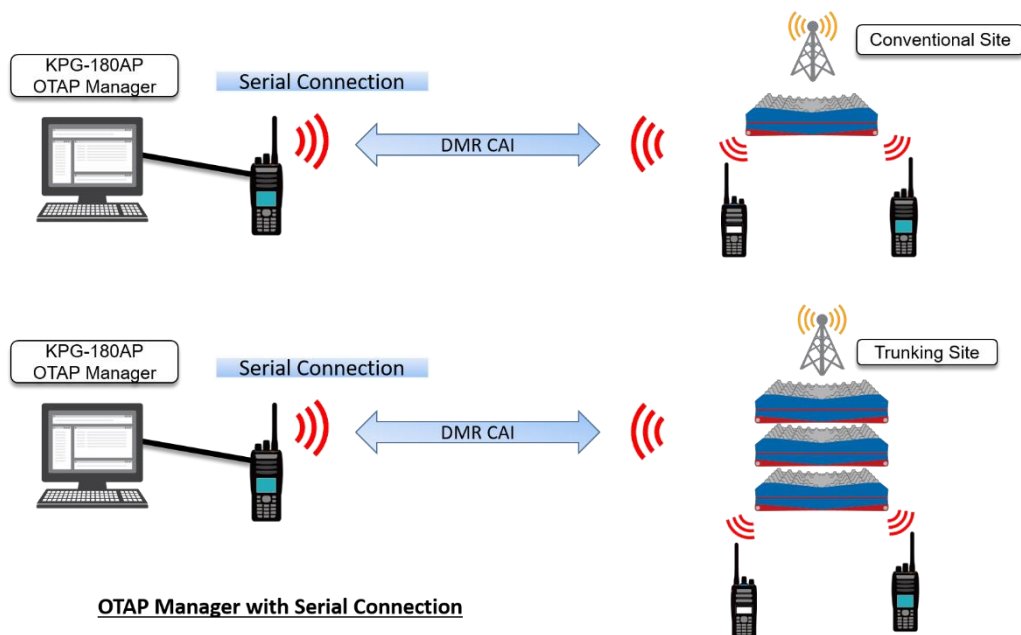
1. Release Information

KPG-180AP OTAP Manager Software working on Radio Activity KAIROS System is released. It allows radio programming by connecting through IP network via IP Gateway and Direct to KAIROS, and serial cable connection as well. The document introduces OTAP direct connection with Kairos. How to connect to a KAIROS System with OTAP Manager are bellows.

- A) A method of connecting directly to a KAIROS Repeater via IP network.
(In this document, it is described this method.)
- B) A method for connecting to an IP gateway via IP network.
(Refer to document "AN-19-0006 KAIROS DMR System Application Note V1.10")



- C) Connecting to the radio unit with serial cable.
(Refer to document "OTAP Manager Basic operations")



1.1. Version information

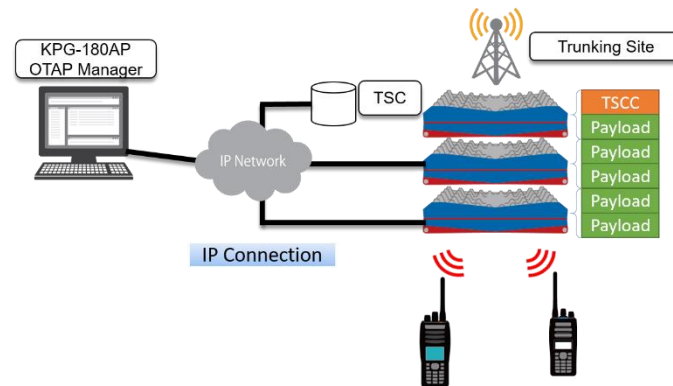
This document is described KPG-180AP OTAP Manager that KAIROS system supports. Version information is as follows.

Product	Supported Version in Release
OTAP MANAGER	KPG-180AP Version 3.02
KAIROS System	Operating System: Linux 2.4.31 Version 01, Build 08 KAIROS Main Firmware Version 1.6.C.5_stable KAIROS DSP Firmware Version 4.67 KAIROS PLD Firmware Version 4.13 Tier III Controller Version 1.1.0.2
KAIROS Tool	KAIROS Manager Version 1.7.14

1.2. System structure with OTAP Manager

OTAP Manager connects to a KAIROS DMR System directly through IP network. There is two type of system, Trunking and Conventional as below.

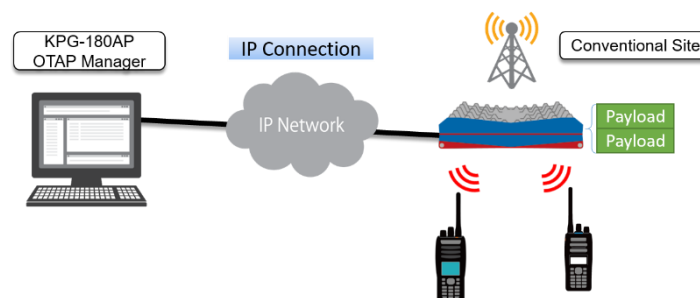
➤ DMR Based Trunking System (S-Trunking/TIER III Trunking)



S-Trunking/Tier III Trunking System with OTAP Manager

Elements of the system	Description	Configuration tool
KAIROS TSC	Trunking System Controller	KA-NMS
KAIROS Base Station	Repeater (Payload Channel)	KAIROS Manager
OTAP Manager (KPG-180AP)	Over-the-air Programing tool	On the KPG-180AP [Menu-Communication profile]

➤ TIER II Conventional System



Tier II Conventional System with OTAP Manager

Elements of the system	Description	Configuration tool
KAIROS Base Station	Repeater (Payload Channel)	KAIROS Manager
OTAP Manager (KPG-180AP)	Over-the-air Programing tool	On the KPG-180AP [Menu-Communication profile]

2. Basic Configurations: DMR Based Trunking System

2.1. OTAP Manager (KPG-180AP)

This section is described OTAP Manager Configuration for S-Trunking/TIER III Trunkig.

2.1.1. Communication Profile

On main menu, click "[Menu – Communication Profile – New]" to open the window. Select DMR IP for Communication Profile. Name for Communication Profile, then click the "Communication Port" button to open the window.

Communication Port [Communication Profile Edit]

☒ LAN

Adapter: 172.33.0.1

Base Station ID: 100

System Configuration

Access: Repeater

System Type: Trunking

RAN Encode: None

Network Category: Regional

System Code: 1

Site Number/ IP Gateway: 1

IP Address: 172 . 16 . 0 . 65

Channel Spacing: Narrow

Encryption

☐ COM

Com Port: COM15

Baud Rate: 9600

IP Gateway

TX Port: 5060

RX Port: 5060

Slot: Slot A

Repeater

TX Port: 40200

RX Port: 40300

Trunking Controller

IP Address: 172 . 33 . 95 . 200

RX Port: 60000

Hang Time [ms]: 983010

Channel List

OK Cancel

2.1.1.1. Adapter

Select correct adapter to connect KAIROS System.

2.1.1.2. Base Station ID

Enter the "Base Station ID" (DMR ID) for OTAP Manager which is defined KAIROS TSC setting. (Refer to: [2.2.1.1 Data for the new Element](#))

2.1.1.3. System Configuration

2.1.1.3.1. Access

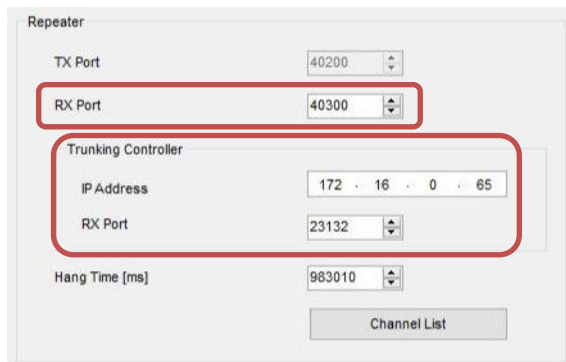
Select "Repeater" from Access device for direct connection.

2.1.1.3.2. System Type

Select "Trunking" from System Type for S-Trunking/TIER III Trunking.

2.1.1.4. Repeater

This section is described setting for connection to the KAIROS System (S-Trunking/TIER III Trunking).



2.1.1.4.1. RX Port

Set the port number of RTP Receive Port. This port number must be same as KAIROS "Data IP Ports" settings.

(Refer to: [2.3.1.2.2 To Console \(TX\)](#))

2.1.1.5. Trunking Controller

This section is described settings to connect to KAIROS TSC.

2.1.1.5.1. IP Address

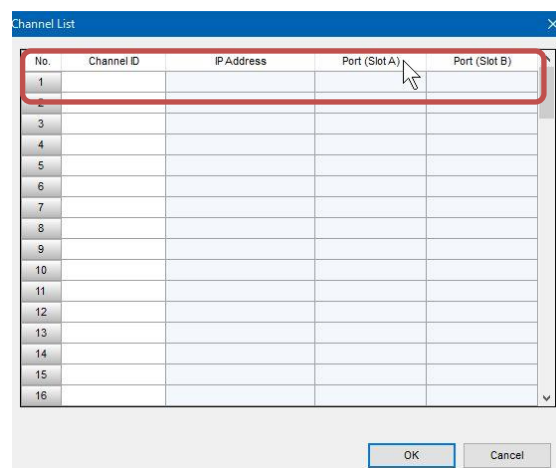
Set the "IP Address" of KAIROS TSC.

2.1.1.5.2. RX Port

Set the port number of Receive Port. This port number must be same as KAIROS "External Server" settings. (Refer to: [2.2.1.1 Data for the new Element](#))

2.1.1.6. Channel List

This section is described setting of RTP session for KAIROS Repeaters. Click "Channel List" button to open the Channel List Table. Enter each repeater parameter in the column.



2.1.1.6.1. Channel ID

Set the KAIROS Base station ID. ID number can be found in TSC settings of KA-NMS. (Refer to: [4.1.5.1 Advance preparation for configuration](#))

2.1.1.6.2. IP Address

Set the IP Address. It must be same as IP Address for each Base station ID. IP Address can be found in TSC settings of KA-NMS.

(Refer to: [4.1.5.1 Advance preparation for configuration](#))

2.1.1.6.3. Port (Slot A)

Set the Port number for Slot A ("TS A" on KAIROS). This port number must be same as KAIROS "Data IP Ports" settings. (Refer to: [2.3.1.2.1 From Console \(RX\)](#))

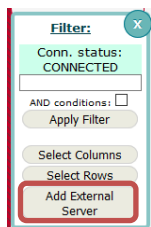
2.1.1.6.4. Port (Slot B)

Set the Port number for Slot B ("TS B" on KAIROS). This port number must be same as KAIROS "Data IP Ports" settings. (Refer to: [2.3.1.2.1 From Console \(RX\)](#))

2.2. KAIROS TSC (Trunking System Controller)

Trunking System Controller (TSC) manages KAIROS S-Trunking/TIER III Trunking System. OTAP Manager is defined as "External Server" in KA-NMS.

2.2.1. External Servers



Login KA-NMS and select [Settings – External Servers] on menu.

The small window is appeared. Click "Add External Server" to open "Data for the new Element" window.

2.2.1.1. Data for the new Element

This section is described settings "External Server" for OTAP Manager.

Name

Name OTAP Manager

Type

Enable "Dispatcher".

IP

Enter IP Address of OTAP Manager.

Port

Enter Receive Port number of OTAP Manager.

It can be same as RX port number of OTAP Manager setting.
(Refer to: [2.1.1.5.2 RX Port](#))

DataInfo

Enable "MS Call", "MS Contact", "MS Short Message" and "MS Status Message".

Active

Select "true".

DmrID

Enter DMR ID for "OTAP Manager".

(Refer to: [2.1.1.2 Base Station ID](#))

Auto ACK.

All Items is set "Uncheck".

After completing, click "Add" button. OTAP Manager is registered in the table of "External Servers".

2.3. KAIROS Repeater (For DMR Based Trunking System)

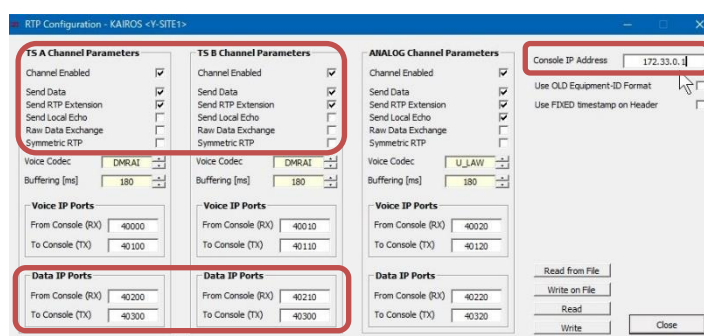
This section is described settings for RTP session. RTP protocol is used for Data communication for OTAP Data. This RTP settings is managed by KAIROS Manager. All Repeaters has to be done this configuration individually.

2.3.1. RTP Configuration

Start KAIROS Manager, and connect to one of Payload Repeater.

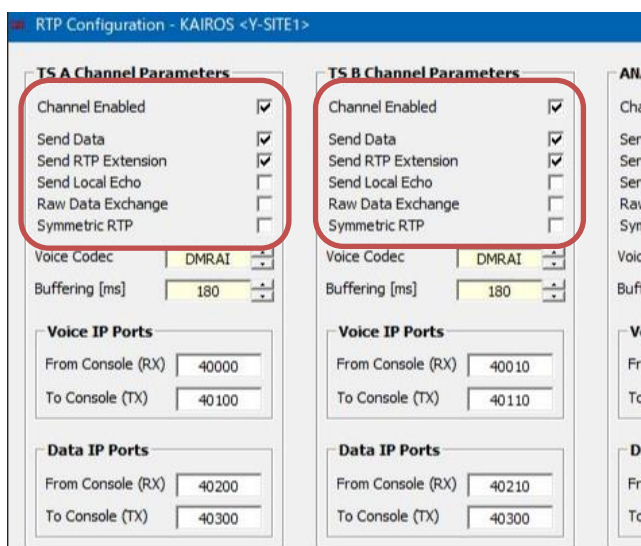
Select [KAIROS – Configuration – RTP Configuration].

The following window is appeared. The red rectangle is an important setting for OTAP Manager.



2.3.1.1. TS A/TS B Channel Parameters

Each “TS” channel (Payload channel) has separate parameters. OTAP Manager communicate with each payload channel of Repeater. Following is necessary settings to communicate with OTAP.



[Channel Enabled], [Send Data], [Send RTP Extension]

These are set “Check”.

[Send Local Echo]

It is set “Uncheck”. If this Item is “Check”, Data communication cannot be established.

[Raw Data Exchange],

[Symmetric RTP]

These are set “Uncheck”.

[Voice Codec], [Buffering [ms]], [Voice IP Ports]

These parameters are configuration for Voice communication, it should be set properly according to requirement of voice service.

2.3.1.2. Data IP Ports

Repeater has a RTP RX Port and a TX Port for each "TS" (slot). Repeater receives Slot Data for Payload independently.



Data IP Ports	
From Console (RX)	40200
To Console (TX)	40300

Data IP Ports	
From Console (RX)	40210
To Console (TX)	40300

2.3.1.2.1. From Console (RX)

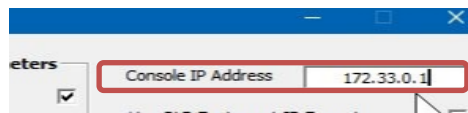
RX Port number for TS A (Slot A) for TS B (Slot B) are configured **different value**. Communication between OTAP manager and a Radio unit is established with same payload. This number is configured same port number as the Channel List table.
(Refer to: [2.1.1.6.3 Port \(Slot A\)](#) , [2.1.1.6.4 Port \(Slot B\)](#))

2.3.1.2.2. To Console (TX)

TX Port number for TS A (Slot A) and for TS B (Slot B) are configured **same value**. Because Receive Port of OTAP Manager is one port number. OTAP Manager always communicate single radio unit. Therefore it have only one RX Port for data.
(Refer to: [2.1.1.4.1 RX Port](#))

2.3.1.3. Console IP Address

Set the IP Address of OTAP Manager.



Console IP Address	
Console IP Address	172.33.0.1

2.3.2. Verify the Basic settings

Verify the Basic settings of KAIROS Repeater. See the section [4.3 Basic Settings](#).

3. Basic Configurations: TIER II Conventional System

3.1. OTAP Manager (KPG-180AP)

3.1.1. Communication Profile

This section is described about OTAP Manager Communication Profile for KAIROS TIER II Conventional. Select DMR IP for Communication Profile. Open Profile window by steps same as TIER III. (Refer to: [2.1.1 Communication Profile](#))

The screenshot shows the 'Communication Port [Communication Profile Edit]' window. The 'LAN' tab is selected. The 'Adapter' field is set to '172.33.0.1' and the 'Base Station ID' is '20'. Under 'System Configuration', 'Access' is set to 'Repeater' and 'System Type' is 'Conventional'. Other settings include 'RAN Encode' as 'None', 'Network Category' as 'Regional', 'System Code' as '1', 'Site Number/ IP Gateway' as '1', 'IP Address' as '172.33.95.91', and 'Channel Spacing' as 'Narrow'. The 'COM' tab is unselected, showing 'Com Port' as 'COM15' and 'Baud Rate' as '9600'. On the right, 'IP Gateway' settings show TX and RX ports at 5060. 'Repeater' settings show TX port at 40200 and RX port at 40300. 'Trunking Controller' settings show IP Address as 172.16.0.65, RX Port as 23132, and Hang Time as 983010 ms. 'OK' and 'Cancel' buttons are at the bottom right.

3.1.1.1. Adapter

Select proper adapter for OTAP Manager to connect KAIROS System.

3.1.1.2. Base Station ID

Enter Base Station ID (DMR ID) of OTAP Manager. If the ACL is enabled on KAIROS TIER II Conventional System, the ID should be listed in KAIROS ACL List.

(Refer to: [3.2.2 Access Control Lists for DMR Tier II](#))

3.1.1.3. System Configuration

3.1.1.3.1. Access

Select Repeater to be Access device for connection.

3.1.1.3.2. System Type

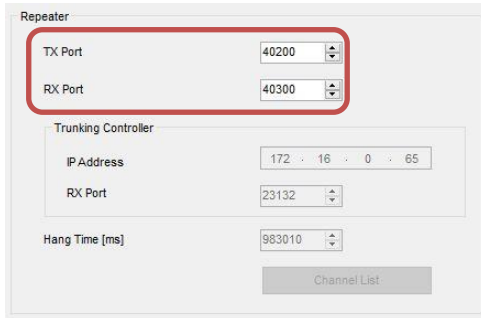
Select Conventional from System Type.

3.1.1.3.3. IP Address

Enter IP Address of KAIROS Repeater.

3.1.1.4. Repeater

This section is described configuration to connect with a KAIROS System (TIER II Conventional).



Repeater

TX Port 40200

RX Port 40300

Trunking Controller

IP Address 172 . 16 . 0 . 65

RX Port 23132

Hang Time [ms] 983010

Channel List

3.1.1.4.1. TX Port

Enter port number of RTP Transmission Port which is same as KAIROS "Data IP Ports" settings.

(Refer to: [3.2.1.2.1 From Console \(RX\)](#))

3.1.1.4.2. RX Port

Enter port number of RTP Receive Port which is same as KAIROS "Data IP Ports" settings.

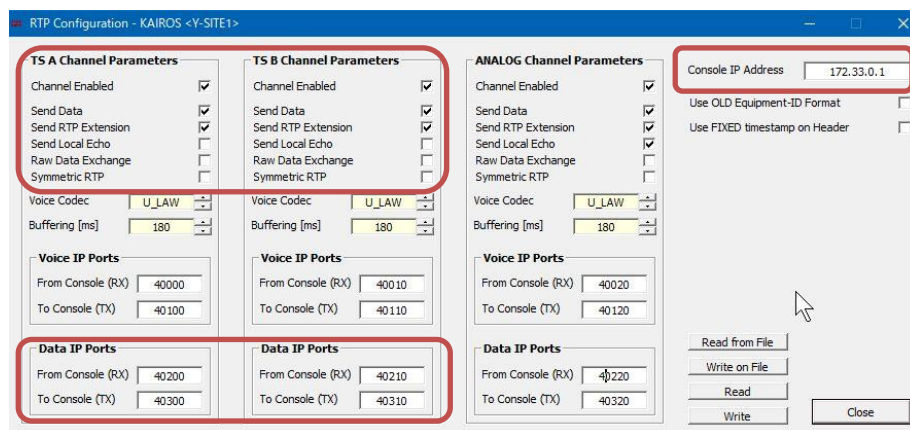
(Refer to: [3.2.1.2.2 To Console \(TX\)](#))

3.2. KAIROS Repeater (For TIER II Conventional)

3.2.1. RTP Configuration

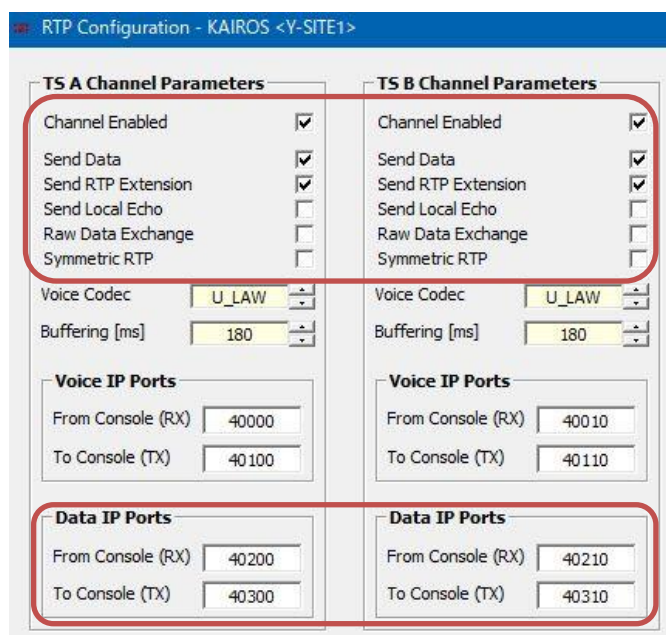
Open KAIROS Manager and connect to KAIROS Repeater.

Select [KAIROS – Configuration – RTP Configuration].



3.2.1.1. TS A/TS B Channel Parameters

OTAP Manager uses one of Slot A or B (Payload channel) and transfers data to the target port number. Configure parameters for one of Slot of Kairos to connect OTAP Manager.



[Channel Enabled], [Send Data], [Send RTP Extension]

Enable these checkbox.

[Send Local Echo]

Disable the checkbox.

Note: If enable, data communication cannot be established.

[Raw Data Exchange],

[Symmetric RTP]

Disable these checkbox.

[Voice Codec], [Buffering [ms]], [Voice IP Ports]

These parameters are configuration for Voice communication, it should be set properly according to requirement of voice service.

3.2.1.2. Data IP Ports

Repeater has a RTP RX Port and a TX Port for each "TS" (slot). Repeater receives Slot Data for Payload independently.

Data IP Ports		Data IP Ports	
From Console (RX)	40200	From Console (RX)	40210
To Console (TX)	40300	To Console (TX)	40310

3.2.1.2.1. From Console (RX)

RX Port number for TS A (Slot A) for TS B (Slot B) are configured **different value.** Communication between OTAP manager and a Radio unit is established with same payload channel. This number is configured same port number as the Channel List table.

(Refer to: [3.1.1.4.1 TX Port](#))

3.2.1.2.2. To Console (TX)

TX Port number for TS A (Slot A) and for TS B (Slot B) are configured **different value.** Because Receive Port of OTAP Manager is one port number and same number with one of Slot A or B port.

(Refer to: [3.1.1.4.2 RX Port](#))

3.2.1.3. Console IP Address

Enter IP Address of OTAP Manager.

eters	Console IP Address	172.33.0.1
-------	--------------------	------------

3.2.2. Access Control Lists for DMR Tier II

Open KAIROS Manager and connect to KAIROS Repeater.

Select [KAIROS – Configuration – Access Control Lists for DMR Tier II]. Following ACL window is appeared.

#	Lower ID	Upper ID
0	1	1
1	2	2
2	3	3
3	20	20
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

#	Lower ID	Upper ID
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		

#	Lower ID	Upper ID
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		

#	Lower ID	Upper ID
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		

Enable ACL ☒

Read from File
Write on File
Read
Write
Close

3.2.2.1. Enable ACL

There is Check box to enable the Access control list on the window.

[Uncheck]

It can be disable Access Control. OTAP Manager can communicate with every DMR ID.

[Check]

It can be enable Access Control. Only DMR ID listed on the list are valid to communicate with OTAP Manager and radios.

3.2.2.2. Allowed DMR IDs

This is Access Control Lists. Register DMR ID that can be accessed on a Tier II system.

Following example is described to be allowed DMR ID "1", "2", "3", "20" on TIER II System .

3.2.3. Verify the Basic settings

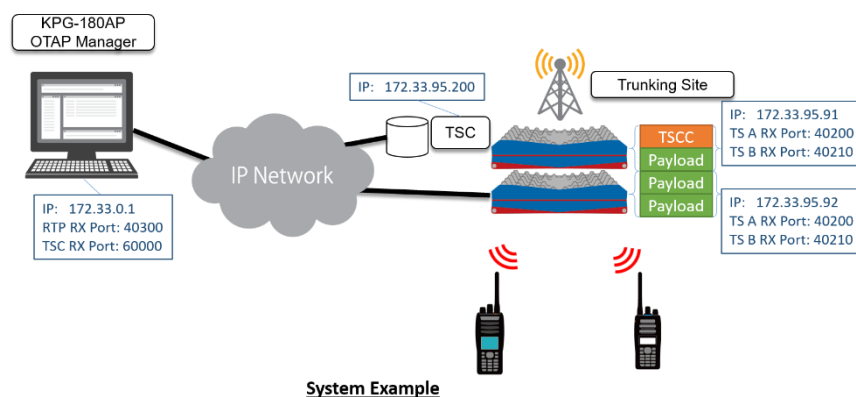
Verify Basic settings of KAIROS Repeater. See the section [4.3 Basic Settings](#).

4. Appendix

4.1. Sample Configurations for S-Trunking/TIER III Trunking with OTAP Manager

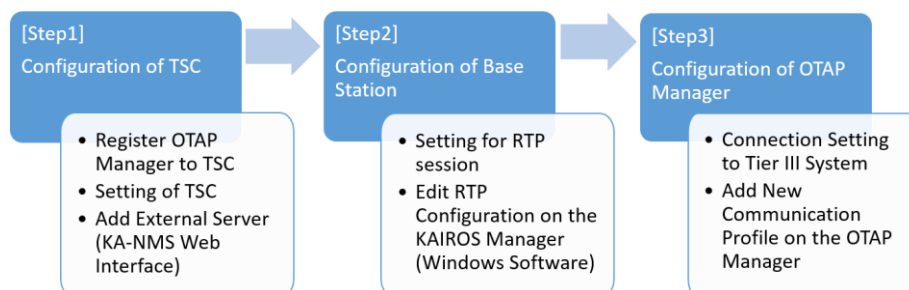
4.1.1. System Example for KAIROS DMR Based Trunking System

Following figure is one of System Examples for DMR Based Trunking System. After this section is described how to configure the parameter of System Example below.



4.1.2. Step of Configurations

Following flow is one of steps to configure the System Example.



[Step1]: Register OTAP Manager to TSC

Register OTAP Manager Information in KAIROS TSC so that it can be used in TIER III Trunking System.

[Step2]: Configuration for RTP Session

Edit RTP configuration of KAIROS Repeaters so that OTAP Manager can be used payload channels.

[Step3]: Connection setting to DMR Based Trunking for OTAP Manager

Edit the OTAP Manager IP connection profile to connect to the KAIROS DMR Based Trunking System.

4.1.3. [Step1] Register OTAP Manager to TSC

4.1.3.1. Advance preparation for configuration

The following table is one of the preparations for the System Example shown in the previous. This table is useful when constructing an OTAP manager system in KA-NMS.

➤ For TSC Settings (External Server of example system)

Following table is parameters of External Server.*

Elements	System Example	Note
Name	OTAP Manager	Display name
Type	Dispatcher	Server Type
IP	172.33.0.1	This IP Address is OTAP Manager.
Port	60000	This number is Receive port of OTAP Manager, KA-NMS default is "60000".
DataInfo	All Check	It should check all Items.
Active	true	It must select "true".
DmrID	100	DMR ID for OTAP Manager
Auto ACK.	All Uncheck	It must not check all Items.

Preparation of TSC settings*

*Refer to [2.2.1 External Servers](#)

4.1.3.2. Add "External Server"

See the section [2.2.1 External Servers](#)

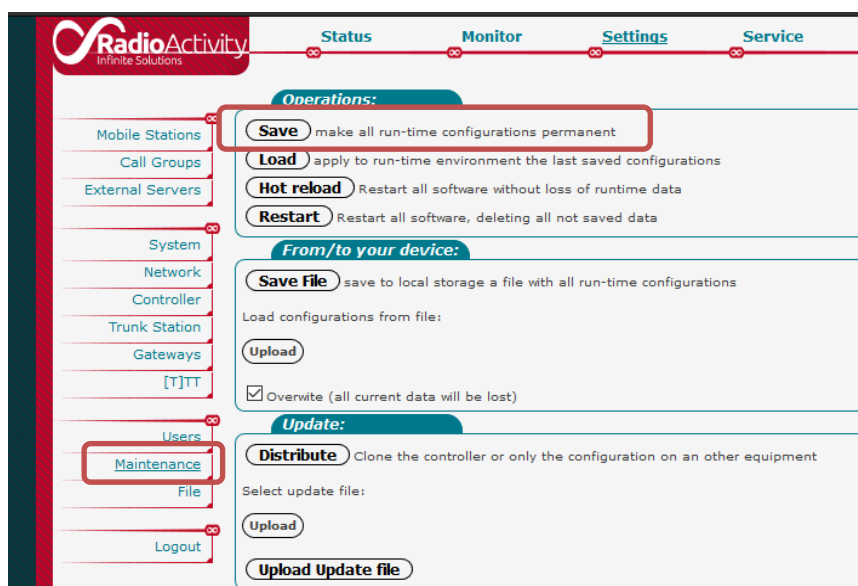
4.1.3.3. Edit Elements of Parameters

Edit the New "External Server" parameters. Using Preparation table, and refer to the section [2.2.1.1 Data for the new Element](#).

4.1.3.4. Save "External Server"

After adding New "External Server", it is listed as one of "External Servers".
Select "Maintenance" which is the left side of menu, following screen is displayed.

Click "Save" and restart just in case.



Note: If TSC is rebooted without saving this configuration, edited data is disappeared.

After save configurations, [Step1] completes.

4.1.4. [Step2] Configuration for RTP sessions

4.1.4.1. Advance preparation for configuration

System Example shown in the previous have two Repeater for the DMR Based Trunking System. In the following table there is parameters for RTP Configuration of Each Repeater. This table is useful when configuring the Payload Channel of RTP in KAIROS Manager.

➤ For RTP Configuration (2 KAIROS Repeaters of System Example)

Channel Parameters		Repeater 172.33.95.91		Repeater 172.33.95.92	
		TS A	TS B	TS A	TS B
Channel Enabled		Check	Check	Check	Check
Send Data		Check	Check	Check	Check
Send RTP Extension		Check	Check	Check	Check
Send Local Echo*		Uncheck	Uncheck	Uncheck	Uncheck
Raw Data Exchange		Uncheck	Uncheck	Uncheck	Uncheck
Symmetric RTP		Uncheck	Uncheck	Uncheck	Uncheck
Voice Codec		(not care)	(not care)	(not care)	(not care)
Buffering [ms]		(not care)	(not care)	(not care)	(not care)
Voice IP Ports	From Console (RX)	(not care)	(not care)	(not care)	(not care)
	To Console (TX)	(not care)	(not care)	(not care)	(not care)
Data IP Ports	From Console (RX)	40200	40210	40200	40210
	To Console (TX)	40300	40300	40300	40300
Console IP Address		172.33.0.1			

Preparation of RTP Configuration for the All Repeater in the System Example

*If this Item is Enabled, OTAP Communication does not work.

4.1.4.2. Edit RTP Configuration for KAIROS Repeater

This section is described how to configure for RTP configuration with KAIROS Manager. The System Example have two Repeaters for RF Channel (Payload). Use the previous table to enter the RTP parameters for this section. See the section from [2.3.1 RTP Configuration](#) to [2.3.1.3 Console IP Address](#).

Note: Another Repeater should also configure these RTP parameter as well.

The screenshot shows the 'RTP Configuration - KAIROS <Y-SITE1>' window. It contains three main configuration panels: 'TS A Channel Parameters', 'TS B Channel Parameters', and 'ANALOG Channel Parameters'. Each panel has a list of checkboxes for various options: 'Channel Enabled', 'Send Data', 'Send RTP Extension', 'Send Local Echo', 'Raw Data Exchange', and 'Symmetric RTP'. Below these are dropdown menus for 'Voice Codec' (set to 'DMRAI' for TS A and B, and 'U_LAW' for ANALOG) and 'Buffering [ms]' (set to '180'). There are also sections for 'Voice IP Ports' and 'Data IP Ports' with input fields for 'From Console (RX)' and 'To Console (TX)'. On the right side, there is a 'Console IP Address' field with the value '172.33.0.1' and checkboxes for 'Use OLD Equipment-ID Format' and 'Use FIXED timestamp on Header'. At the bottom right, there are buttons for 'Read from File', 'Write on File', 'Read', 'Write', and 'Close'.

When all repeaters have been configured, [Step2] completes.

4.1.5. [Step3] Connection setting to DMR Based Trunking System

4.1.5.1. Advance preparation for configuration

Following table is described part of OTAP Manager Communication Profile configurations for the System Example shown in the previous. This table is useful to configure OTAP Manager.

➤ For OTAP Manager (Communication Profile of System Example)

Configuration Items		System Example
Adapter		172.33.0.1
Base Station ID		100
Access		Repeater
System Type		Trunking
Repeater	RX Port	40300
Trunking Controller	IP Address	172.33.95.200
	RX Port	60000

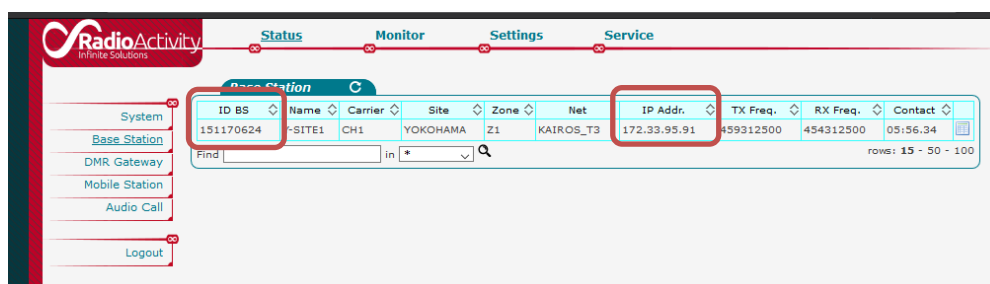
Preparation of Profile settings of OTAP Manager

There is "Channel List" table in the Communication Profile. Following table is described Channel List of System Example.

Channel List			
Channel ID**	IP Address	Port (Slot A)	Port (Slot B)
151170624	172.33.95.91	40200	40210
151170656	172.33.95.92	40200	40210

Preparation of Channel List

** Note: The "Channel ID" is a unique ID that is the "Base Station ID" of the KAIROS repeater device. It can find on the KA-NMS [Status – Base Stations (ID BS)]. And also can find the IP Address of BS.



4.1.5.2. Add Communication Profile

Previous section "[2.1.1 Communication Profile](#)" is described how to add New "Communication Profile". Please see this section "[2.1.1 Communication Profile](#)".

4.1.5.3. Edit Communication Profile (except "Channel List")

Following table has summarized to explain how to set each parameter in Communication Profile. This step were already described previous section for details. Please see the column "Reference Section".

Configuration Items		System Example	Reference Section
Adapter		172.33.0.1	2.1.1.1 Adapter
Base Station ID		100	2.1.1.2 Base Station ID
Access		Repeater	2.1.1.3.1 Access
System Type		Trunking	2.1.1.3.2 System Type
Repeater	RX Port	40300	2.1.1.4.1 RX Port
Trunking Controller	IP Address	172.33.95.200	2.1.1.5.1 IP Address
	RX Port	60000	2.1.1.5.2 RX Port

How to edit "Communication Profile"

4.1.5.4. Edit Channel List

This section is described how to enter the Channel List. Preparation of the table previous section is useful for this edit.

- ① Click "Channel List" on the Edit screen. (Refer to: [2.1.1.6 Channel List](#))
- ② Enter the line of Channel List as same as parameter of Preparation table of Lines.
- ③ Click "OK".

Channel List			
Channel ID**	IP Address	Port (Slot A)	Port (Slot B)
151170624	172.33.95.91	40200	40210
151170656	172.33.95.92	40200	40210



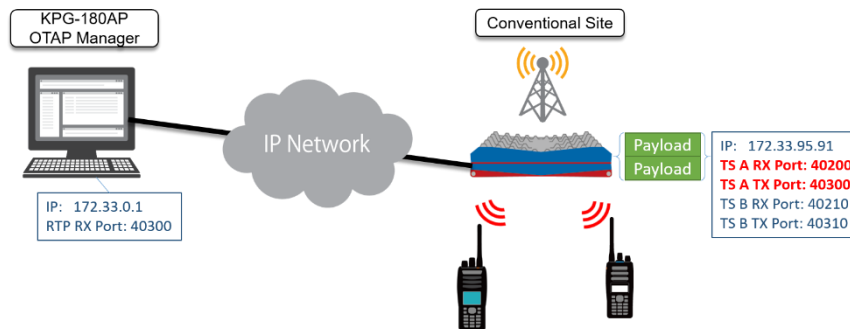
No.	Channel ID	IP Address	Port (Slot A)	Port (Slot B)
1	151170624	172.33.95.91	40200	40210
2	151170656	172.33.95.92	40200	40210
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

After click "OK", [Step3] completes.

4.2. Sample Configurations for TIER II Conventional with OTAP Manager

4.2.1. System Example for KAIROS TIER II Conventional System

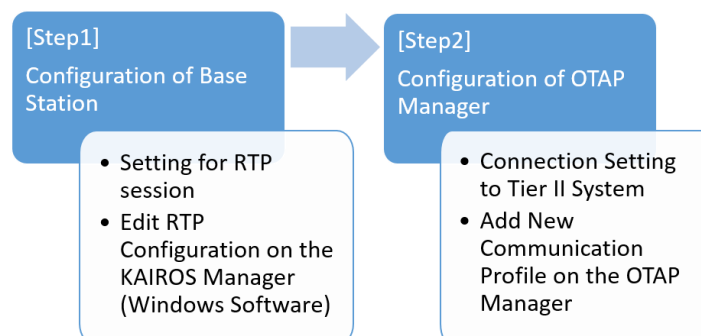
Following figure is one of System Examples for TIER II Conventional System. After this section is described how to configure the parameter of System Example below.



System Example

4.2.1. Step of Configurations

Following flow is one of steps to configure the System Example.



(Note: ACL is disabled this sample configurations.)

[Step1]: Configuration for RTP Session

Edit RTP configuration of KAIROS Repeaters so that OTAP Manager can be used payload channels.

[Step2]: Connection setting to TIER II Conventional System for OTAP Manager

Edit the OTAP Manager IP connection profile to connect to the KAIROS TIER II Conventional System.

4.2.2. [Step1] Configuration for RTP sessions

4.2.2.1. Advance preparation for configuration

In the following table there is parameters for RTP Configuration of the Repeater for the System Example shown in the previous. This table is useful to configure the Payload Channel of RTP in KAIROS Manager.

➤ For RTP Configuration (KAIROS Repeater of System Example)

Channel Parameters		Repeater 172.33.95.91	
		TS A	TS B
Channel Enabled		Check	Check
Send Data		Check	Check
Send RTP Extension		Check	Check
Send Local Echo*		Uncheck	Uncheck
Raw Data Exchange		Uncheck	Uncheck
Symmetric RTP		Uncheck	Uncheck
Voice Codec		(not care)	(not care)
Buffering [ms]		(not care)	(not care)
Voice IP Ports	From Console (RX)	(not care)	(not care)
	To Console (TX)	(not care)	(not care)
Data IP Ports	From Console (RX)	40200	40210
	To Console (TX)	40300	40310
Console IP Address		172.33.0.1	

Preparation of RTP Configuration for the Repeater

* If this Item is Enabled, OTAP Communication does not work.

4.2.2.2. Edit RTP Configuration

This section is described how to configure for RTP configuration with KAIROS Manager. Use the previous table to configure the RTP configurations. To configure the System Example, see the section from [3.2.1 RTP Configuration](#) to [3.2.1.3 Console IP Address](#).

Note: This configuration only need to be configured one repeater which OTAP Manager connects.

RTP Configuration - KAIROS <Y-SITE1>

TS A Channel Parameters	TS B Channel Parameters	ANALOG Channel Parameters
Channel Enabled ☒	Channel Enabled ☒	Channel Enabled ☒
Send Data ☒	Send Data ☒	Send Data ☒
Send RTP Extension ☒	Send RTP Extension ☒	Send RTP Extension ☒
Send Local Echo ☐	Send Local Echo ☐	Send Local Echo ☒
Raw Data Exchange ☐	Raw Data Exchange ☐	Raw Data Exchange ☐
Symmetric RTP ☐	Symmetric RTP ☐	Symmetric RTP ☐
Voice Codec: U_LAW	Voice Codec: U_LAW	Voice Codec: U_LAW
Buffering [ms]: 180	Buffering [ms]: 180	Buffering [ms]: 180
Voice IP Ports	Voice IP Ports	Voice IP Ports
From Console (RX): 40000	From Console (RX): 40010	From Console (RX): 40020
To Console (TX): 40100	To Console (TX): 40110	To Console (TX): 40120
Data IP Ports	Data IP Ports	Data IP Ports
From Console (RX): 40200	From Console (RX): 40210	From Console (RX): 40220
To Console (TX): 40300	To Console (TX): 40310	To Console (TX): 40320

Console IP Address: 172.33.0.1

Use OLD Equipment-ID Format ☐

Use FIXED timestamp on Header ☐

Read from File
Write on File
Read
Write
Close

After write the configuration, [Step1] completes.

4.2.3. [Step2] Connection setting to TIER II Conventional System for OTAP Manager

4.2.3.1. Advance preparation for configuration

Following table is described part of OTAP Manager Communication Profile settings for the System Example. This table is useful when configuring OTAP Manager.

➤ **For OTAP Manager (Communication Profile of System Example)**

Configuration Items		System Example
Adapter		172.33.0.1
Base Station ID		20
Access		Repeater
System Type		Conventional
IP Address		172.33.95.91
Repeater	TX Port	40200
	RX Port	40300

Preparation of Profile settings of OTAP Manager

OTAP Manager can only use either slot A or slot B. In this System Example, OTAP Manager only use Slot A.

The image displays two side-by-side screenshots of a configuration window titled "Data IP Ports". Each window contains two input fields: "From Console (RX)" and "To Console (TX)". In the left window, the RX value is 40200 and the TX value is 40300; these two fields are enclosed in a red rectangular box. In the right window, the RX value is 40210 and the TX value is 40310.

4.2.3.2. Add Communication Profile

Previous section "[3.1.1 Communication Profile](#)" is described how to add New "Communication Profile". Please see this section "[3.1.1 Communication Profile](#)".

4.2.3.3. Edit Communication Profile

In this System Example, OTAP Manager should be configured following table. See the "Reference Section" to configure the parameters.

Configuration Items		System Example	Reference Section
Adapter		172.33.0.1	3.1.1.1 Adapter
Base Station ID		20	3.1.1.2 Base Station ID
Access		Repeater	3.1.1.3.1 Access
System Type		Conventional	3.1.1.3.2 System Type
IP Address		172.33.95.91	3.1.1.3.3 IP Address
Repeater	TX Port	40200	3.1.1.4.1 TX Port
	RX Port	40300	3.1.1.4.2 RX Port

How to edit "Communication Profile"

4.3. Basic Settings

4.3.1. Enable RTP Service on KAIROS Manager

Connecting the KAIROS Repeater with KAIROS Manager, select menu [KAIROS – Configuration – Main Setup]. Following screen is displayed.

The screenshot shows the 'Main Setup - KAIROS <Y-SITE1>' window. The 'Features' section is highlighted with a red box. It contains the following settings:

- Run TRX Layer: ☒
- Run Station Layer: ☒
- Run RTP Layer: ☒
- Run SIP Layer: ☐

Other sections visible include:

- Equipment Name:** Y-SITE1
- Geographic Data:** Network Name: KAIROS_T3, Zone Name: Z1, Carrier Name: CH1, Site Name: YOKOHAMA, Maidenhead Locator: JJ00AA
- Identity Data:** Station ID: 64, Network ID: 160, 1+1 Address: 144, DMR ID: 2048, Group ID: 128
- Remote Control:** LAN Connection IP Port: 4000, Remote Control Via RF Link: Enabled on Timeslot A, Enabled on Timeslot B
- I/O Contacts:** ALARM OUT (ALR_OUT), EXT-1 IN (ALR_IN_1), EXT-2 IN (ALR_IN_2), AUX-1 OUT (IO_OUT_1), AUX-2 OUT (PTT_OUT), Fans Activation (FAN), ALARM Status Flag

Check the "Run RTP Layer". If this check box is "Uncheck" then RTP service does not work. Therefore OTAP Manager cannot use data communication.

4.3.2. Adjust the Hung Timer for data

Connecting the KAIROS Repeater with KAIROS Manager, select menu [KAIROS – Configuration – Base Station Layer Configuration]. Following screen is displayed.

The screenshot shows the 'Base Station Layer Configuration - KAIROS <Y-SITE1>' window. The 'Hung Times' section is highlighted with a red box. It contains the following settings:

- Hung Times [30 ms ticks] (0 · 32767):
 - Private Calls: 1000
 - Group Calls: 1000
 - Data Response: 1000
 - Channel: 0

Other sections visible include:

- Configuration:** Enable Repeater Mode, Direct Mode Reception, Send RC on Same Timeslot, Display IDLE Packets, Manual AT bit Handling, Enable ETSI Tier III features, TX: act as..., RX: act as..., MAIN Color Codes, AUX Color Codes
- Reports:** DMR Status, Digital Mode Enabled, TRANSMITTING, RECEIVING, MS-TO-MS DIRECT
- Internal Timings:** Current Second/Timeslot, Current Extended Timeslot, Last Received Timeslot, Frequency offset rx [Hz], Time offset rx [ms], Error Vector, Last Received Color Codes, Last Transmitted Data Types

Please check the "Hung Times" of "Data Response". If data communication does not good work then "Hung Times" of "Data Response" should be increase or some adjust parameter.

*This sample value is "1000", and almost 30sec.