BTI WIRELESS

COMMISSIONING GUIDE

CROSSFIRE

MP-PS-A

MID POWER Advanced

Dual Band Digital Radio
UL2524
Supports Band 700/800/900/UHF/VHF
Supports Tetra/P25/DMR/PMR/LTE
Passive Cooling
HVIN：PS-R23208

This device must be professionally installed.

- This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC License to operate this device.You MUST register Class B signal Boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.
- This is NOT a CONSUMER device. It is designed for installation by an installer approved by an ISED licensee. You MUST have an ISED LICENCE or the express consent of an ISED licensee to operate this device.
- Il ne s'agit PAS d'un dispositif CONSOMMATEUR. Il est conçu pour être installé par un installateur agréé par un titulaire de licence ISED. Vous devez avoir un LICENCE ISED ou le consentement exprès d'un titulaire de licence de l'ISED pour l'utilisation de cet appareil.
- To comply with FCC&IC RF exposure compliance requirements, each individual antenna used for this transmitter must be installed to provide a separation distance greater than 46cm or more from all persons during normal operation and must not be co- located with any other antenna for meeting RF exposure requirements.
- Pour se conformer aux exigences FCC&IC en matière d'exposition RF, chaque antenne utilisée pour cet émetteur doit être installée pour assurer une distance de séparation supérieure ou supérieure à 46 cm de toutes les personnes pendant le fonctionnement normal et ne doit pas être co-localisée avec une autre antenne pour satisfaire aux exigences d'exposition RF.
- Antenna gain should not exceed 0 dBi.
- Le gain d'antenne ne doit pas dépasser 0 dBi

Note: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including

interference that may cause undesired operation.

NOTE: This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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Content

System Overview

CrossFire MP-PS-A is a dual band digital DAS system supporting public safety coverage on fiber optic cable using the CPRI protocol. It adopts Feed-Forward and Class AB PA technology, allowing for deployment of legacy narrow band solutions while still benefiting from the digital transmission and filtering functionality. This platform is ideal for P25, DMR, PMR, LTE & Tetra technology either as standalone or complimentary with wide-band cellular deployments.

System Features

Up to 30dBm for VHF	Dual Band per Remote Unit
Up to 37dBm for UHF	UL-2524 Compliant
Up to 40dBm for 700/800/900MHz	Band/Carrier Selective Digital Filters
Radio Cascading and Loop	UL Squelch

System Connection

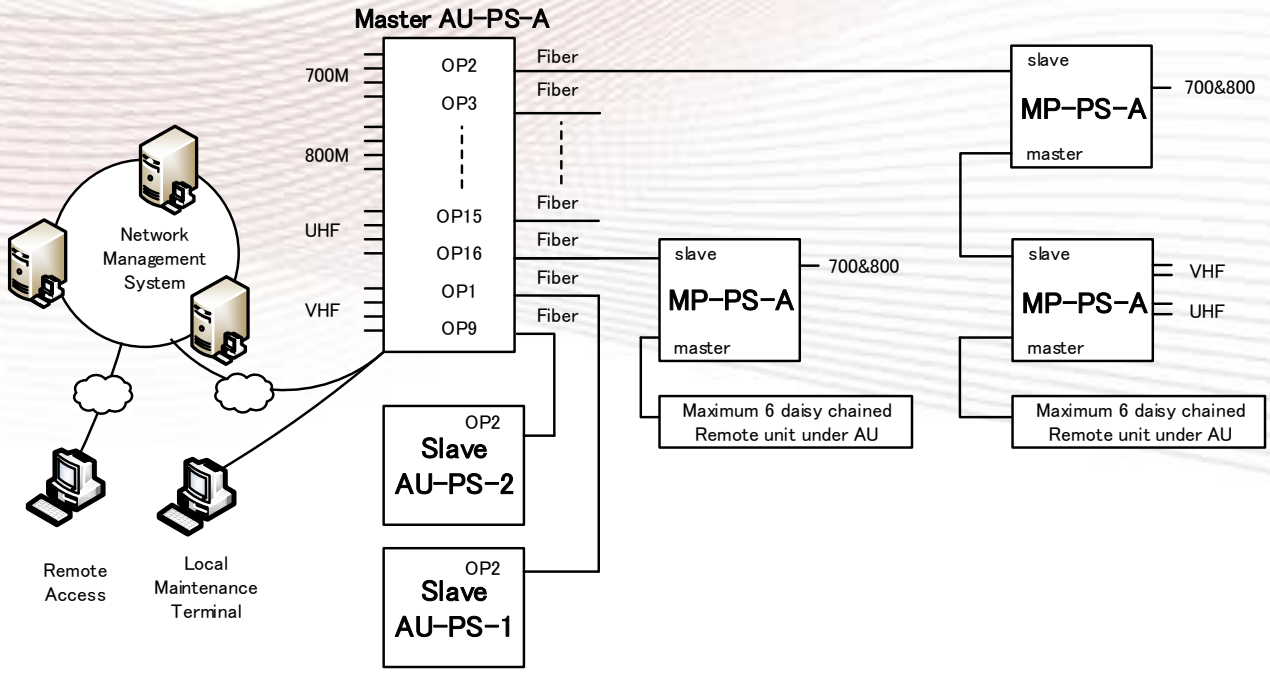


Figure 1 Typical System Connection

Pre-Commissioning

Before starting the commissioning process, verify the status of the equipment as follows:

Access Unit (AU-PS-A)

1. Verify that the correct band-specific Active Combiner modules are installed.
2. Ensure the RF cables between the BTS and modules on AU-PS-A are connected as designed.
3. Ensure the fibers are connected to the proper optical ports as designed.
4. Check LED of Status and Optical ports.

Remote Unit (MP-PS-A)

1. Verify that the correct band-specific PA modules are installed.
2. Ensure the RF cables from each RF port are connected tightly.
3. Ensure the optical transceivers are inserted and fibers are connected to the proper optical ports as designed.
4. Check LED of Status and Optical ports.

Interfaces and Indicators

AU-PS-A and MP-PS-A Interfaces and the Indicators are as below.

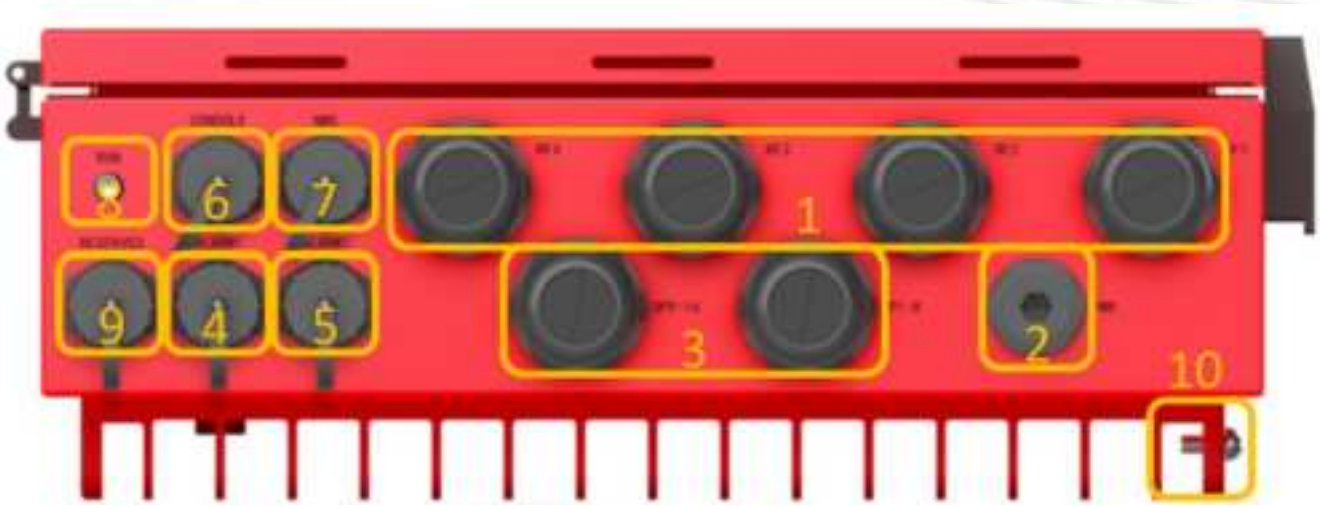


Figure 2 AU-PS-A Interface

1	4x Quad-Core RF Cable Glands	6	RJ-45 OMT Access Ethernet Port
2	Power	7	RJ-45 NMS Access Ethernet Port
3	2x Octa-Core Fiber Cable Glands	8	LED Status Indicator
4	RJ-45 External Alarm Interface 1	9	Reserved Annunciator Port
5	RJ-45 External Alarm Interface 2	10	GND

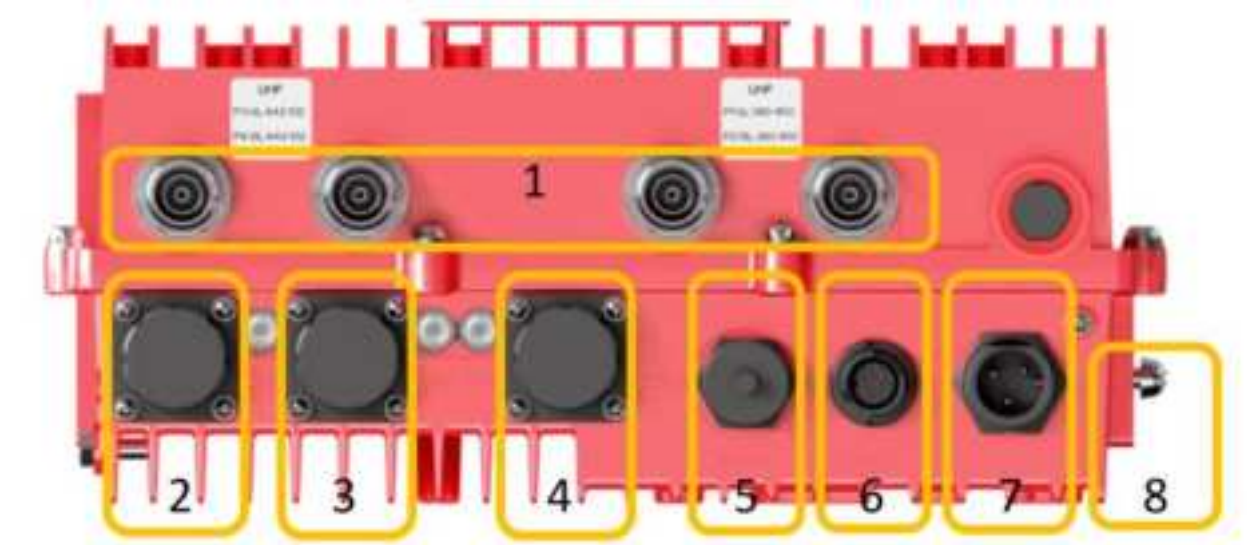


Figure 1. MP-PS-A Optical Port

1	1 ~ 4 RF Port (Number of ports depends on the band configuration)		
2	Slave OP Port	3	Master OP Port
4	RJ-45 Maintenance Interface	5	RJ-45 for Annunciator
6	Socket for External Alarms	7	Power
8	GND		

Optical Indicator	Description
Green	Normal
Red	The optical path is not synchronized, or optical module is not plugged in

Status Indicator	Description
Flash Green	Element is working without an alarm
Solid Green	Software is crashed, but it will reboot automatically in 3 mins
Flash Red	Element is working but with alarm
Solid Red	Software is crashed (with alarm), but it will reboot automatically in 3 mins
Flash Orange	Software is upgrading
Solid Orange	Element is booting

Operation and Maintenance Terminal

The Operations and Maintenance Terminal (OMT) software runs on all devices in the CrossFire system. WebOMT is the interface for OMT. WebOMT is based on a web browser and is compatible with most common browsers such as IE and Google Chrome. WebOMT is customized for CrossFire to query, debug, and configure parameters on devices.

The Master AU-PS-A is generally set as the Host of the system. Meanwhile, technicians can access the whole system through the WebOMT of any device (Master or Slave AU and RU) connected in the system.

Access to the OMT on the Master AU-PS-A

In the CrossFire system, the Master AU-PS-A is defined as Host. The default IP address of the AU-PS-A is 10.7.3.200.

To set up wired access to the OMT:

1. Connect a PC to the Master AU with a network cable in the CONSOLE port on the front panel.
2. Change the TCP/IP properties (see Figure 3):
    a. Click Network Connections
    b. Click Local Area Connection Properties
    c. Click TCP/IP Properties
    d. Change parameters as indicated:

        IP address: 10.7.3.1 (the last number is changeable except for 10.7.3.200)

        Subnet mask: 255.0.0.0

        Default Gateway: 10.7.3.200 (IP address of Master AU-PS-A)
3. Check the status of the Local Area Connection and confirm the connection.
4. Open a browser window and enter the default gateway in the navigation bar to access the WebOMT page. Figure 6 shows an example using https://10.7.3.200 as the default gateway.

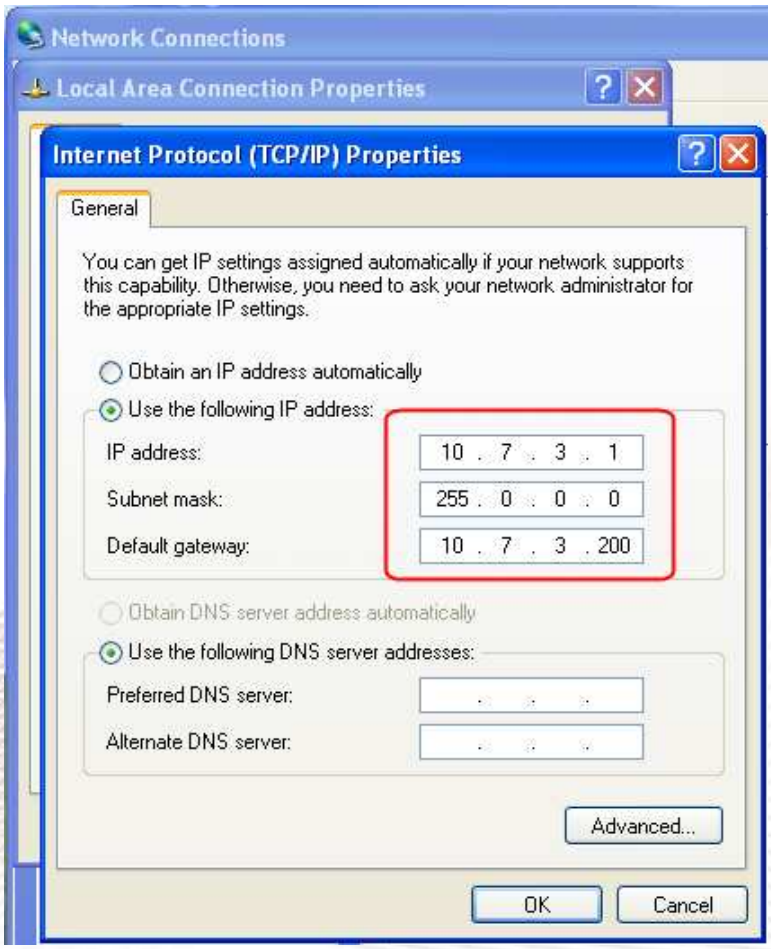


Figure 4. Wired Connection to the OMT on the Master AU-PS-A

Figure 5. Web Browser OMT Connection for Wired Access

Access to the OMT on the Slave Devices

In the CrossFire system, MP-PS-A and AU-AIR, as well as the Slave AU-PS-A, are defined as Slaves. They have no fixed IP address. The IP addresses are assigned by the host automatically, based on the network topology.

To set up wired access to the OMT:

1. Connect a PC to the slave device with a network cable in the CONSOLE / DEBUG port on the front panel.
2. Change the TCP/IP properties (see Figure 6):
    a. Enable Obtain an IP address automatically by clicking the check box.
    b. Enable Obtain DNS server address automatically by clicking the check box.
3. Check the status of the Local Area Connection and confirm the connection.
4. Open a browser window and enter the default gateway in the navigation bar to access the WebOMT page. Figure 11 shows an example using https://12.7.1.1 as the default gateway.

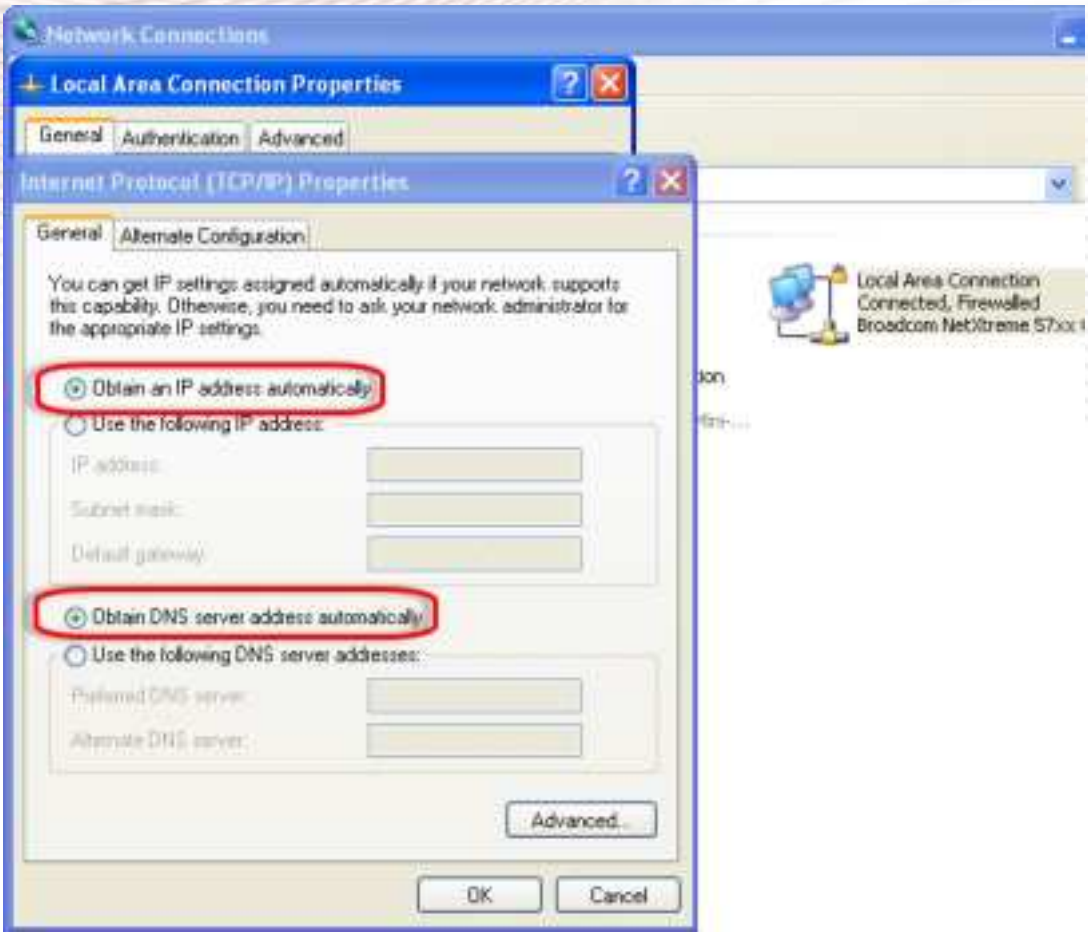


Figure 6. TCP/IP Properties Configuration – Slave devices

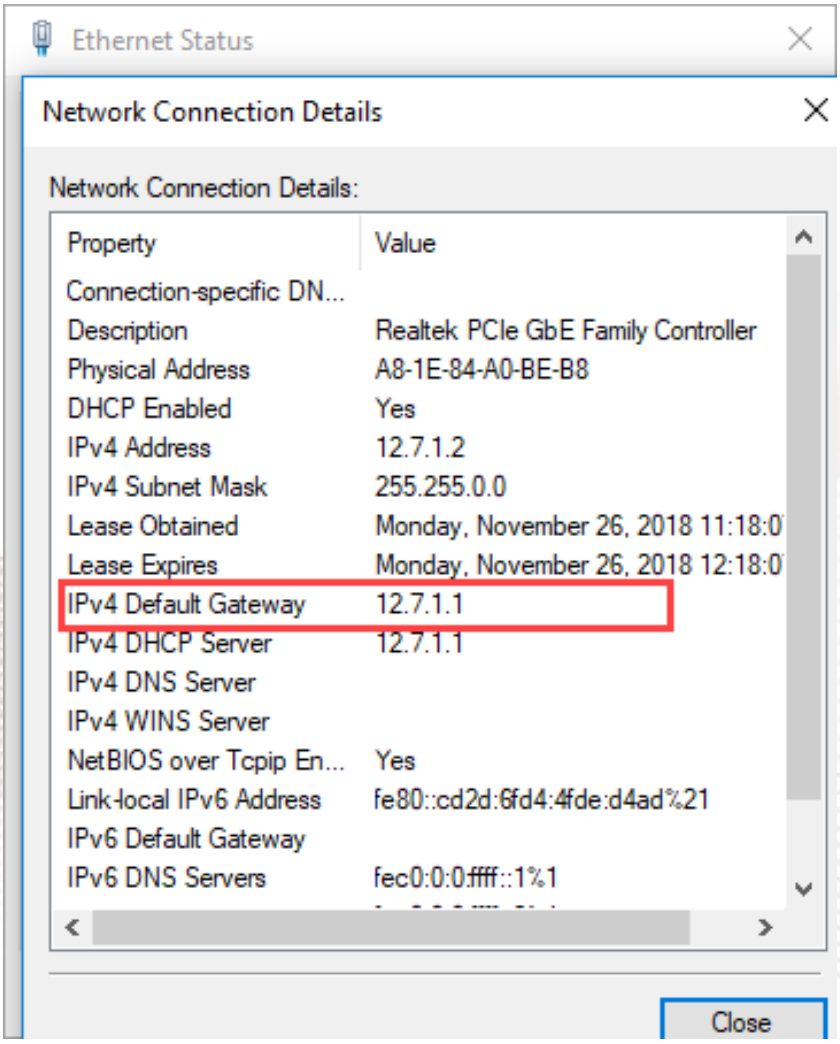


Figure 7. Wired Connection to the OMT on the Master AU-PS-A

Figure 8. Web Browser OMT Connection for Wired Access

User Login

1. Enter the IP address of the OMT you are trying to access.
2. Type the username and password in the field.

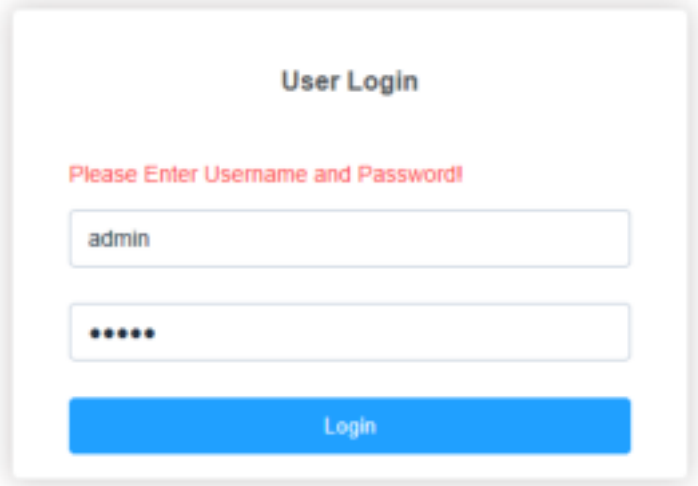


Figure 9. Login Screen

Account	Password	Access Level
admin	admin (default)	Fully administration permissions. (User Management)
Others	(null)	Installer, configuration, monitoring

Note: Only the **admin** account has the permission of user management, including creating a user profile, changing password.

Homepage and Basic Functions

When first logged in OMT, it displays the main page, as shown in Figure 9.

The topology of the system displays in the center of the main page.

Device icons in the topology have 2 colors:

Green icon: indicates this element is connected.

Red icon: indicates this element was once connected but is currently disconnected.

⚠ This symbol indicates the devices with alarms.

When a red icon shows up, check whether this device exists or not. If the device does not exist anymore, delete the device in the DAS Topo page.

Note: **D**eleting one device or all slave devices must be under **Factory Mode**. Access **Factory Mode** through **Maintenance -> Factory Command -> Factory Mode**. Enable the mode and click **Set** to validate it.

Figure 10. WebOMT Homepage

Tabs, buttons, and fields description (refer to corresponding numbers in Figure):

No.	Name	Description
1	Site Info	Includes “Device ID”, “Device Sub ID”, “Dev Type” and “Dev Name” information
2	Screenshot	Button used for saving the current parameter information and device operating status. (See more details in Section Screenshot)
3	Logs	Records the operating status of the devices. The logs can be downloaded and deleted on the Logs page.
4	Upgrade	Access to function that enables system and element upgrades. See more details in Section 5.5 Software Upgrade.
5	Register	This function is for BTI factory use only.
6	Configuration	Access to manage configuration files and restore configurations.
7	Log Out	Button used for logging out.
8	Operation Interface	Queries status and sets parameters.
9	Online User	Shows the users that are currently connected to the OMT and the IP address of each user’s device.
10	Operation Bar	Tabs that access pages that display and allow setting of device parameters.
11	Parameters Backup	Buttons that show/hide the parameter ID number & checkbox and save configuration parameters. See more details in Section 5.4 Backup/Restore Configuration.
12	Users	Displays user list.

Operation Bar

Figure 11 Operation Bar

Name	Description
Settings	
DAS Topo	All devices are automatically discovered and displayed in the topology.
System Info	Displays digital filter operating frequency, device temperature, etc.
Combiners	Displays Input power per port per module and adjusts the attenuation
Optical Power	TX / RX Power of SFP Modules.
LAN Connectivity	Displays general information includes software version, site information, serial number, etc.
SNMP Configuration	SNNP Configuration.
Alarms	
Device Alarms	Access to the real-time device general alarm list.
DL Input Power Alarms	Access to the real-time downlink input alarm list. Including Over input power alarm and under input power alarm.
Alarm Thresholds	Access to configure the alarm threshold as an over-temperature alarm threshold, input power alarm threshold, etc.
Channel/Band	
Radio Module 1/2/3/4	Operating channel/band frequency configuration;
Channel Power	Displays the channel power
Maintenance	
Digital Info	Displays digital baseband power and SFP parameters (TX/RX Power, voltage, wavelength, etc.)
Engineer	Access to maintenance function.
Software Package Info	Displays the current software package information and CRC code. Delete the saved software package by clicking the button Clear.
Factory Command	Used to obtain the permission to delete unwanted devices in the topology and initialize all alarms.

Network & Communicating Settings

The CONSOLE port of the Master AU-PS-A is pre-assigned from the factory with the default IP address – 10.7.3.200. To enable local/remote access to the system, you must assign a unique routable address within the domain of the local/wide-area-network.

Configure the IP address of the CONSOLE port as follows:

1. Log in the Master AU OMT, and go to the LAN Connectivity section.
2. Go to the IP Settings section and assign the following fields as appropriate:

   Protocol - The CrossFire system supports SNMP (Get & Set, Trap, etc.) and BTI NMS(UDP) for remote monitoring.

   NMS IP Addr - The BTI NMS IP Addr

   NMS Port - The Port number assigned for communication with BTI NMS

   Device IP Addr 1(NMS) - The address assigned to the AU for local and remote access

   Subnet Mask1(NMS)

   Default Gateway1(NMS)

   Device IP Addr2(CONSOLE) - The address assigned to the AU only for local access

   Device Port (UDP) - The Port number assigned for communication with BTI NMS

   Heartbeat Interval - The interval in which the Master AU sends a heartbeat to the surveillance server.

3. Click Set to save the setting.

IP Settings

☐	Protocol	UDP	
☐	NMS IP Addr	10.7.3.100	
☐	NMS Port	80	
☐	Device IP Addr1(NMS)	10.7.3.200	
☐	Subnet Mask1(NMS)	255.0.0.0	
☐	Default Gateway1(NMS)	10.7.0.1	
☐	Device IP Addr2(CONSOLE)	9.7.3.200	
☐	Subnet Mask2(CONSOLE)	255.0.0.0	
☐	Default Gateway2(CONSOLE)	9.7.0.1	
☐	Device Port(UDP)	100	
☐	Heartbeat Interval Time	300	s

Figure 12 IP Address Configure

NMS Configuration

BTI Network Management System (NMS) is a software system to achieve remote monitoring, alarm reporting, and remote configuration of all the devices.

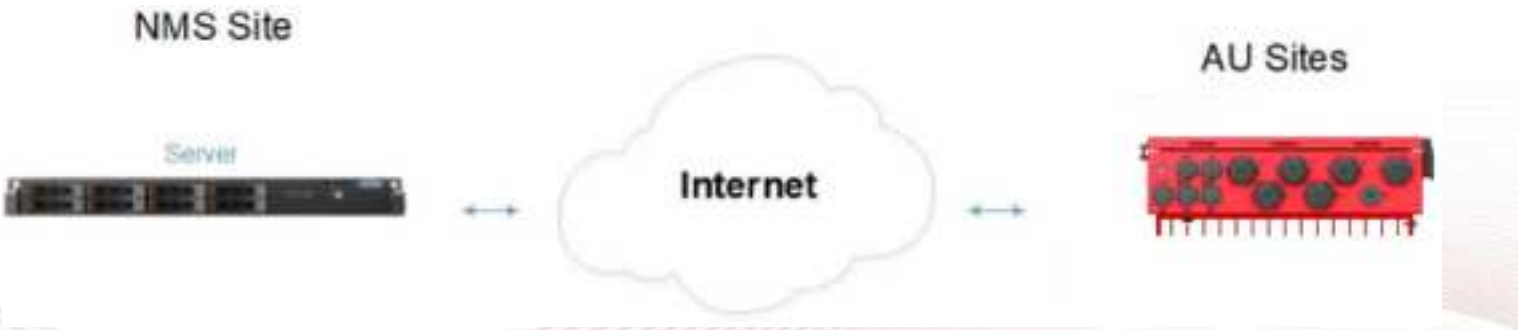


Figure 13. NMS System Architecture

Use the following steps to configure NMS IP settings.

1. Log in the Master AU OMT, and go to the LAN Connectivity section.
2. Go to the IP Settings section and select UDP protocol, as shown in Figure 13.
3. Locate the fields and set the appropriate values:

   NMS IP Address - The target IP address of NMS Server.

   NMS Port - The target port of NMS Server (default defined port of 80).
4. Click Set to save the setting.

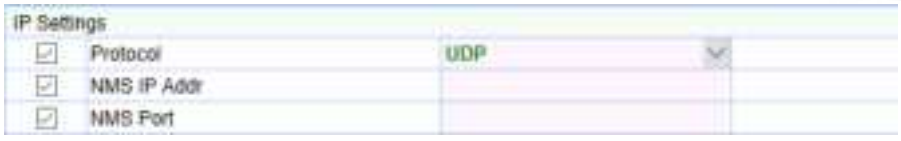


Figure 14. NMS Configuration

SNMP Configuration

The Master AU generates SNMP traps and delivers them through the CONSOLE Ethernet interface.

The CrossFire system supports SNMP V2 and V3 in this current version.

To configure SNMP settings:

1. Log in the Master AU OMT, and go to the LAN Connectivity section.
2. Go to the IP Settings section and select the SNMP protocol, as shown in Figure 14.
3. Click Set to save the setting.
4. Go to the SNMP Configuration section and select the appropriate SNMP Trap Protocol.

   SNMP Trap Protocol - The trap protocol to send the SNMP trap.

Figure 15. SNMP Trap Protocol

5. Locate the fields and set the appropriate values:

   For **SNMP V2**

   Trap IP Address (1~2): Up to 2 target IP address of SNMP trap receiver.

   Trap Port: The target port of the SNMP trap (default defined port of 162).

   For **SNMP V3** (See Figure 15 for details)

   Reset USM - USM Reset

   Security User Name - Security User Name

   Authentication Protocol - Authentication Protocol

   Authentication Password - Authentication Password

   Privacy Protocol - Privacy Protocol

   Privacy Password - Privacy Password

   Edit User Confirm - Edit User Confirm

   Trap IP Address (1~2) - Up to 2 target IP address of SNMP trap receiver.

   Trap Port - The target port of SNMP trap (default defined port of 162).

   Trap IP Addr Security EngineID - The Security EngineID of target Trap IP address.

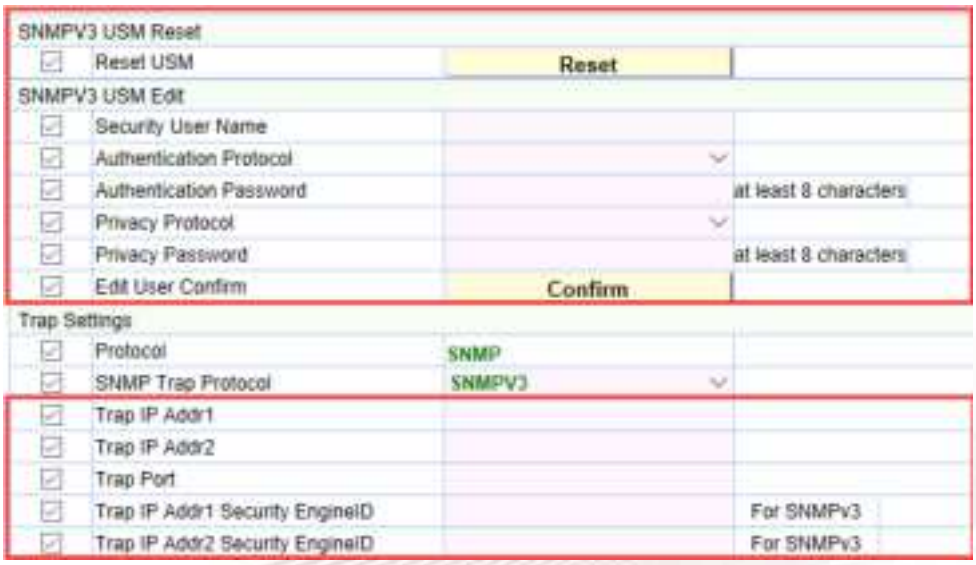


Figure 16. SNMP V3 Configuration

6. Go to the Trap Resend section at the bottom of the page.

   Trap Resend Enabled: **On** / **Off** to enable / disable trap resend.

   Trap Resend Interval: The interval time to resend the SNMP trap.

   Community: Community Identifier.

   Delete History Alarm: Click **Confirm** to delete history alarms.

7. Click Save to save the settings.

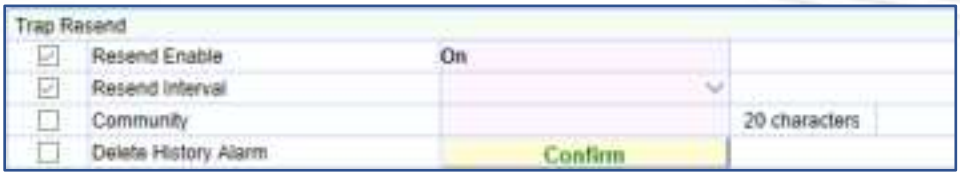


Figure 17. Trap Resend

Note that the Write/Read Community in SNMP server to communicate with CrossFire Public Safety Device is 'Community + Device Sub ID'. For example, the defaut community is 'public' and the Device Sub ID of Master AU-PS-A is '0'. SNMP Server must use 'public0' to communicate with Master AU-PS-A.

Additional Settings

Site Info

1. Log in the Master AU OMT, and go to the LAN Connectivity section.
2. Locate the *General* fields and set the appropriate values:

   Device ID - Unique hexadecimal number used to identify the site, default 00000000.

   Device Sub ID - Device number in a single system, auto-assigned by Master AU or manually set by the user.

   Device Location - The detailed device installation location.

   Site Name - The detailed device site name

   Device Name -The detailed device name
3. Click Set to save the setting.

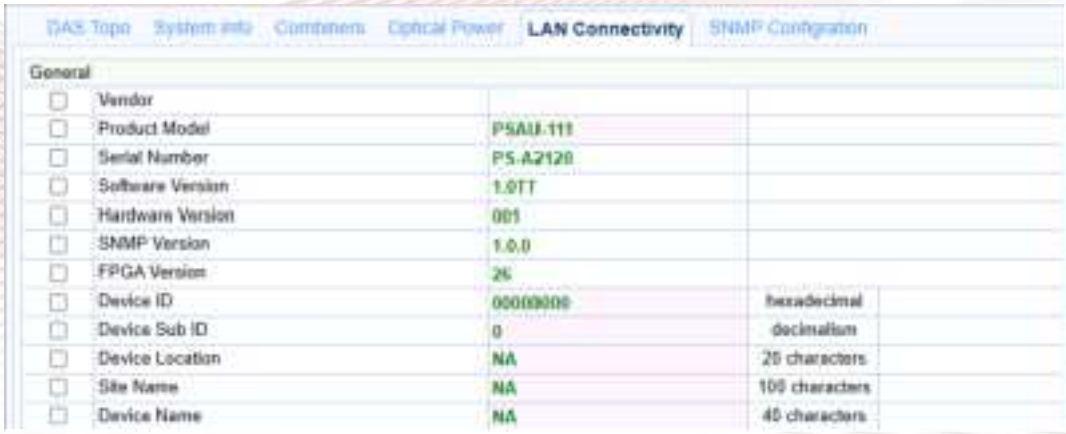


Figure 18. Site Info Configuration

Time Synchronization

The CrossFire system uses a local timeclock on Master AU to create timestamps for locally generated alarms.

1. Log in the Master AU OMT, and go to the LAN Connectivity section.
2. Locate the Date and Time section at the bottom of the page and click Query to check the current setting.
3. Click now to synchronize the system time with the local PC time.
4. Go to the Time Zone section at the bottom of page.
5. Select the appropriate time zone and click the button Set to validate the settings.

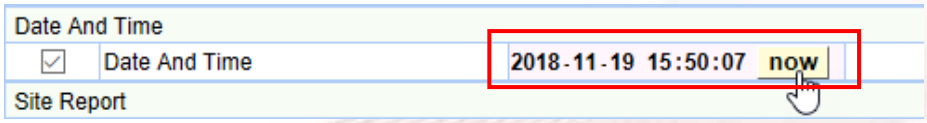


Figure 19. Time Synchronization

Figure 20. Time Zone Setup

Note: If the NMS is connected to the NTP server, the CrossFire system time is updated automatically and periodically.

Local Access Control

To Enable / Disable the Local Debug Port of all slave devices in the system.

1. Log in the Master AU OMT, and go to the LAN Connectivity section.
2. Locate the Local Access Control section at the bottom of the page.
3. Select Enable / Disable and click the button Set to validate the settings..

Figure 21. Local Access Control

System Configuration

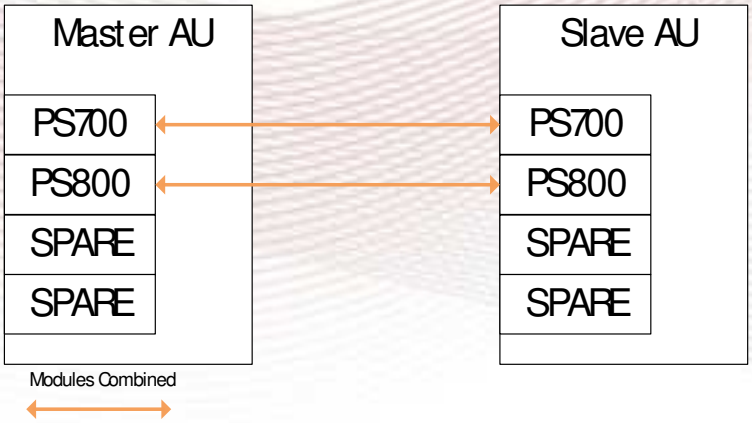
Frequency Channel/Band Configuration

According to the different base station operating frequency channels or bands for each operator, select the active combiner modules for the AU-PS-A and active PA modules for the MPRU with the corresponding frequency channel or band and set the frequency properties in the OMT of the Master AU-PS-A and Slave AU-PS-A.

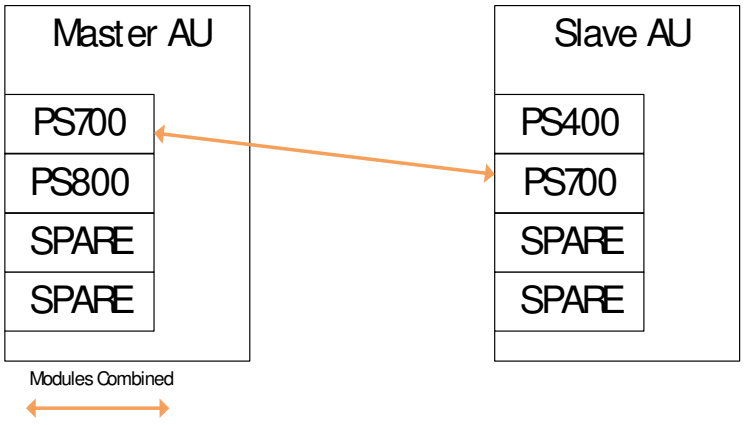
The AU-PS-A and MP-PS-A support 2 operating modes - wideband and channelized filters. The public safety solution also provides Master/Slave AU-PS-A modules combined function that 2 same band modules(separated in Master and Slave AU) combine all input power of different RF service mapping to one RU PA module.

For example, the system has 6 RF service in a same band, like PS700, mapping to one RU module. Because each module has only 4 port for RF service, we need 2 x PS700 modules for this case, one in Master AU; another one in Slave AU. Then the system will combine all 6 RF service from 2 modules and transmit combined signal to RU PA module.

Example1



Example2



To configure the channel or band frequency of active combiner modules in the AU-PS-A:

1. Log in the AU-PS-A OMT, and go to the **Channel/Band** section.

Figure 22 General Settings of Frequency/Band Configuration

UL/DL Operating frequency band limits - Read Only

Filter Count - Max.12 channelized filters and Max.4 Wideband Filters per band per system

Including Master AU-PS-A, Slave AU-PS-A.

Low Delay Mode - Enable or Disable the Low Delay Mode.

If enable Low Delay Mode for Channelized filter, Only uplink channel is turned on and downlink channel will be invalid.

If enable Low Delay Mode for Wideband filter, Only downlink channel is turned on and uplink channel will be invalid.

Note - Only Radio Module 4 can support VHF Band.

2. Verify the uplink and downlink operating frequency band limits for Module 1, 2, 3, and 4.
3. Set the appropriate values in Channelized Filter Configuration and Wideband Filter:

   Signal UL Centre Freq - The uplink centre frequency of the channel or band.

   Signal DL Centre Freq - The downlink centre frequency of the channel or band.

   Bandwidth – The bandwidth of channelized and wideband filters.

   Filter Delay - Channelized – Filter Selection

   Filter Selection - Type A/B/C/D

   Type A: 40us / 50dB @ 70KHz offset; Type B: 65us / 50dB @ 30KHz offset

   Type C: 90us / 50dB @ 20KHz offset; Type D: 160us / 50dB @ 10KHz offset

   Note: Each Carrier can have different Filter Delay Selection.

   RF Signal Switch – Disable/Enable the RF channel or band.

Note:	Each band can operate with channelized and wideband filters together at same time. However the channelized filter shall not exceed 12 and wideband filter shall not exceed 4. The UL/DL Centre Freq and Bandwidth shall not over range of the band of AU-AC.

4. Click Set to save the settings and then click Update button to validate the settings.

5. Click Query all to verify the value of the Info Check is valid.

Note: If the Info Check is invalid after configuration, check if the Signal UL/DL Centre Freq are correct and retry Update.

Figure 21 Frequency Configuration

Module Gain Adjustment (Attenuation)

In CrossFire, the downlink input power of the AU is specified as -10dBm, and the maximum allowable input power is 10dBm. CrossFire has an automatic level control (ALC) function to balance the input power around -10 dBm at the input port. What's more, AU and RU digital board have attenuation configuration for Gain Adjustment.

Gain Adjustment on AU (Active Combiner)

Each active combiner module has four ports that support up to 4 inputs, and each input is reduced by its corresponding attenuator as shown in Figure 24.

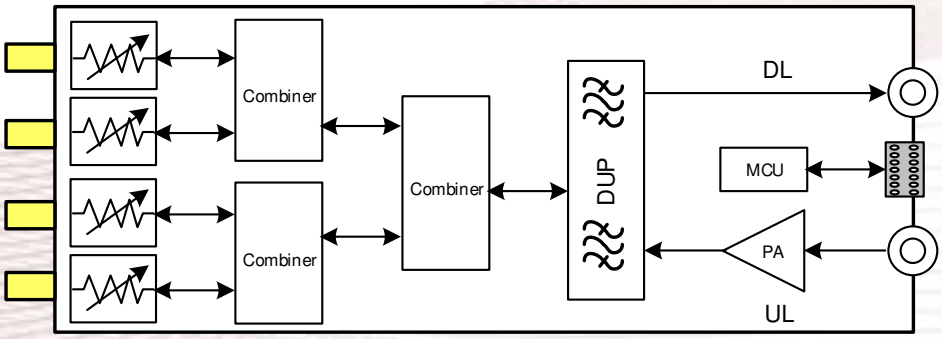


Figure 24. Active Combiner Block Diagram

To adjust the gain of the active combiner modules.

1. Log in the Master AU OMT, and go to the Combiners section.
2. Select the desired attenuation control mode and click Set to save the setting.

   Combiner ATT Control Mode - The mechanism to maintain the input power no higher than -10 dBm.

   Automatic Mode - The internal ALC function is working when the peak input power exceeds -10 dBm. The host can allocate the maximum output power of each operator in percentage(%).

   Manual Mode - Reduce input power by setting the attenuation manually.

   Adjust Interval - The interval time to automatically reduce the attenuation in 2dB step when the peak input power decrease.

   Combiner Att Reset - Reset all the attenuation values.

3. Locate the field and set the appropriate values:

   For Manual Mode: Set the appropriate value in the field of **Port Attenuation Value**.

   For example: if Port 1 input power is -4.5 dBm / Port 2 input power is -1.0 dBm and the composite output power is divided by fifty-fifty, set 8.5 dB (-4.5dB – (-10) + 3dB) in Port 1 Attenuation Value and 12.5 dB (-1.0 – (-10) +3dB) in Port 2 Attenuation Value. (Note: Extra 3dB attenuation is used for power distribution).

   For Automatic Mode: Set the appropriate value in the field of **Port Power Offset** for power distribution.

   For example: If the system has 2 operators in Port1/2 and each operator shares 50% output power at RU side. Then configure Port 1/2 Power Offset to 50%/50%.

If the system has 3 operators in Port1/2/3 and Operator 1 shares 50% and Operator 2/3 share 25%/25% output power at RU side. Then configure Port 1 Power Offset to 50% and Port 2/3 to 25%/25%.

4. Set the operator information in the field of Port 1 ~4 Operator.

5. Click Set to save the settings.

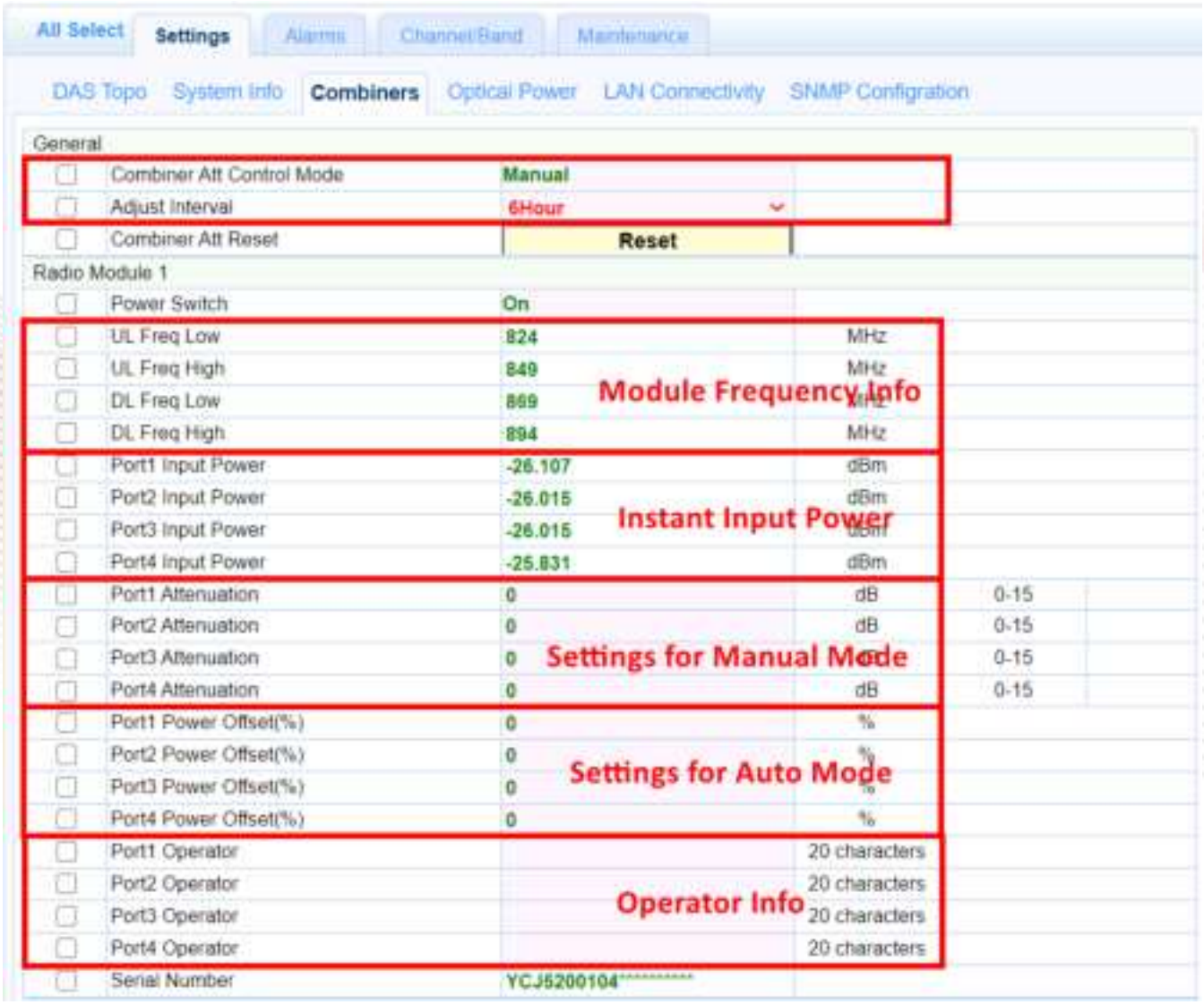


Figure 25. Channel Gain Adjustment

Gain Adjustment on AU-PS-A (Digital Board)

To configure the downlink and uplink attenuation for each band as follows:

1. Log in the AU WebOMT, and go to the System Info section.
2. Locate the fields and set the appropriate values:

   RF Signal Switch - Turn On / off the signal transmission.

   UL Attenuation - UL attenuation to reduce the uplink input power, range 0 – 20 dB

   DL Attenuation - DL attenuation to reduce the composite output power, range 0 – 20 dB
3. Click Set to save the settings.

Note: The downlink attenuation setting determines the maximum output power.

Note: It is recommended that no more than 10 dB attenuation be set.

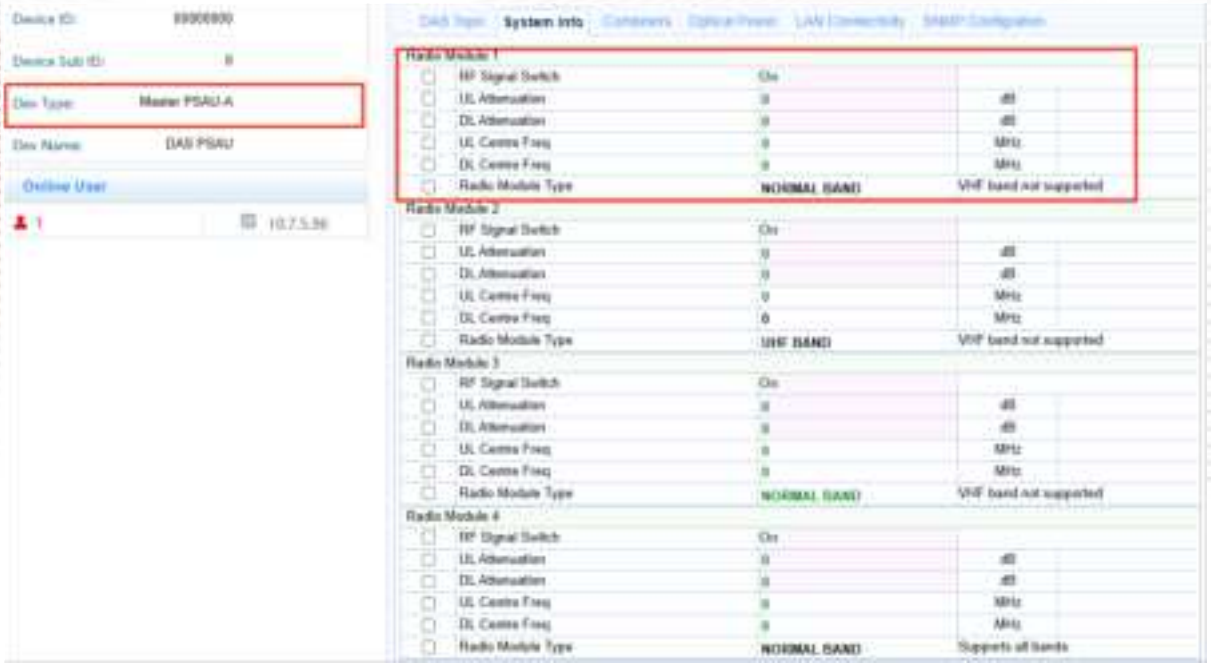


Figure 26. Gain Adjustment on AU-PS-A (Digital Board)

Gain Adjustment on MP-PS-A

The downlink attenuator settings determine the maximum composite output power level at the antenna port.

The uplink attenuator settings determine the balance between the uplink and downlink signals.

To adjust the downlink and uplink gain:

1. Log in the RU WebOMT, and go to the Band Configuration section.
2. Locate the fields and set the appropriate values:

   RF Signal Switch - Turn On / off the signal transmission.

   UL Attenuation - UL attenuation to reduce the uplink input power, range 0 – 20 dB

   DL Attenuation - DL attenuation to reduce the composite output power, range 0 – 20 dB
3. Click Set to save the settings.
4. Go to System Info section to check the downlink output composite power and VSWR.

Note: Increased UL attenuation will affect the Noise Figure. The UL noise floor has to be taken into consideration.

For reference, the Noise figure is lower than 4 with 0 attenuation and increased to 13 with 15 dB attenuation.

Note: It is recommended that no more than 10 dB attenuation be set.

Figure 27. Gain Adjustment on RU WebOMT

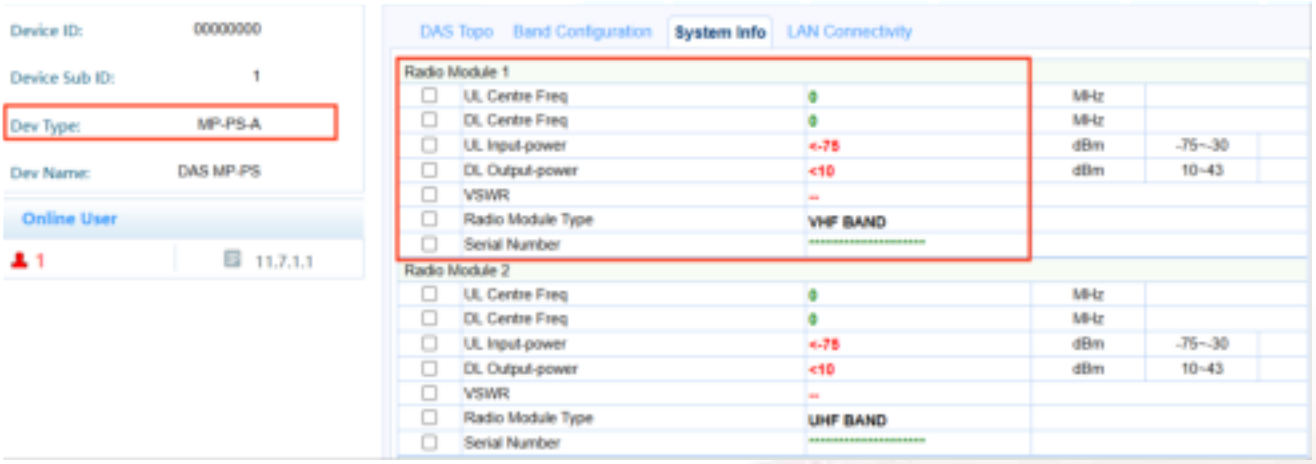


Figure 28. Check Output Power and VSWR

Alarm Settings

Alarm Severity

The CrossFire System supports four different alarm levels – Warning, Minor, Major, and Critical.

To set up the appropriate alarm severity:

1. Log in the WebOMT, and go to the Alarms section.
2. Select the appropriate severity in the drop-down box for the alarm in use.
3. Click Set to save the settings.
4. Wait 3 minutes after completing the setup, then query to see if there is an alarm.

   Blank Indicator means alarm disabled.

   Green color means no alarm.

   Red color means the alarm is triggered.

Note: All alarms are default disabled at the factory. Disable the alarms not in use to avoid false alarms.

Note: Power Interruption Alarm and Battery Failure Alarm can **NOT** be enabled if there is no accumulator installed.

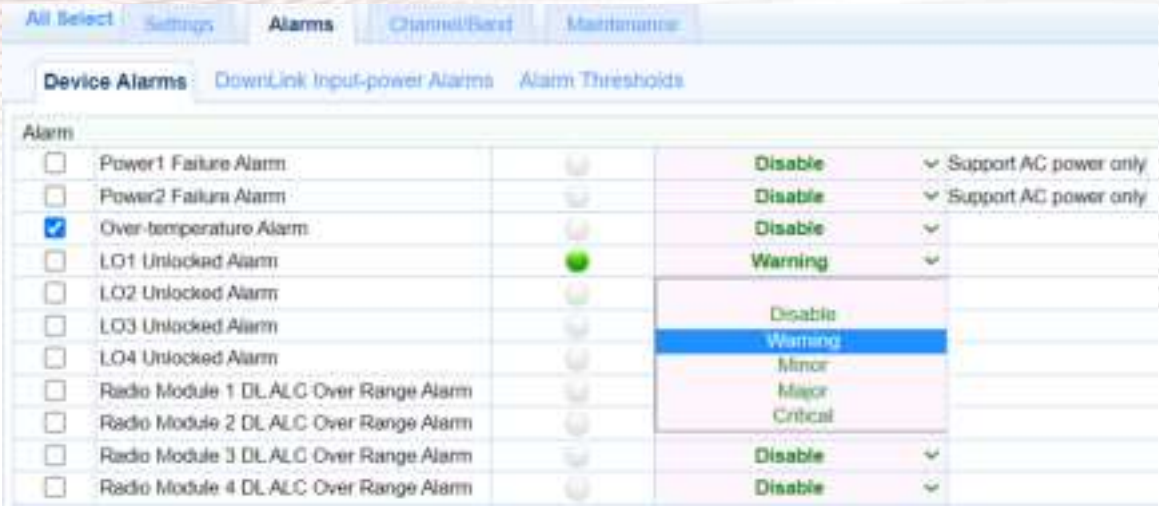


Figure 29. Alarm Severity Setup

External Alarm

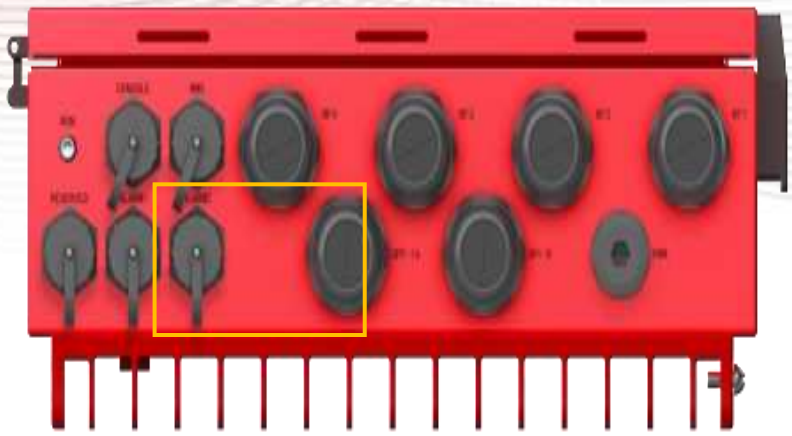
The CrossFire system supports external alarms inputs such as UPS failure, condition of air, entrance guard, etc.

External Alarm of AU-PS-A

The external alarms are input to a RJ45 interface located on the front panel of AU-PS-A. See Figure 30 for the detailed PIN configuration of this connector. The external alarms can be monitored as normally closed or normally open

Use the following steps to view and configure the external alarms.

1. Log in the AU-PS-A OMT, and go to the Element **Alarms** section.
2. Select the appropriate alarm level for external alarm in use at the bottom of the page.
3. Click **Set** to save the settings.
4. Go to the **Alarm Thresholds** section
5. Type **External alarm name** and select **Normally closed** or **Normally open** mode.
6. Click **Set** to save the name.



1	RJ-45 External Alarm Interface 1	External Output Alarm 1~4
2	RJ-45 External Alarm Interface 2	External Input Alarm 1~4

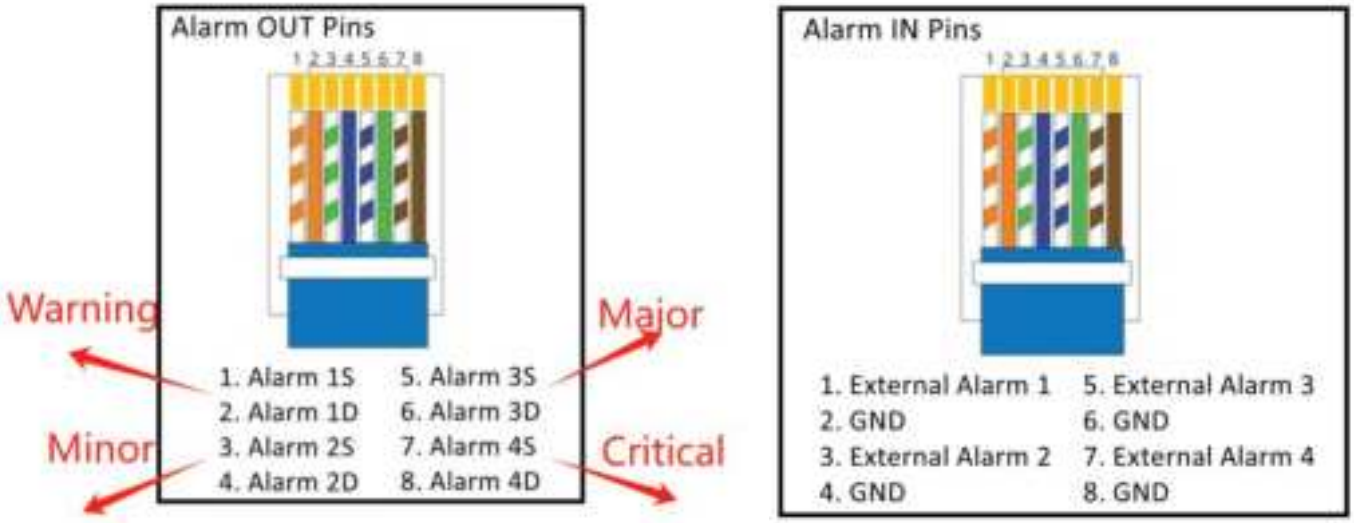


Figure 10. RJ45 Pins Description

☐	External Alarm 1	●	Warning	
☐	External Alarm 2	●	Warning	
☐	External Alarm 3	●	Warning	
☐	External Alarm 4	●	Warning	

Figure 11. External Alarms on AU-PS-A OMT

External Alarm				
☐	External Input Alarm 1 Mode Select	Normally open		
☐	External Input Alarm 2 Mode Select	Normally open		
☐	External Input Alarm 3 Mode Select	Normally open		
☐	External Input Alarm 4 Mode Select	Normally open		
☐	External Input Alarm 1 Label	null	20 characters	
☐	External Input Alarm 2 Label	null	20 characters	
☐	External Input Alarm 3 Label	null	20 characters	
☐	External Input Alarm 4 Label	null	20 characters	
☐	External Output Alarm(warning) Mode Select	Normally open		
☐	External Output Alarm(minor) Mode Select	Normally open		
☐	External Output Alarm(major) Mode Select	Normally open		
☐	External Output Alarm(critical) Mode Select	Normally open		
☐	External Output Alarm(warning)	●		
☐	External Output Alarm(minor)	●		
☐	External Output Alarm(major)	●		
☐	External Output Alarm(critical)	●		

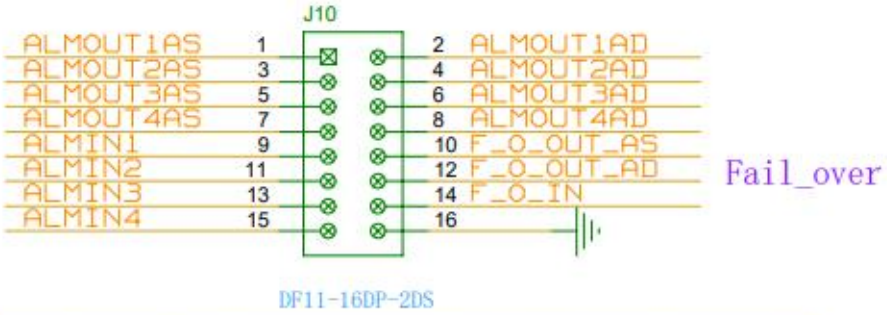
Figure 12. External Alarms Name and mode

External Alarm of MP-PS-A

The external alarms are connected to the MP-PS-A using a special interface located on the front panel of the MP-PS-A (4 x Inputs, 4 x Outputs). See Figure 33 for detailed PIN configuration of this connector. The external alarms can be monitored as normally closed or normally open.

Use the following steps to view and configure the external alarms.

1. Log in the MP-PS-A OMT, and go to the **Element Alarms** section.
2. Select the appropriate alarm level for external alarm in use at the bottom of the page.
3. Click **Set** to save the settings.
4. Go to the **Alarm Thresholds** section
5. Type **External Alarm Label, External Alarm Level** and select **Normally closed** or **Normally open** mode.
6. Click **Set** to save the name.



ALMOUT1	Active RF-emitting devices malfunction
ALMOUT2	Active system component malfunction
ALMOUT3	Reserved
ALMOUT4	Reserved
EXALMIN1	Loss of AC power
EXALMIN2	Battery charge failure
EXALMIN3	Loss of battery capacity
EXALMIN4	Remote shutoff

Figure 11 Socket Pins Description

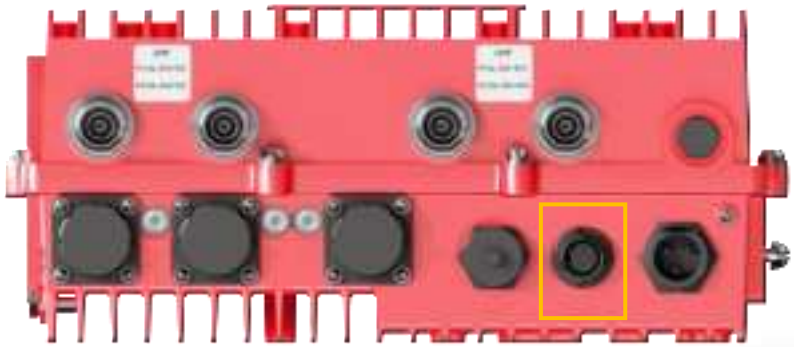


Figure 14. External Alarm Port on MP-PS-A

☐	Loss of AC power		Disable
☐	Battery charge failure		Disable
☐	Loss of battery capacity		Disable
☐	Remote shutoff		Disable

Figure 15. External Alarms on MP-PS-A OMT

External Alarm				
☐	Loss of AC power Mode	Normally open	Input Alarm 1 Mode	
☐	Battery charge failure Mode	Normally open	Input Alarm 2 Mode	
☐	Loss of battery capacity Mode	Normally open	Input Alarm 3 Mode	
☐	Remote shutoff Mode	Normally open	Input Alarm 4 Mode	
☐	Loss of AC power Label	NA	20 bytes	
☐	Battery charge failure Label	NA	20 bytes	
☐	Loss of battery capacity Label	NA	20 bytes	
☐	Remote shutoff Label	NA	20 bytes	
☐	Active RF-emitting devices malfunction Mode	Normally open	Output Alarm 1 Mode	
☐	Active system component malfunction Mode	Normally open	Output Alarm 2 Mode	
☐	Reserved 1 Mode	Normally open	Output Alarm 3 Mode	
☐	Reserved 2 Mode	Normally open	Output Alarm 4 Mode	
☐	Active RF-emitting devices malfunction		Output Alarm 1 Indication	
☐	Active system component malfunction		Output Alarm 2 Indication	
☐	Reserved 1 Indication		Output Alarm 3 Indication	
☐	Reserved 2 Indication		Output Alarm 4 Indication	

Figure 16. External Alarms Name and mode

MP-PS-A Uplink ALC Threshold Configuration

Only UHF/VHF bands can support MP-PS-A Uplink ALC Threshold Modification.

1. Login to MP-PS-A OMT and go to Channel/Band Section.
2. Go to ALC/Squelch 1 page.
3. Configure the Rated Threshold within the range from -50 to -30dBm.

MP-PS-A Uplink Noise Floor Squelch

This uplink noise floor squelch feature is valid only for Channelized filters. Can manage the 12 channels individually.

1. Login to MP-PS-A OMT and go to Channel/Band Section.
2. Go to ALC/Squelch 1 page.
3. Configure the Carrier Uplink Squelch.

- Squelch Switch - Enable or Disable
- RX threshold - Upper Limit@ Power Increasing
- Hysteresis - Lower Limit@Power Decreasing

For example, RX threshold is set to -50dBm and Hysteresis is set to -70dBm. So when uplink input power is increasing, uplink output will be turned on until the input power is greater than -50dBm. And when uplink input power is decreasing, uplink output will be turned off until the input power is lower than -70dBm.

Master/Slave AU-PS-A Transition

Slave AU-PS-A is used for upgrading the CrossFire system to support up to 4 discrete bands in SISO or MIMO formats. Each AU-PS-A is factory-set to be the Master AU-PS-A.

To change a Master AU-PS-A to slave.

1. Power on the AU-PS-A which will be set to be the Slave AU-PS-A.
2. Login to the AU-PS-A OMT and go to the Maintenance section.
3. Go to the Engineering section and locate the Advanced Command section at the bottom of the page.
4. Select Slave AU-PS-A from the drop-down menu and click Set to save the settings.
5. Wait for the AU-PS-A to reboot automatically and then connect to the CrossFire system.
6. Login the AU-PS-A OMT and verify the device type in the field of Site Info on the homepage.

Note: Do NOT connect the AU-PS-A to the CrossFire system before being set to Slave AU-PS-A.

Figure 18. Master / Slave AU-PS-A Transition

Figure 19. Device Type Check

Screenshot

When you require BTI assistance to troubleshoot the system, use the Screenshot function to save all the parameters and send the compression file to the BTI technicians.

To use the Screenshot function:

1. Log in to the OMT. Click Query all to obtain all the parameter values of the specified page.
2. Click Screenshot button at the top of the main page to capture.
3. Click the Configuration button to access the configuration page.
4. Check box for the Screenshot file and click the Download button to download it to the local disk.

Note: Query all the parameters before Screenshot.

Note: Verify the name and the date of the screenshot file before download.

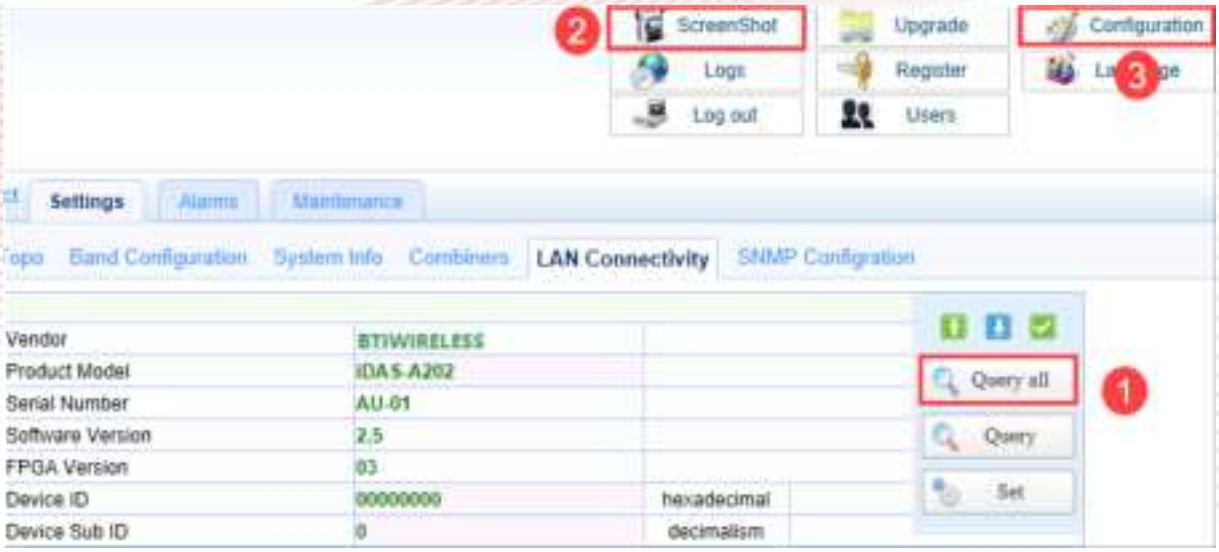


Figure 40 Screenshot Steps

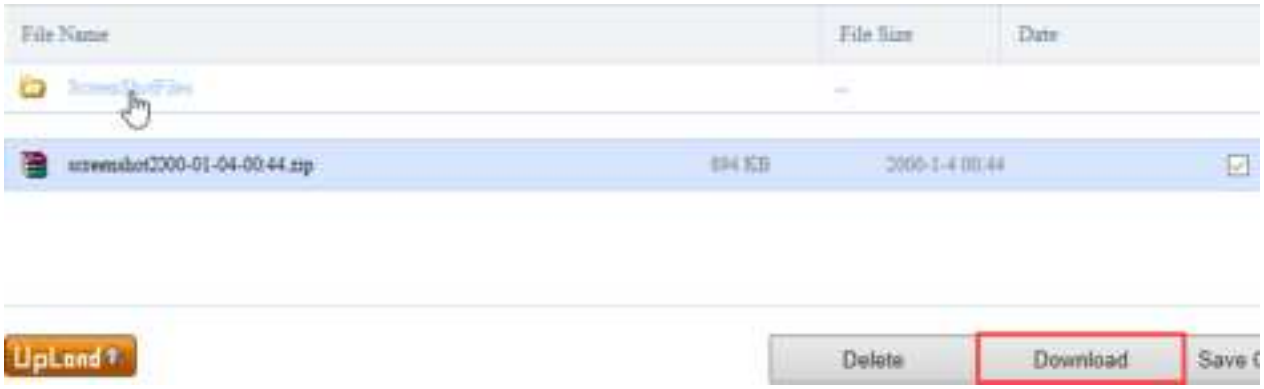


Figure 41 Download Screenshot File

Backup/Restore Configuration

The CrossFire system supports to backup and restore the configuration files.

Back-Up Configurations

To create a back-up file:

1. Log in to the OMT and click the icon to show/hide the parameter ID.
2. Check boxes for the parameters you want to back up.
3. Click the icon to save the settings.
4. Click the button Configuration to access the page for configuration management.
5. Click the button Save Configurations to create a back-up file.
6. Check box of the back-up file and click the button Download to save the file to the local disk.
7. Click the button Delete to delete the unwanted backup files.

Note: The button is only enabled after checking the selected parameter.

Note: The parameters have to be saved once per sub-tab.

Note: Do NOT back-up Power Interruption Alarm and Battery Failure Alarm if there is no accumulator installed.

Figure 42 Create a back-up file

Figure 43. Download the back-up file

Figure 44. Create a backup file successfully

Restore Configurations

Backup files created can be used to restore a known state to devices in the system. This may be helpful if a failed device is replaced with a “blank” device, or to copy known configurations into devices to speed up a large configuration.

To restore the configurations.

1. Log in to the OMT and click the button Configuration to access the configuration page. (6 in Figure 10)
2. Click the button Upload to upload a backup file and check box.
3. Click the button Load Configuration to restore the configurations.
4. Click the button Delete to delete the unwanted backup files.

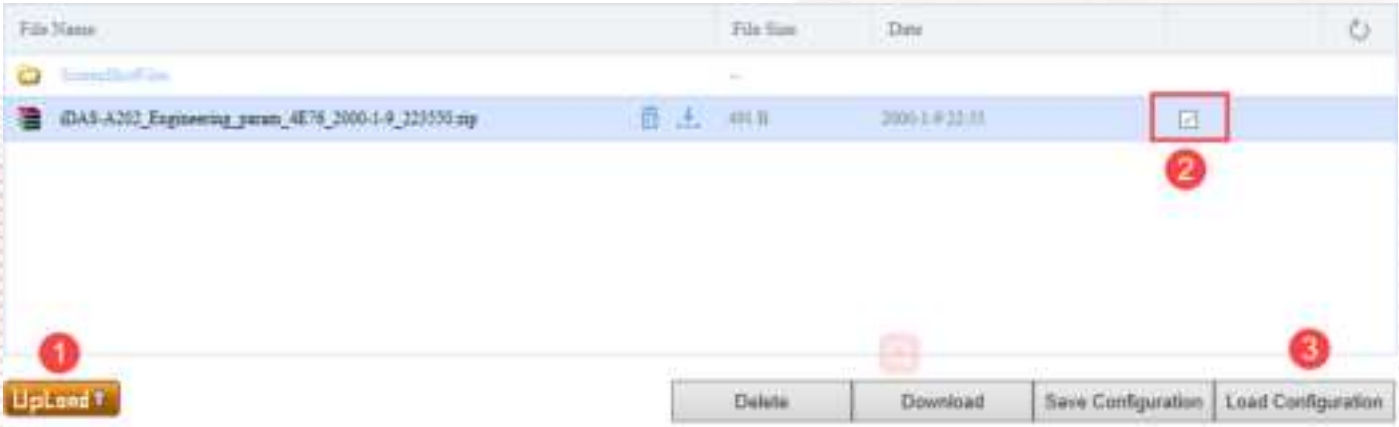


Figure 45. Restore a back-up file

Figure 46. Restore configurations successfully

Software Upgrade

The CrossFire system supports local upgrade via OMT and remote upgrade via SFTP.

The Master AU-PS-A consolidates the management of software upgrades for the entire system and saves the last software package information for AU-PS-A and MPRU. Slave devices will compare the local software with the latest information saved in Master AU-PS-A by checking CRC at run time. If the CRC is different, slave devices will be synchronized via the current software package from Master AU-PS-A. Therefore, when a slave device is replaced, its software will be upgraded automatically without any additional operation.

Note: If it is the Master AU-PS-A to be replaced in a system, ensure that the software packages stored in the old and new AU-PS-A are identical. If not identical, upload and upgrade the software before connecting the new Master AU-PS-A to the system.

To check the software packages:

1. Log in the Master AU-PS-A OMT, and go to the Maintenance section.
2. Go to the Software Package Info section and click on Query all to check all software package version.

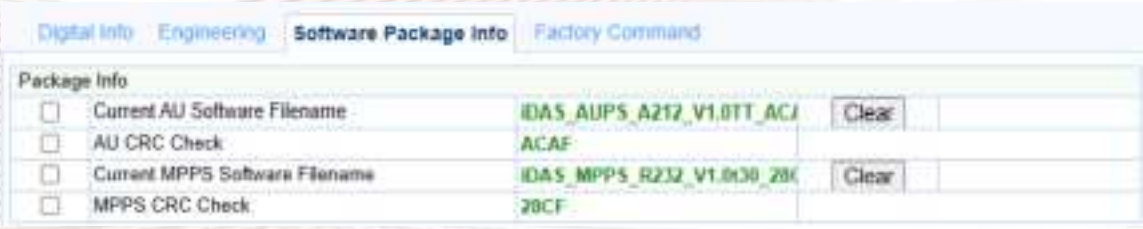


Figure 47. Checking Software Package Version

Local Upgrade

The CrossFire system supports local sync-upgrade. There are two steps for the system software local sync-upgrade. First, upload the software package to the master AU-PS-A. Second, slave devices will be synchronized automatically via the master AU-PS-A if the CRC is different. Please make sure the upgrading from the lowest level device to the highest level device (MPRU -> AU-PS-A). The AU-PS-A must be the last one to be upgraded.

To upgrade the software locally:

1. Log into the WebOMT on the Master AU-PS-A. Click the Upgrade button on the main page to navigate to the software upgrade page.

Figure 48. Software Upgrade 1

2. On the software upgrade page, as shown in Figure 49, click the Upgrade button to upload the software package file.

Figure 49. Software Upgrade 2

Note: The master AU-PS-A software storage is currently limited to 50MB. Please be aware of not exceeding the limitation and check that the software package size is as large as its size in local after uploading. Uploading and upgrading software packages will fail if there is no more storage. Delete some packages with the old version to continue the upgrade.

3. After the software package uploads successfully, check box and click the Upgrade button to start to upgrade.

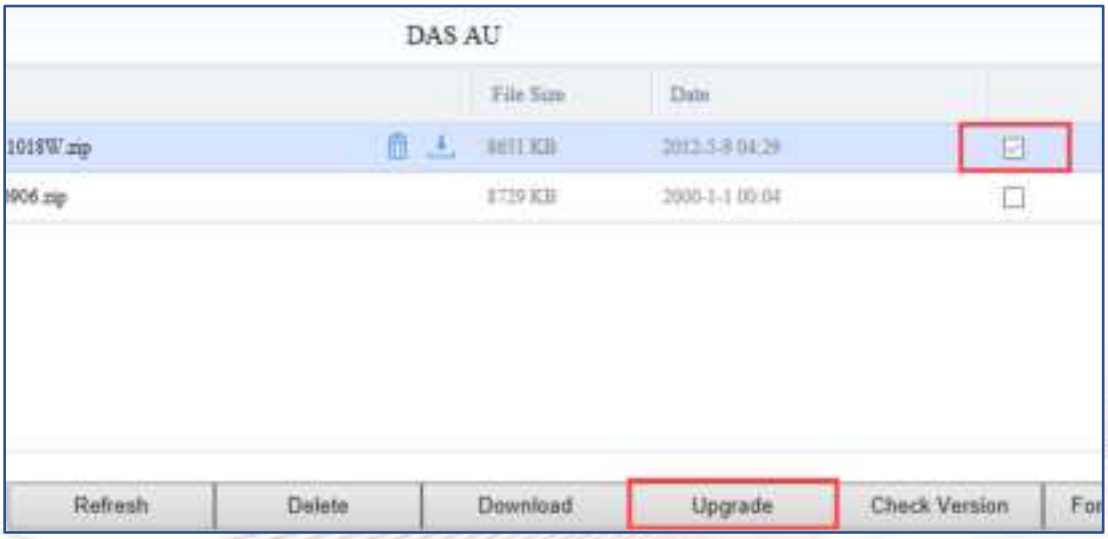


Figure 50. Software Upgrade 3

4. After the upgrade has been completed and devices reset, log in to the devices' OMT and go to Maintenance -> Software Package to confirm that the software version is correct.

5. And then go to Settings -> LAN Connectivity to confirm that the software version is correct.

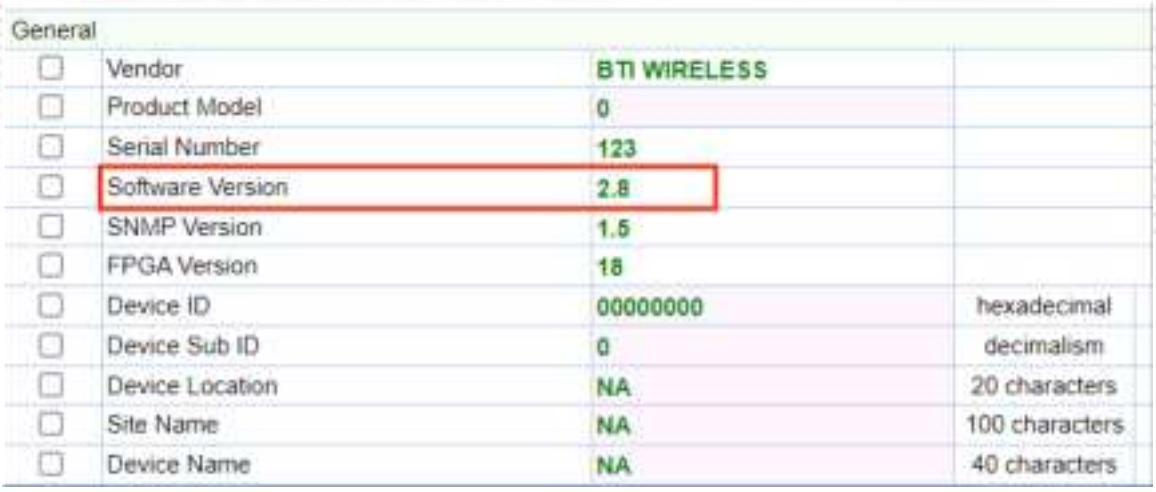


Figure 51. Software Version Check

Note: If the software version is not incompatible, please upgrade the same software again to make upgrade completed.

Remote Upgrade

To configure for remote upgrade:

1. Log in the Master AU-PS-A OMT, and go to the LAN Connectivity Section.
2. Go to the SFTP Settings section at the bottom of the page.
3. Set the appropriate values in the fields and click Set to save the settings.

   Server IP Addr (SFTP) - The IP address of the SFTP server.

   Server Port (SFTP) - The port of SFTP Server.

   SFTP Username - Username to access the SFTP server.

   SFTP Password - Password to access the SFTP server.

   Upgrade File path - The file path to obtain the software package from SFTP server,

   Upgrade Filename - The name of the software package file.

   SFTP File Transfer Control - Start / Cancel the software upgrade.
4. Select Start Upgrade and click Set to enable software upgrade.
5. Check the software version after the software upgrade is completed.

Figure 52 Setting up Remote Upgrade via SFTP

Note: Remote upgrade software WITHOUT the preceding configurations if the system connects to BTI NMS.

Note: Ensure that the SFTP server is running and the software package has been stored in the specified directory.

Note: If the software version is not incompatible, please upgrade the same software again to make the upgrade completed.

Fiber Chained Switch Over (Loop Back)

Fiber Chained Switch over enables the systems remaining link even if there is a disconnection in the link, such as fiber is broken or one middle device shut down.

Connect the whole system as Figure 53 to link additional fiber from RU4 back to AU.

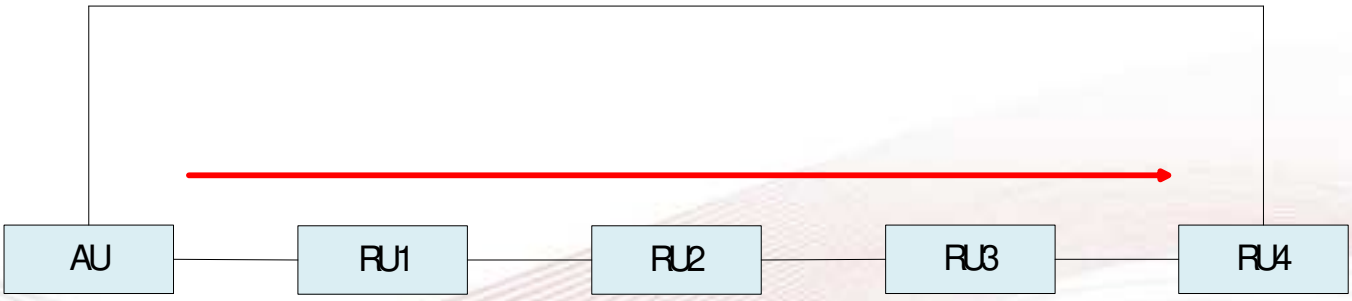


Figure 53. AU - RU (1)

When fiber is broken between RU1 and RU2 as Figure 54, the additional fiber will alternately connect RU4 to AU to make the entire system alive.

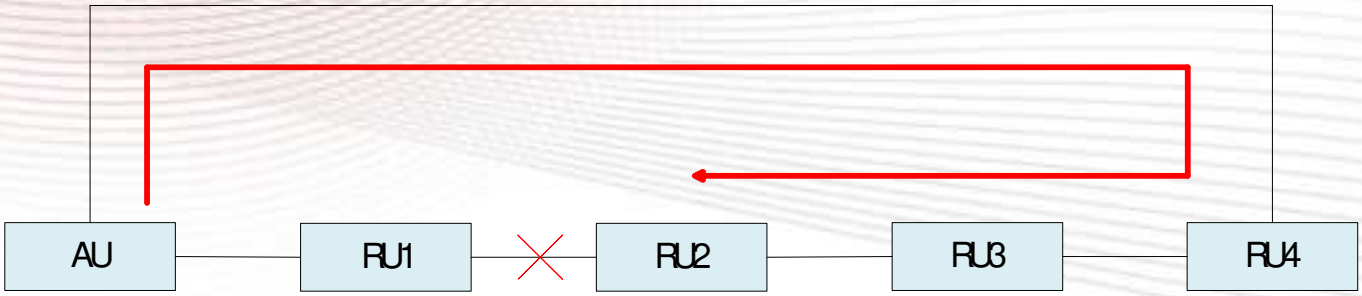


Figure 54. AU - RU (2)

Failover Function

Refer to document *BTI_FO_CF_MP-PS-A*