AIMA-FRAS

OPTICAL ANALOG FORWARD RECEIVER

Product user manual

technetix

Online

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Technetix Group Limited
2018-08/EN V1

Contents

1 About this manual

1.1 Related documentation

The following documents may be used in conjunction with this manual:

- AIMA3000 - Product user manual
- AIMA ASMM - Product user manual
- AIMA3000 NMS web management system product user manual
  - NMS3-EPSM - Basic inventory management
  - NMS3-EPSM - Basic alarm management
  - NMS3-EPSM - Basic system management
  - NMS3-EPSM - Basic template management

1.2 Document conventions

Before you use the manual, please familiarise yourself with the format used in this manual.
‘*’Asterisk: Points marked with an asterisk means there is a corresponding note on the page.

1.3 Technical Support

If you need help in the process of setting up and maintaining an FPAS, please contact Technetix's technical support staff:

Europe:

Technetix BV
Kazemat 5
NL-3905 NR Veenendaal
P.O. Box 385
NL-3900 AJ Veenendaal
The Netherlands

Phone: +31 318 58 59 59
Email: customer.service.vdl@technetix.com

2 Precautions

WARNING!

This equipment is intended for indoor applications. To prevent fire or electrical shock, or damage to the equipment, do not expose units to water or moisture.

- You should carefully read and thoroughly understand the contents of the manual before installing and using this equipment.
- A typical connector is the SC/APC.
  Note: 8° angle polished optical connectors must be used.
- At any time, there may be dangerous voltage inside the device.
- **DO NOT** power up before the cover and the panels of the equipment are installed and the enclosure is closed.

Cleaning

Only use a damp cloth to clean the front panel. Use a soft dry cloth to clean the top of the unit. **DO NOT** use any spray cleaners or chemicals of any kind.

Outage or overload requiring service and repairs

Unplug the unit and refer the servicing to qualified service personnel only.

Servicing and repairs

DO NOT attempt to service this unit yourself. Refer all servicing needs to qualified service personnel only.

3 Overview

3.1 FRAS overview

3.1.1 Product description

The Analog Forward Path Receiver - Standard (FRAS) is designed to plug into the latest generation Advanced Intelligent Multi-services Access platform - the AIMA3000.

The FRAS is available in single and dual port configurations. It incorporates a low noise front-end circuit that receives optical wavelengths from 1260 nm to 1620 nm and converts them into RF signals for Master Antenna Television (MATV), CATV, and broadband applications. The supported RF bandwidth is from 45 to 1218 MHz.

The module offers a superior frequency response with a low distortion profile and low noise characteristics.

The FRAS optical receiver module features automatic gain control (AGC), which is based on broadband detection or through optional pilot signal detection.

The RF output AGC threshold level and the slope can be managed remotely.

3.1.2 Product Key Features

- Plug-and-play AIMA3000 platform module
- Superior performance with a low noise profile and minimal distortion characteristics
- High RF output for flexible deployment
- Supports Automatic Gain Control (AGC) for a stable RF output
- Electronic slope control
- Electronic gain setting and AGC adjustable thresholds
- Broadband GaAs amplifier technology
- Support for CENELEC and NTSC standards up to 110 channels (analog and digital)
- Comprehensive status monitoring and alarm with the NMS network management software
- HMS compliant
- Remote firmware upgrade and auto upload/download of configuration files through ASMM web interface or using the NMSE
- Bulk firmware updates through the NMSE
- FCC, CE and RCM[1] compliant

[1] See Declaration of Conformity for current status.

3.1.3 Specifications

Optical performance

Optical bandwidth	1260 - 1620 nm
Optical input	-5 - +3 dBm
Optical return loss	> 60 dB
Optical connector	SC / APC [1], FC / APC, LC / APC, E2000 / APC

RF performance

RF bandwidth	45 - 1218 MHz
RF output level[2]	40 dBmV
RF flatness	± 0.75 dB
Gain adjustment	0 - 20 dB
Slope adjustment	0 - 7 dB
ACG range (input variation)	10 dB
AGC accuracy	±0.5 dB over AGC range
RF impedance	75 Ω
RF return loss	> 16 dB
RF test point relative to RF output port	-20 ± 1 dB
RF OUT connector	GSK-type female
RF test point	Mini-SMB
Alarms and status	Front-panel LEDS, SNMP traps

Notes:

[1] Standard option. Contact a Technetix Sales Representative for availability of other options.

[2] Measured in a typical system with 0 dBm optical input, 3% - 4% OMI, and dBuV=60+dBmV.

Link Performance[1]

CNR	> 53 dB
CSO	> 65 dB
CTB	> 70 dB

General

Power supply	Powered via AIMA3000 backplane
Power consumption	< 12 W (without FBC module) < 17 W (with FBC module)
Operating temperature	-5 - 55°C
Operating humidity	90% (non-condensing)
Storage temperature	-25 - +70°C
Storage humidity	90% (non-condensing)
Dimensions (W*D*H)	24.6 * 410 * 152.5 mm
Weight	0.88 kg
Network management	NMSE or through ASMM's web interface

With the FBC Module

Frequency capture range	45 - 1000 MHz
Demodulation mode	QAM64, QAM256
Metrics and functions available	Level, SNR, MER, BER and live spectrum

Notes:

[3] Loaded with 77 NTSC channels, measured with PBN referenced optical transmitter, 0 dBm, 3% - 4% OMI.

3.1.4 Block diagram

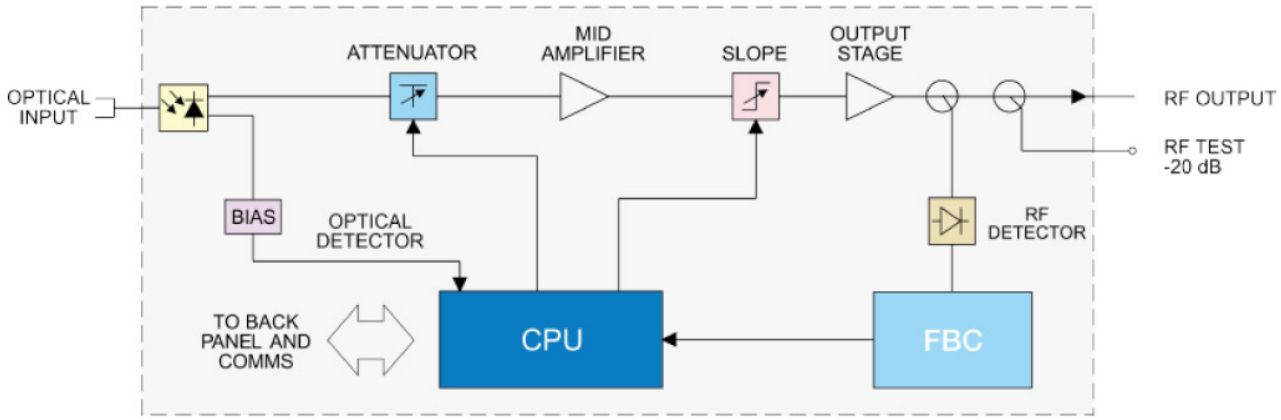


Figure 3-1 block diagram FRAS

Table 3-1 FRAS block diagram glossary

Parameters	Glossary RF
OPTICAL INPUT	Optical input port
ATTENUATOR	Pre-attenuator
MID AMPLIFIER	Mid-stage amplifier
SLOPE	Slope control
OUTPUT STAGE	Post-amplifier
RF OUTPUT	RF output port
RF TEST -20 dB	-20 dB RF output test port
RF DETECTOR	RF sensor
FBC	Full band capture
BIAS	Bias voltage measurement
CPU	Micro-processor
TO BACKPLANE AND COMMS	Module power and communication interface
MODULE POWER SUPPLIES	Supply bus

3.1.5 Order details

A-FRAS-[W]-[X]-[Y]-[Z] Analog Forward Receiver – Standard

Options:

W Optical input ports

S	Single[1]

X FBC function[1]

Y Optical connector type

S	SC/APC[2]
F	FC/APC
L	LC/APC
E	E2000/APC

Z Bandwidth

1G	45 - 1000 MHz (standard)
12	45 - 1218 MHz

Notes:

[1] Option for FBC Management configurations only. Please omit X when selecting a model without FBC function.

[2] Standard option. Contact a Technetix Sales Representative for availability of other options.

3.2 FRAR overview

3.2.1 Product description

The Analog Forward Receiver - Redundant (FRAR) is designed to plug into the latest generation of Advanced Intelligent Multi-services Access platform - the AIMA3000.

The FRAR is available in single port configurations. It incorporates a low noise front-end circuit that receives optical wavelengths from 1260 nm to 1620 nm and converts them into RF signals for Master Antenna Television (MATV), CATV, and broadband applications. The supported RF bandwidth is from 45 to 1218 MHz.

The module offers a superior frequency response with a low distortion profile and low noise characteristics.

The FRAR optical receiver module features automatic gain control (AGC), which is based on broadband detection. The RF output AGC threshold level and the slope can be managed remotely.

3.2.2 Product Key Features

- DOCSIS 3.1 Compatible with operating bandwidth up to 1218 MHz
- Plug-and-play with the AIMA3000 platform
- Superior performance with a low noise profile and minimal distortion characteristics
- High RF output for flexible deployment
- Supports Automatic Gain Control (AGC) for a stable RF output
- Electronic slope control
- Electronic gain setting and AGC adjustable thresholds
- Broadband GaAs amplifier technology
- Support for CENELEC and NTSC standards up to 110 channels (analog and digital)
- Comprehensive status monitoring and alarm with NMS network management software
- SCTE-HMS MIB compliant
- Remote firmware upgrade and auto upload/download of configuration files through ASMM web interface or using the NMSE
- Bulk firmware updates through the NMSE
- Fully FCC, CE, and RCM compliant

[1] See Declaration of Conformity for current status.

3.2.3 Specifications

Optical performance

Optical bandwidth	1260 - 1620 nm
Optical input	-10 - +3 dBm
Optical return loss	> 50 dB
Optical connector	SC/APC [1], FC/APC, LC/APC, E2000/APC

RF performance

RF bandwidth	45 - 1218 MHz
RF output level[2]	40 dBmV
RF flatness	± 0.75 dB
Gain adjustment	0 - 20 dB
Slope adjustment	0 - 7 dB
ACG range (input variation)	10 dB
AGC accuracy	± 0.5 dB over AGC range
RF impedance	75 Ω
RF return loss	> 16 dB
RF test point relative to RF output port	-20 ± 1 dB
RF OUT connector	GSK-type female
RF test point	Mini-SMB
Alarms and status	Front-panel LEDS, SNMP traps
Redundant switching time	Typical: < 30 ms

Link Performance[1]

	NTSC [4]	**CENELEC (42 ch) [5]**
CNR	> 52 dB	> 52 dB
CSO	> 68 dB	> 70 dB
CTB	> 70 dB	> 70 dB

General

Power supply	Powered via AIMA3000 backplane
Power consumption	< 12 W
Operating temperature	-5 - +55 °C
Operating humidity	90% (Non-condensing)
Storage temperature	-25 - +70 °C
Storage humidity	90% (Non-condensing)
Dimensions (W*D*H)	24.6 * 410 * 152.5 mm
Weight	0.88 kg
Network management	NMSE or through ASMM's Web Interface

Notes:

[1] Standard option. Contact a Technetix Sales Representative for availability of other options.

[2] Measured in a typical system with 0 dBm optical input, 3% - 4% OMI.

[3] dBuV=60+dBmV.

[4] Loaded with 77 NTSC channels, measured with an optical transmitter @ 0 dBm, 3% - 4% OMI.

[5] Loaded with 42 CENELEC channels, measured with an optical transmitter @ 0 dBm, 3% - 4% OMI.

3.2.4 Order details

A-FRAR-[W]-[Y]-[Z] Analog Forward Receiver – Redundant

Options:

X Optical input ports

S	Single[1]

Y Optical connector type

S	SC/APC*
F	FC/APC
L	LC/APC
E	E2000/APC

Z Bandwidth

1G	45 - 1000 MHz (standard)
12	45 - 1218 MHz

Notes:
*Option for FBC Management configurations only. Please omit X when selecting a model without FBC function.

3.2.5 Block diagram

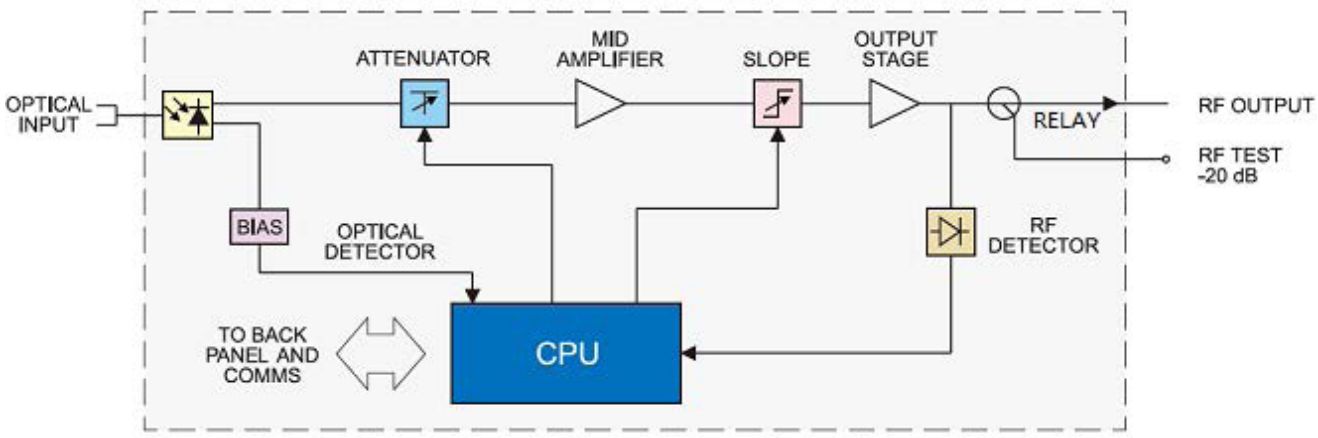


Figure 3-2 FRAR block diagram

Table 3-2 FRAS block diagram glossary

Parameters	Glossary
OPTICAL INPUT	Optical input port
ATTENUATOR	Pre-attenuator
MID AMPLIFIER	Mid-stage amplifier
SLOPE	Slope control
OUTPUT STAGE	Post-amplifier
RF OUTPUT	RF output port
RF TEST -20 dB	-20 dB RF output test port
RF DETECTOR	RF sensor
BIAS	Bias voltage measurement
CPU	Micro-processor
TO BACKPLANE AND COMMS	Module power and communication interface

4 Module characteristics

4.1 Module appearance and port layout

4.1.1 Overview

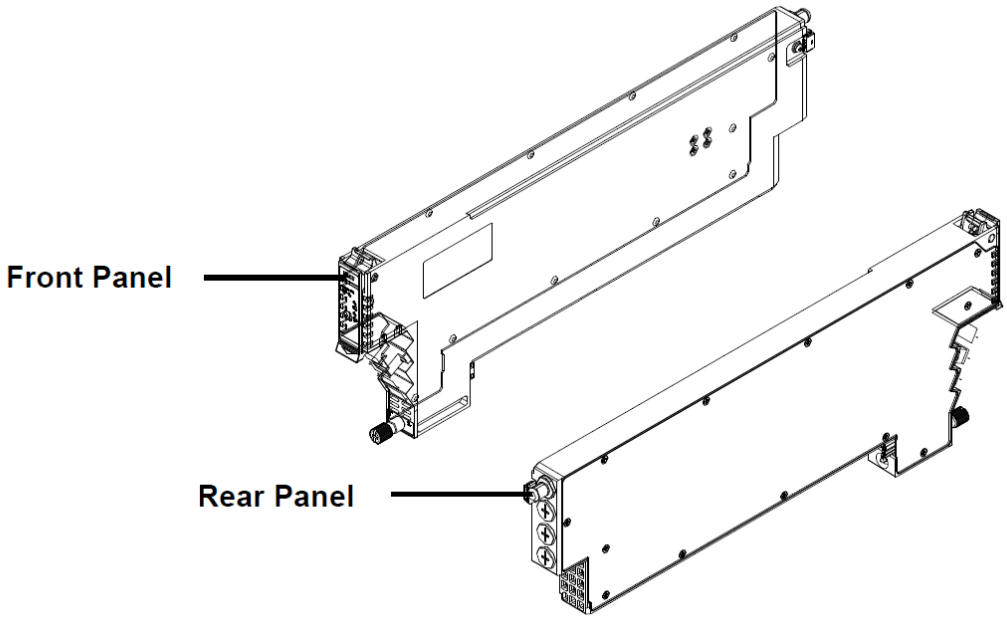


Figure 4-1 module appearance

4.1.2 Front panel layout

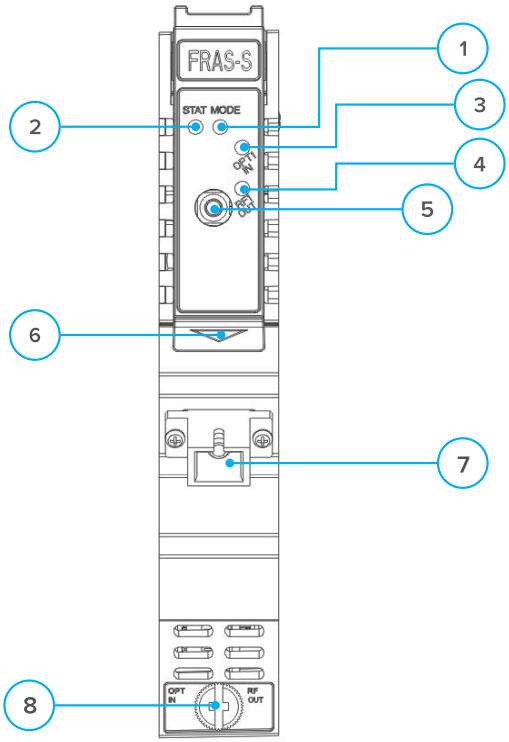


Figure 4-2 FRAS front panel layout

Table 4-1 FRAS front panel functions

Item No.	Item	Description
1	MODE LED	Module gain control mode indicator MGC: Green light Blinking AGC: Green
2	STATUS LED	Module working alarm indicator Normal: Green Minor alarm: Orange Major alarm: Red
3	OPT IN LED	Optical input signal status indicator ON: Green Input signal slightly high/low: Orange Input signal too high/low: Red
4	RF OUT LED	RF output signal status indicator ON: Green Output RF level slightly high/Low: Orange Output RF level too high/low: Red
5	RF OUT TP	RF output test port
6	Orange tab retaining clip	Used to plug and anchor the module. The orange tab retaining clip will pop-up after pressing the release and plug module
7	OPT IN	Optical forward signal input port
8	Mounting screw	Module fastening screw

4.1.3 Rear panel layout

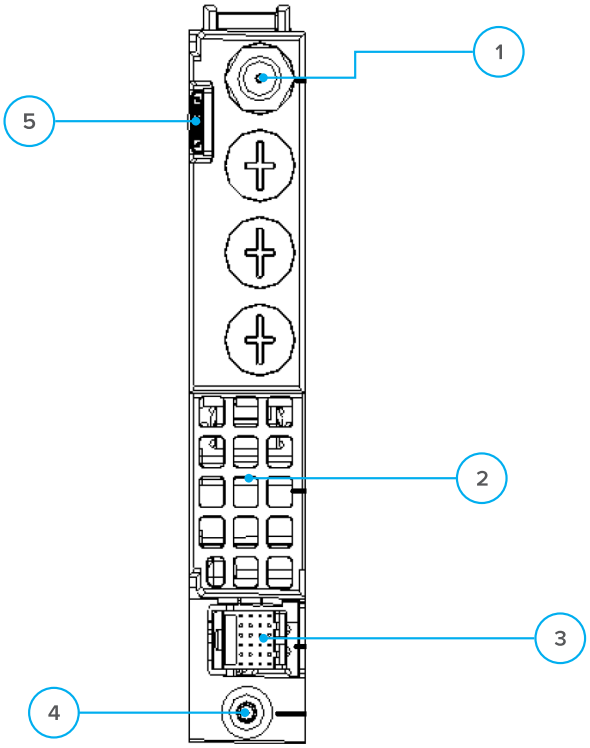


Figure 4-3 FRAS rear panel layout

Table 4-2 FRAS rear panel functions

Item Number	Item	Description
1	RF output port	Forward RF signal output port
2	Air vent	Air vent allowing air to flow out of the module
3	Multi-pin connector	Power supply and communication port
4	Placement pin	Used to position the module in the chassis
5	Redundancy connector	RF1 input test point

5 Installation

5.1 Preparatory work for installation

Before installing this device, you must ensure that the unit is intact and ready for installation.
Unpack and check the unit: Open the box to check for any damage that may have occurred during shipment.

If damage is found, please contact a Technetix customer support representative.

Necessary equipment and tools for installation:

Table 5-1 Necessary equipment and tools for installation

Tools/Modules	Description
Phillips screwdriver PH1/PH2	For use with the AIMA3000 chassis
FRAS / FRAR module	The module to install into the AIMA3000 chassis

5.2 Unpacking

Unpack the module. Keep the packaging materials for future transport needs.

Check the package manifest, record the product module type, serial number, purchase date, and any other relevant information to facilitate later management and maintenance.

Table 5-2 Packing manifest

No.	Description	Qty
1	FRAS/FRAR module	1
2	Product user manual (CD)	1
3	Individual test sheet (Certificate of Performance)	1

5.3 Module installation

1. Gently press down the retainer clip and release the leaver

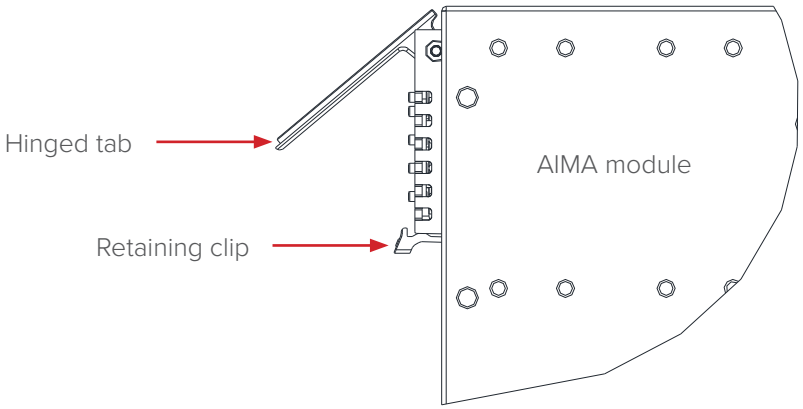
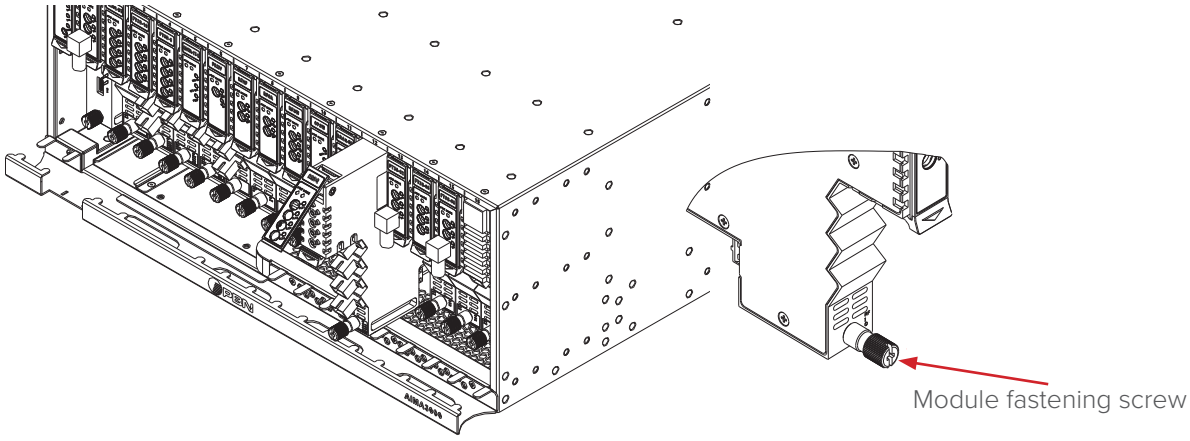


Table 5-1 Depress the clip and release the hinged tab

2. Hold the AIMA module casing upright, align it with the AIMA3000 slide rails for the correct slot, and insert the module until it reaches the multi-pin connector.

DO NOT use excessive force when inserting the module, but ensure the RF connectors at the rear of the module are securely connected to the chassis's RF connectors.



CAUTION!

The module MUST be installed correctly to ensure the module's multi-pin connector and backplane are properly connected.

Tip:

When inserting the module into the guide rails, vertically tilt the module slightly to check that the guides are properly seated on the rails. The module is guided to the correct position using the large metal fastening screw on the lower part of the front panel.

3. After the module is inserted, gently push the hinged tab until it snaps into the retaining clip. While pushing down on the hinged tab, the AIMA module will pair with the power bus and will lock into the chassis.

CAUTION!

If force is required to insert a module, then it may not be correctly seated on the slide rails, or the mounting screw may be misaligned.

4. When the module is fully seated within the chassis, on the AIMA module, fasten the spring-loaded mounting screw. Only use fingers to fasten the mounting screw. **DO NOT** use a screwdriver.

5.4 Connecting optical cables

For the convenience of the user, the AIMA3000 Chassis has a Sliding Fiber Guide to help the operator to arrange the cables. For the specific steps to connect the fibre, please refer to the instructions in section 5.4.1.

5.4.1 Using the sliding fibre guide

The sliding fibre guide is located in the lower-left corner of the chassis if looking at the front of the chassis, and is designed to help installation of the optical fibre cabling. To access the sliding fibre guide you will need to remove the rear panel located on the back of the chassis firstly.

1. Unscrew the two thumbscrews on the rear panel.

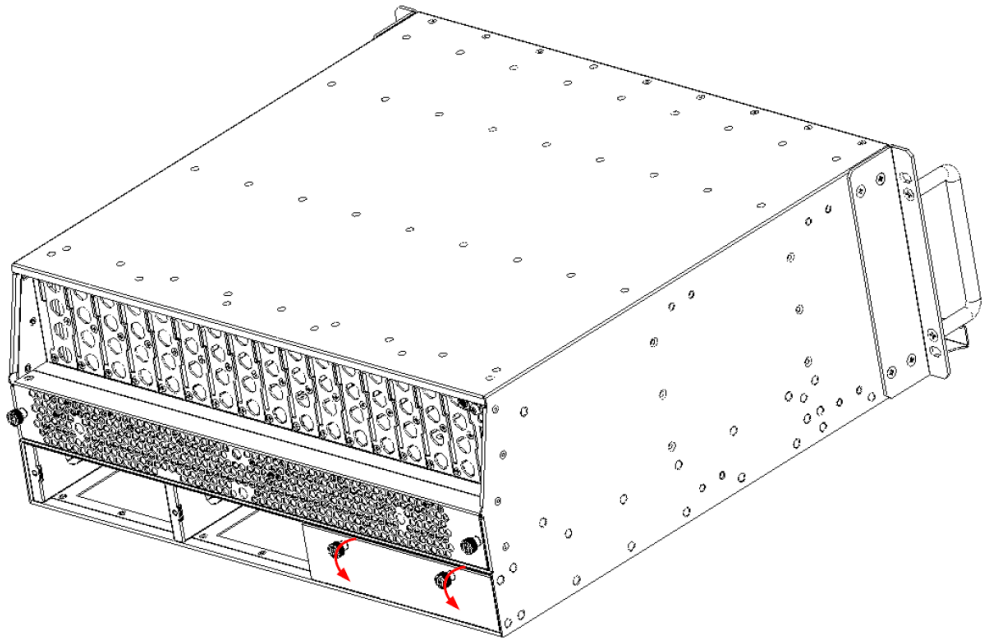


Figure 5-3 unscrew the thumbscrews on the rear panel

2. Then, pull the panel forward.

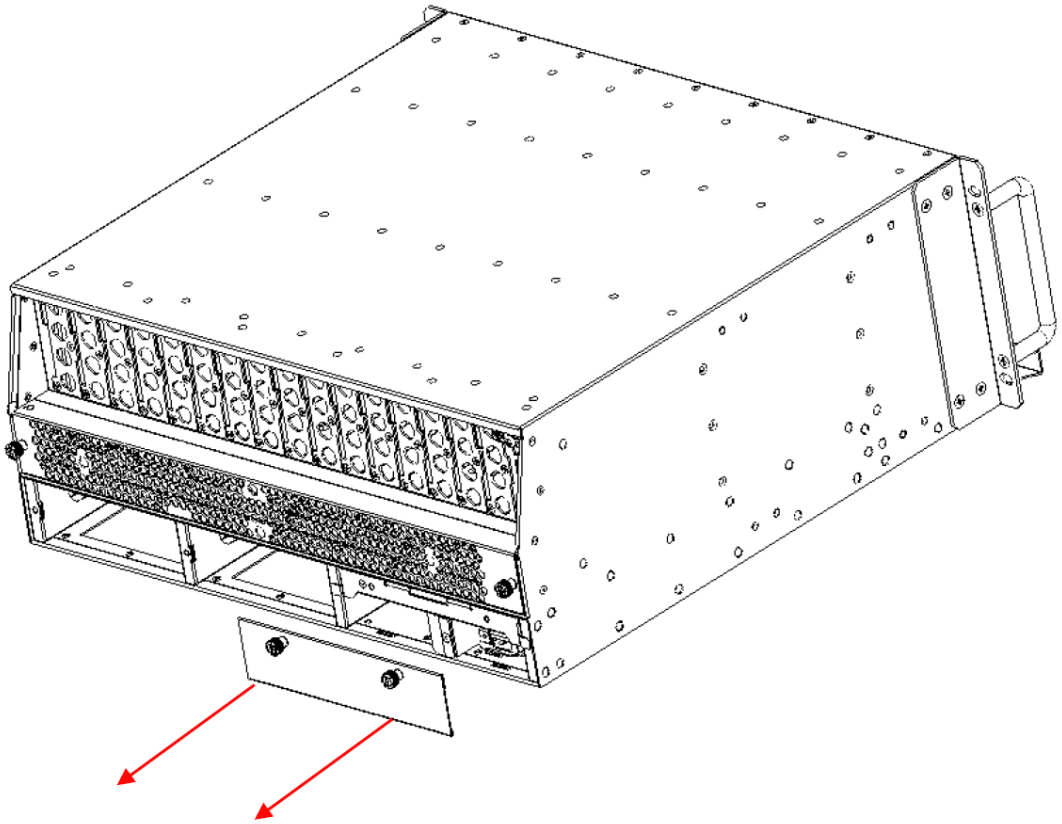


Figure 5-4 pull the panel

3. Then lift up the handle and slide the fibre guide out of the front of the chassis.

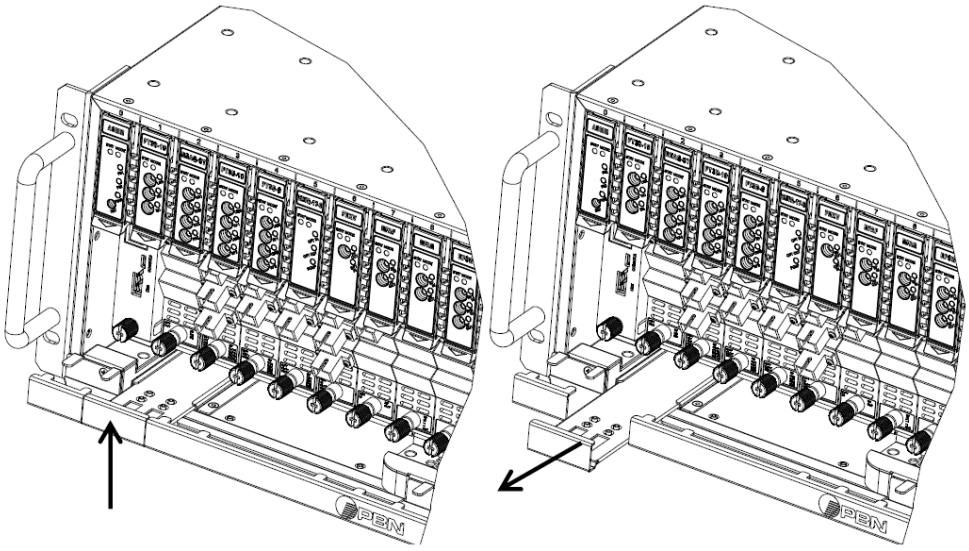


Figure 5-5 lift up the handle and slide the fibre guide out of the front of the chassis

DO NOT remove the dust cap from the fibre connector until right before connecting it to the input port.

4. Raise the clip, insert the fibre connector, and then lower the clip over the connector.

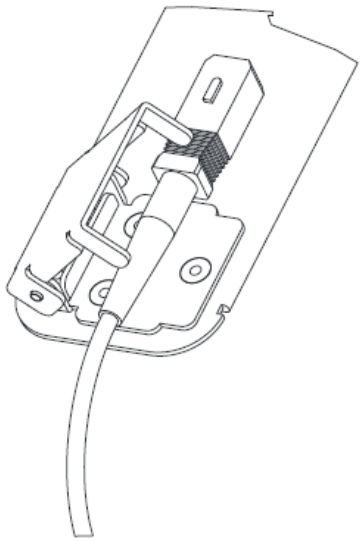


Figure 5-6 Raise the clip and insert the fibre connector

When using the sliding guide, put the fibre connector in the clip and slide it in from the rear to the front, through the chassis. Ensure that the optical fibre tail does not become trapped or pulled tightly.

Fibre clip
(at rear, for up to two connectors)

Handle
(at front)

Figure 5-7 the sliding gate

5.4.2 Using the sliding fibre guide

All optical fibres must be organized in a tidy manner in the chassis' fibre tray, which provides enough space for up to 64 optical fibres. This allows for easy positioning and future replacement of optical fibres. Along the front of the chassis, there are cut-outs for keeping the optical fibres in position.

1. When organizing the optical fibres, lift up the metal flap at the rear of the panel above the sliding guide. This will allow fibre cables to be moved over and into the purposed fiber management channel, with integrated bend radius protection, and away from the sliding guide rails.

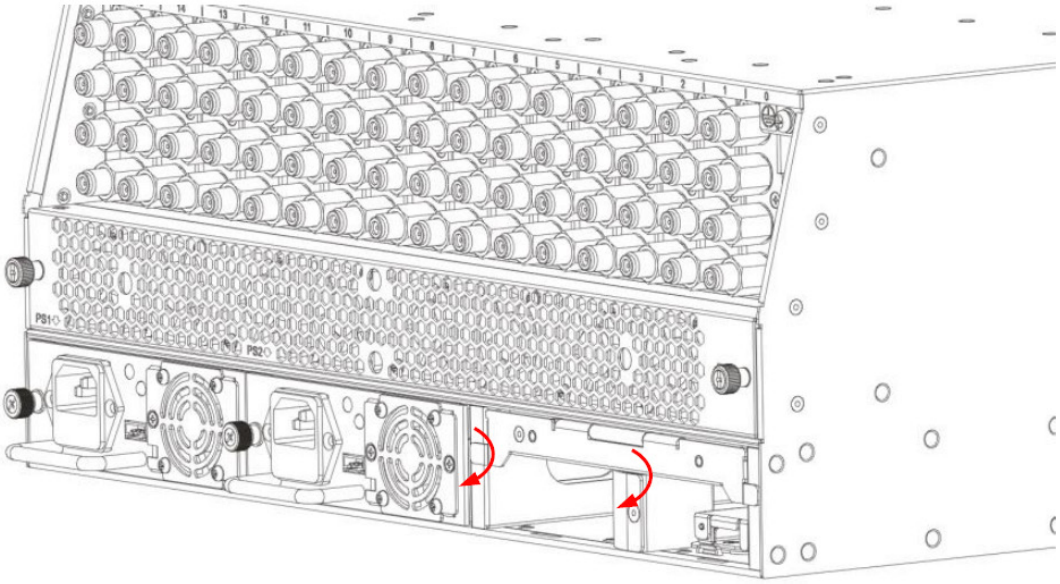


Figure 5-8 using the fibre tray

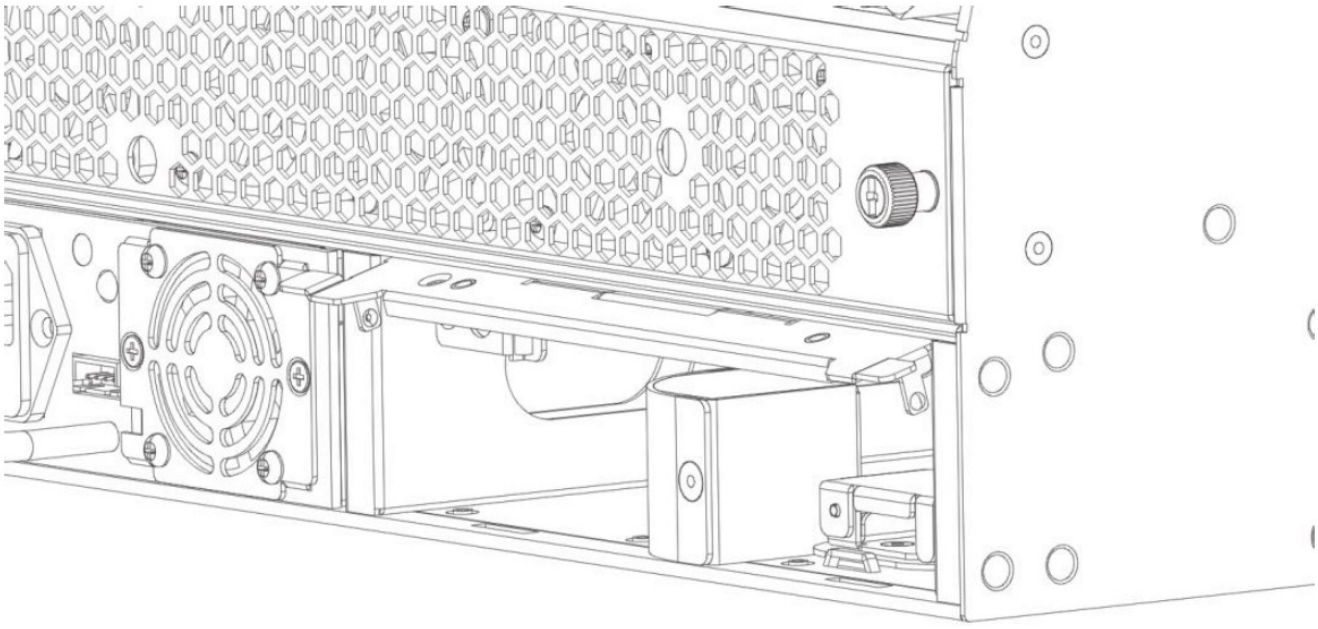


Figure 5-9 using the fibre tray

2. Use the Fibre Guide Tool to organize the cables and wires in the fibre tray to prevent tangles and the blocking of the guide rails.

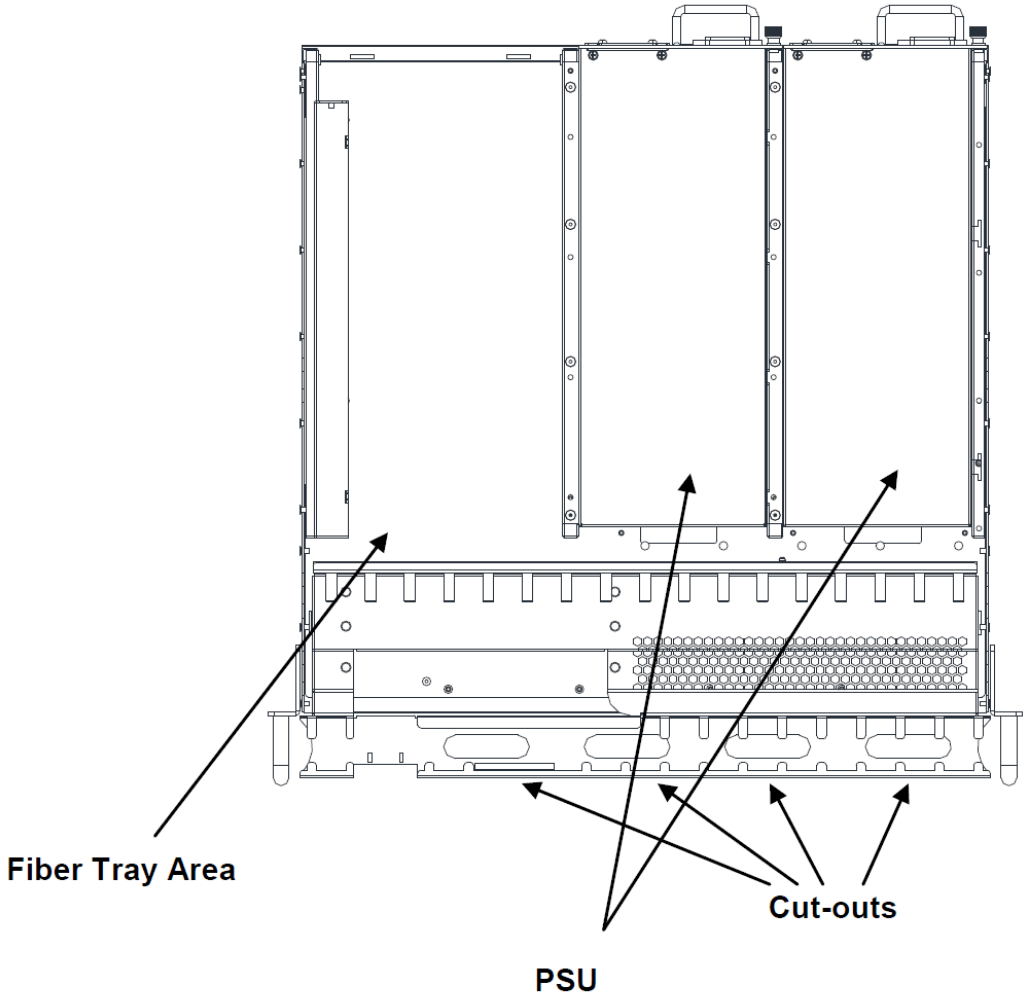


Figure 5-10 the chassis view

5.4.3 Cleaning the fibre connector ends and front-panel optical ports

To obtain good quality optical signal inputs, all optical fibre input ports and fibre connector ends must be carefully cleaned then inspected with a connector inspection scope to verify that there is no damage and connectors are clean.

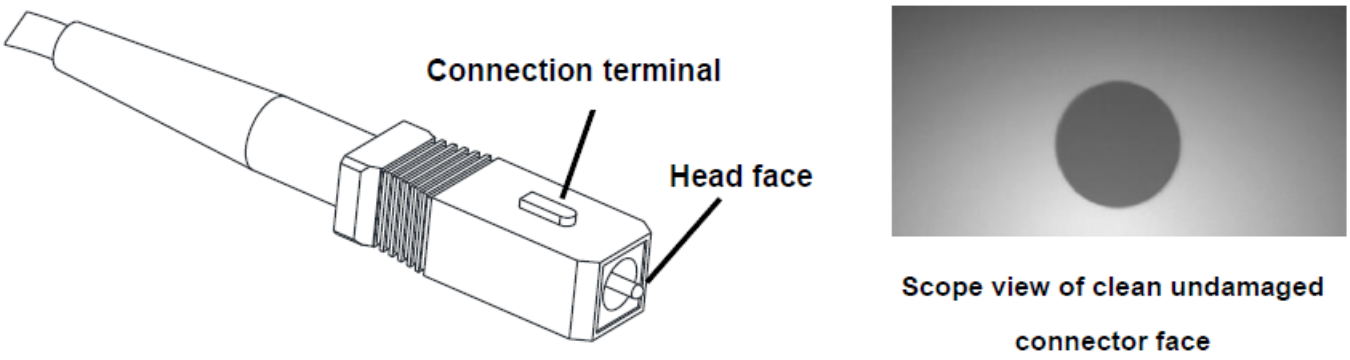


Figure 5-11 the fibre connector ends

When cleaning the optical fibre connector end, remove the dust cap and then use a lint-free cloth dampened with a static dissipative solvent to clean the angled surface. Dry the surface using a dry lint free cloth.

To clean the front panel optical port, use a special lint-free swab that is designed for this purpose. Dampen it with a static dissipative solvent. Apply slight pressure to the internal angled surface of the optical port, while rotating the swab 90 degrees back and forth. You may need to remove excess solvent using a dry lint free swab. Alternatively, a cleaning pen such as the one click cleaner can be used.

SC one click cleaning pen

www.oneclickcleaner.com

5.4.4 Connecting the optical fibres

Carefully lift up the hinged cover of the optical input port, align the raised tab on the connector with the slot in the port. Insert the connector until the connector is securely held in place indicated by a clicking sound.

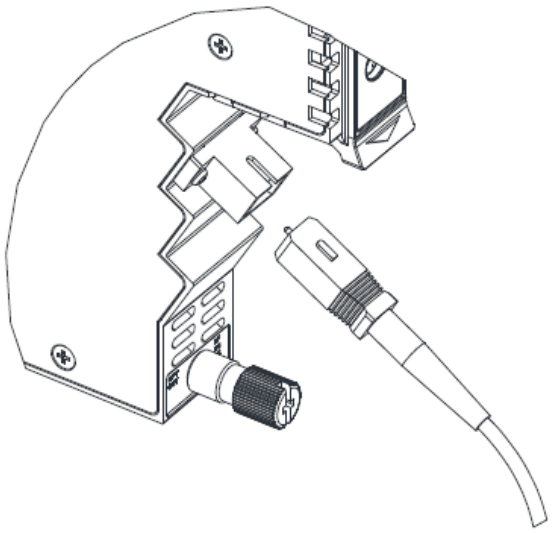
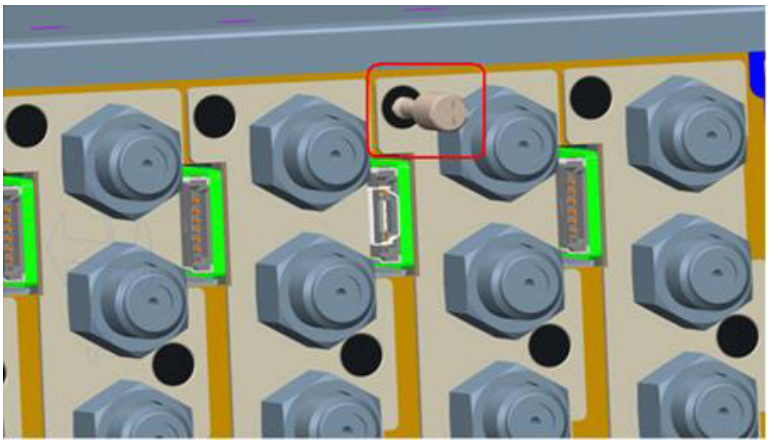


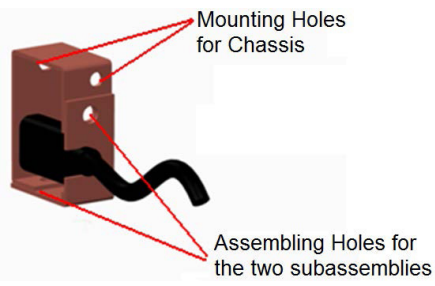
Figure 5-12 connecting the optical fibre

5.5 Redundancy connection (for FRAR only)

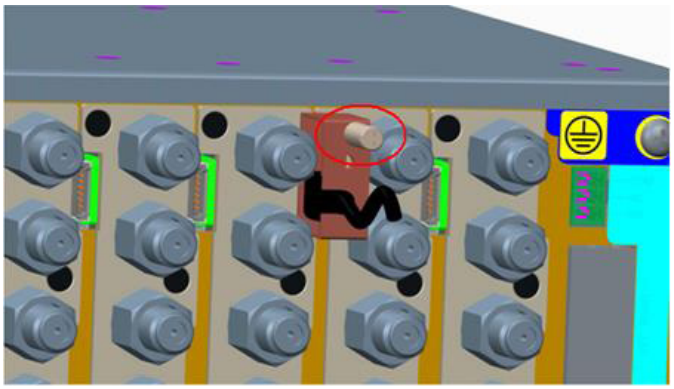


(a) Redundancy cable brace mounting hole on chassis

(b) Redundancy cable brace



(c) Redundancy cable and its brace



(d) Mounting the redundancy cable assembly to the chassis

Figure 5-13 Redundancy connection

1. Unfasten the screw in figure (a);
2. Fasten the subassemblies of redundancy cable brace in figure (b), and then insert the USB connector of the redundancy cable to it, as shown in figure (c).
3. Mounting the assembly of redundancy cable and its brace to the brace mounting holes on chassis by tighting the securing screw, as shown in figure (d).

5.6 Check module LEDs

When the module has been installed, and power is supplied from the chassis, the status LEDs will show a blinking green light indicating that module has started. After 15 seconds if the input signal is normal, the module STAT status LED should show a green light. The optical input indicator will show a green light. If there is no signal then the module STAT and the corresponding port status indicators will show a red light.

5.7 Test the optical input signal

Test the optical input before configuring the module. First, confirm the optical input signal by using the optical signal power meter according to the technical specifications. This step ensures the device receives an input signal within specified -5 to +3 dBm input range. Then access the optical signal to the module, at the same time the module optical input indicator should show a green light.

5.8 Test the RF output signal

After confirming, that the module's input optical signal is within the normal range, login into ASMM's web interface to set the appropriate RF gain/slope parameters. A spectrum analyser or RF signal meter can be connected to the RF output of the FRAS or through the test point located on the front panel of the FRAS module. Make sure that the RF output does not exceed 40 dBmV for 80 channels of RF.

In order to make sure the output nonlinear performance, the total output power should not be higher than 60 dBmV.

CAUTION!

When testing the RF signal at TP port, ensure that all unused RF ports are terminated with a 75 Ω load to reduce the potential errors during testing.

6 Module configuration and alarm setup

The module's configuration settings can be managed by using a web browser and the NMSE management software. This manual only provides the information regarding the ASMM's web interface. For NMSE configuration methods please refer to the NMSE manual.

6.1 Port configuration screen

After logging in to the AIMA ASMM controller, select the **'Modules'** tab and then the **'FRAS'** to configure the FRAS module. After selecting **'FRAS'**, the **'Port'** option will appear.

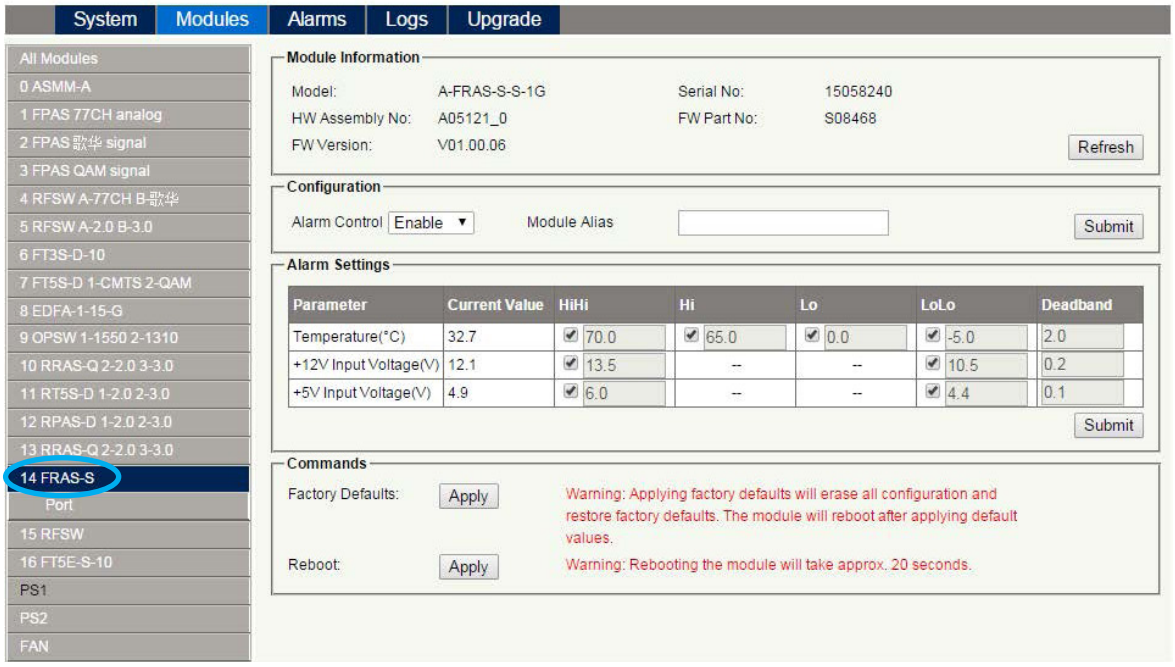


Figure 6-1 module information

On the FRAS main page, alarms, events and alarm settings for DC voltages can be toggled.

Table 6-1 Modules configuration parameters

Items	Sub items	Effect and configuration method	Configuration
Module Information	Model	-	-
	HW assembly no	-	-
	FW version firmware version	-	-
	Serial No	-	-
	FW part no firmware package number	-	-
Configuration	Alarm control	Master alarm control switch	ON/OFF
Alarm setting	Critical high		
	Alarm thresholds and parameters cannot be changed		
	Warning high		
	Warning low		
	Critical low		
	Deadband		

Select **'Port'** from the left column under the FRAS to go the module's configuration page.

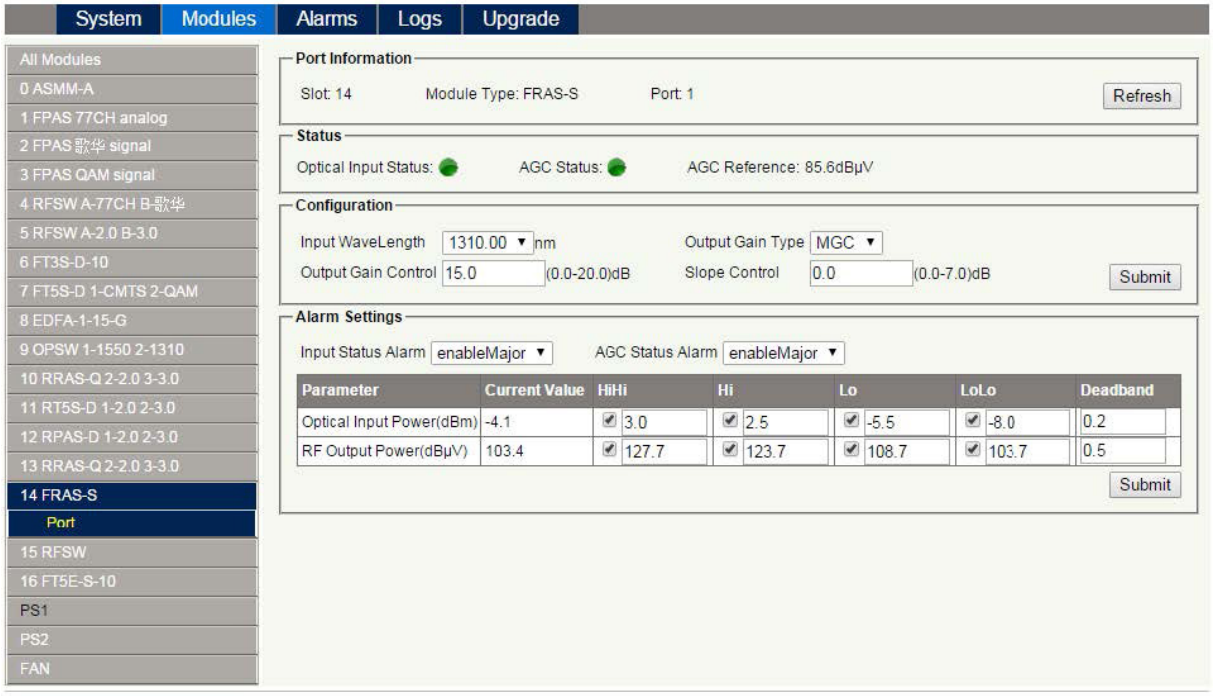


Figure 6-2 port web

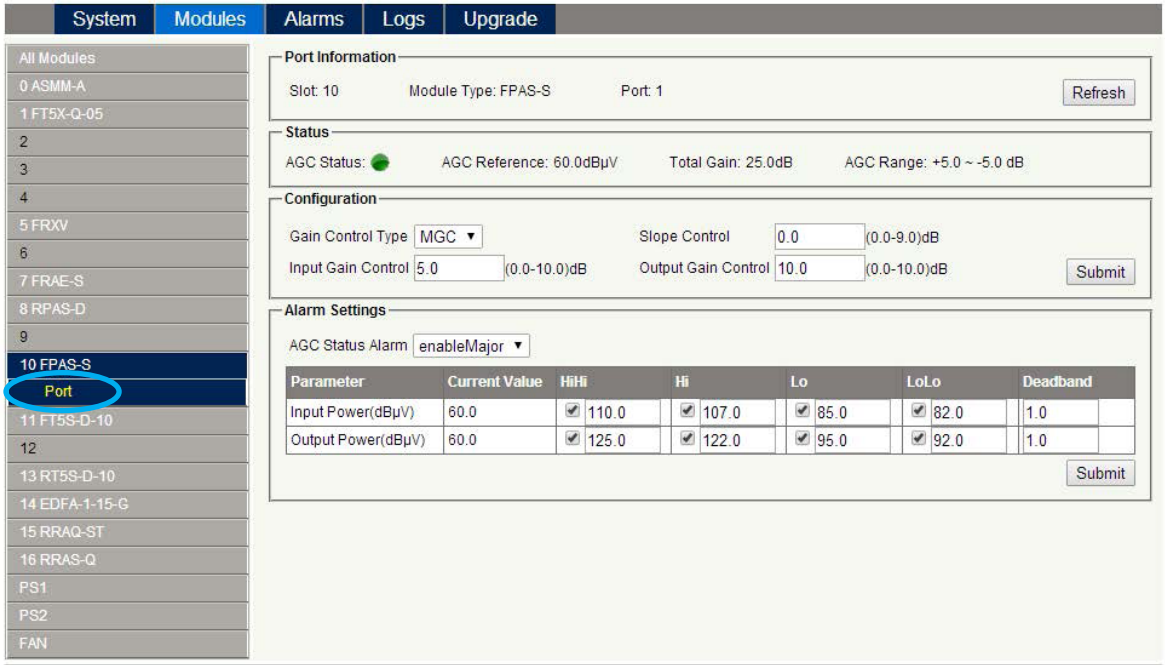
Im the **'Status'** window the following parameters are shown:

Parameter	Description	Factory Default Setting (bold) and range if applicable
Optical input status alarm	Indicate if the optical input is within portioning threshold parameters	Enable Major Enable Minor Disable
AGC status alarm	Indicate that AGC is enabled and operating in range	Enable Major Enable Minor Disable

In the configuration screen following parameters can be configured:

Parameter	Description
Input wavelength	User configurable field to indicate at which optical wavelength the FRAS is operating on. Use to configure CWDM/DWDM systems
Output gain type	To set operational mode between Manual gain control (MGC) and Automatic gain control (AGC)
Output gain control	Set the output gain value
Slope control	RF output tilt can be set up to 7 dB slope

After selecting 'Port', the RF configuration screen will appear for the designated transmitter.



In the FPAS **'Port'** configuration screen **'Output Gain Control'**, **'Slope Control'**, **'Input Gain Control'**, **'Gain Control Type'**, and **'Alarm Settings'** become available.

Total Gain is calculated by adding the Input Gain Level and the Output Gain Level with 10 dB. AGC Range is from (10- **'Input Gain Control'**) to (0- **'Input Gain Control'**)

Table 6-2 Port configuration parameter description

Items	Sub Items	Effect and configuration method	Configuration
Port information	Slot	-	-
	Module type	-	-
	Port	-	-
Status	Optical input status	Monitor the input optical signal status; on the alarm page, the operator can change the input port monitoring upper/lower limit and alarm level	-
	AGC status	Under normal circumstances, the AGC indicator is green. When the AGC automatic regulation exceeds the adjustable range, the red status indicator will be shown	-
	AGC reference	AGC reference level when the module is working under the AGC status	-
Configuration	Input wavelength	Changeable manual input	1260 - 1620 nm
	Output gain type	Select the MGC/AGC working mode	MGC/AGC
	Out gain control	Factory setting 10 dB	0 - 20 dB
	Slope control	Output RF signal slope regulation	0 - 7 dB
Alarm setting	Input status alarm	Enable major alarm Enable minor alarm Disable alarms	Enable major Enable minor Disable
	AGC status alarm		
	Critical high	Alarm level setting; Adjustable alarm parameters	
	Warning high		
	Warning low		
	Critical low		
	Deadband		

6.2 Restore factory defaults

Loading factory defaults can restore the device to the original default settings.

Detailed operations:

Click **'Modules'** tab and click the module to be configured as shown in Figure 6-3. Click the **'Apply'** button under **'Factory Defaults'**. When finished, the device configuration will be reset. For more detail information, refer to the factory restore and upgrade configuration parameter table shown in Table 6-3.

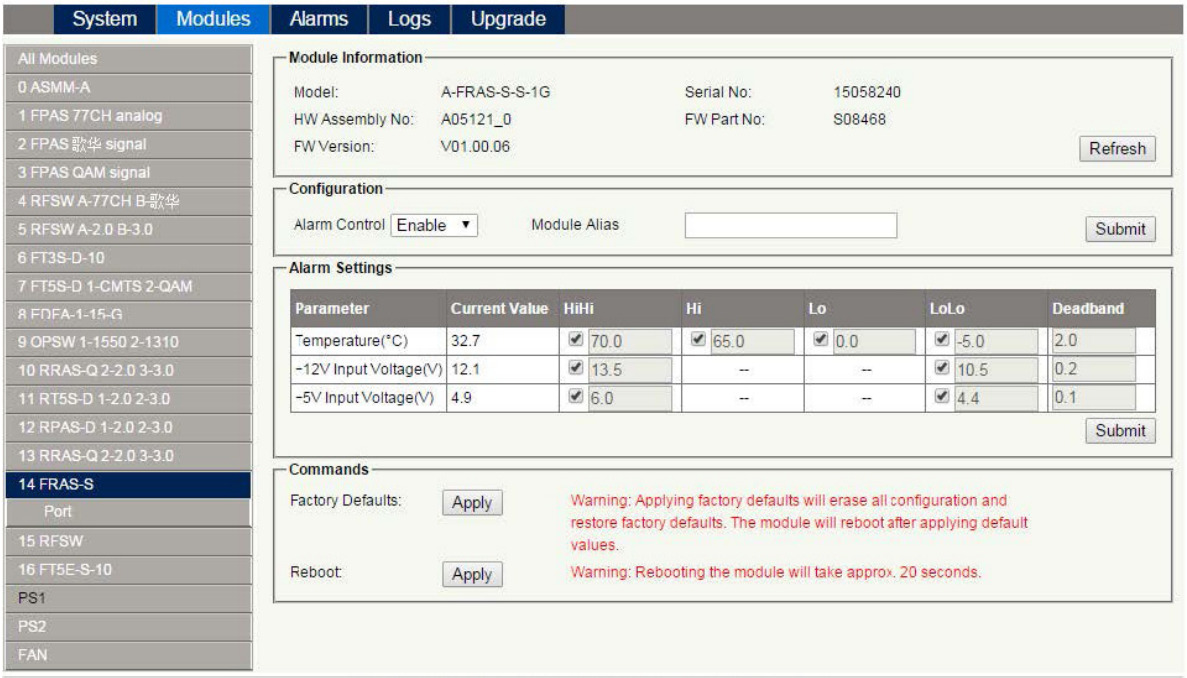


Figure 6-3 Factory defaults webpage

Table 6-3 Factory default parameter table

Name	Configuration	Factory Default Value	After Software Upgrade
Alarm control	ON/OFF	ON	Same as the configuration before upgrade
Output gain type	MGC/AGC	MGC	Same as the configuration before upgrade
Output gain control (dB)	0 - 20 dB	10 dB	Same as the configuration before upgrade
Slope control	0 - 7 dB	0 dB	Same as the configuration before upgrade
Input status alarm	EnableMajor EnableMinor Disable	EnableMajor	Same as the configuration before upgrade
AGC status alarm	EnableMajor EnableMinor Disable	EnableMajor	Same as the configuration before upgrade

6.3 Reboot

The module can be rebooted remotely, see Figure 6-4.

Detailed operations:

Click the **'Modules'** tab, select the **'FRAS'**, and then click the **'Apply'** button next to **'Reboot'**. Next, click on **'Submit'** to confirm, and then the module will automatically restart. The configuration of the module will be retained after rebooting.

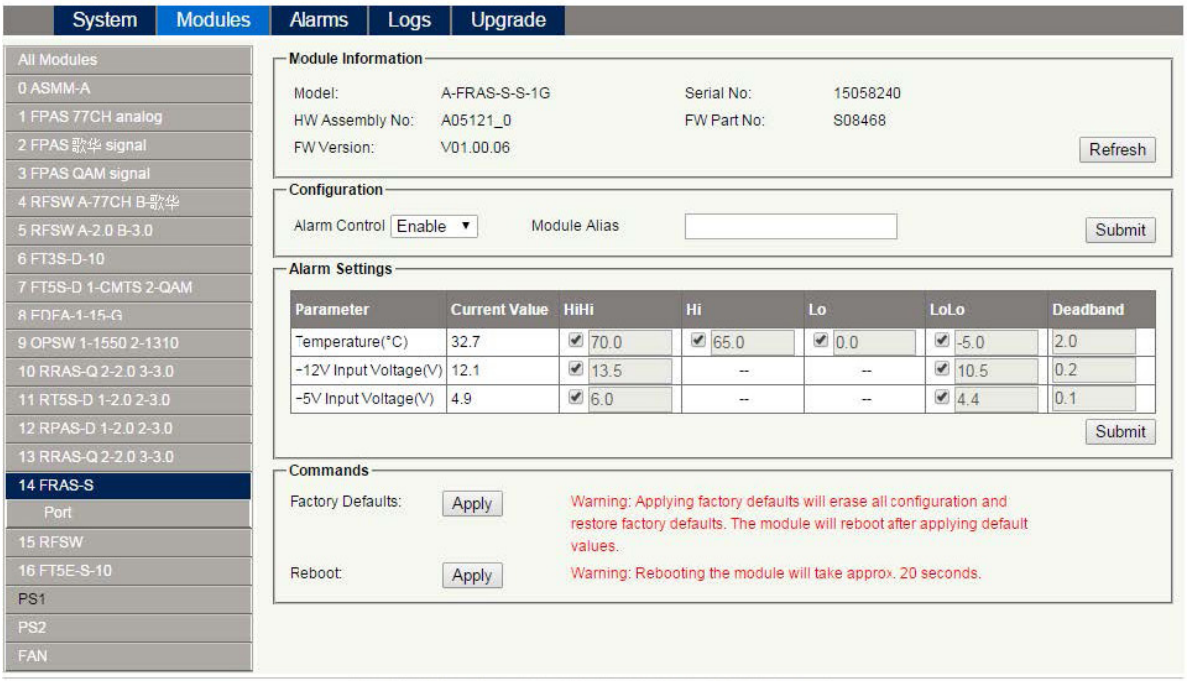


Figure 6-4 Reboot webpage

6.4 Alarms monitoring

The module has detailed alarm monitoring for temperature levels, optical power input and RF output signal. All the module alarms are shown on the alarm page. If an alarm occurs, the operator can view the associated pages to find more detailed alarm information.

6.4.1 Alarm status pages

Click the **'Alarms'** tab on the top menu bar to display an overview of the alarm status for all the installed modules as shown in Figure 6-5.

Working status alarm

Normal operation: Green
Major alarm: Red

Figure 6-5 Alarm status page

6.4.2 Module operating voltage and temperature alarm

Click on the corresponding module, as shown in Figure 6-6, to view the module alarm information. After clicking on the FRAS in **'Modules'** tab, the operator can view the module temperature and power supply voltage alarms. The operator can view the status indicators to check if the module is functioning properly.

The status has three conditions:

Normal: Green
Minor alarm: Amber
Major alarm: Red

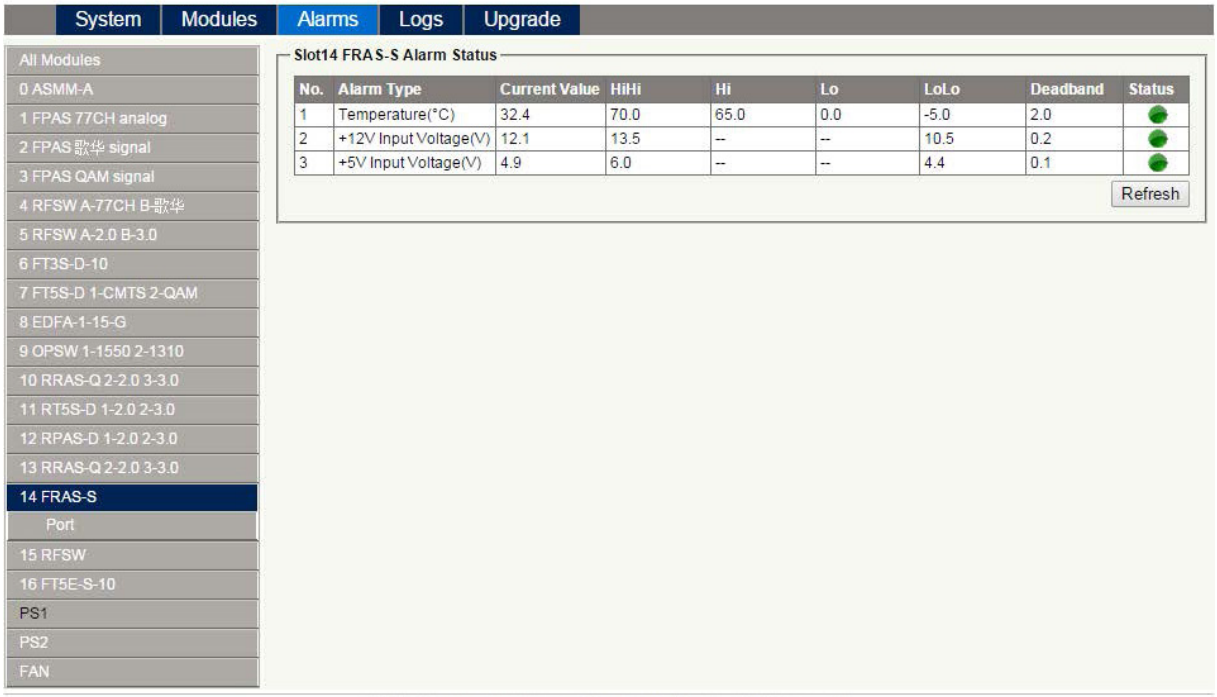


Figure 6-6 Module alarm status

Use the status indicators to determine if the module is working properly. If the device is replaced or reset, click on **'Refresh'** to update the alarms information.

6.4.3 Module Port Alarms

Click on the Module's **'Port'** label on the right column, as shown in Figure 6-7. The module's optical input status, RF output power status, input status and AGC status can be viewed from this page.

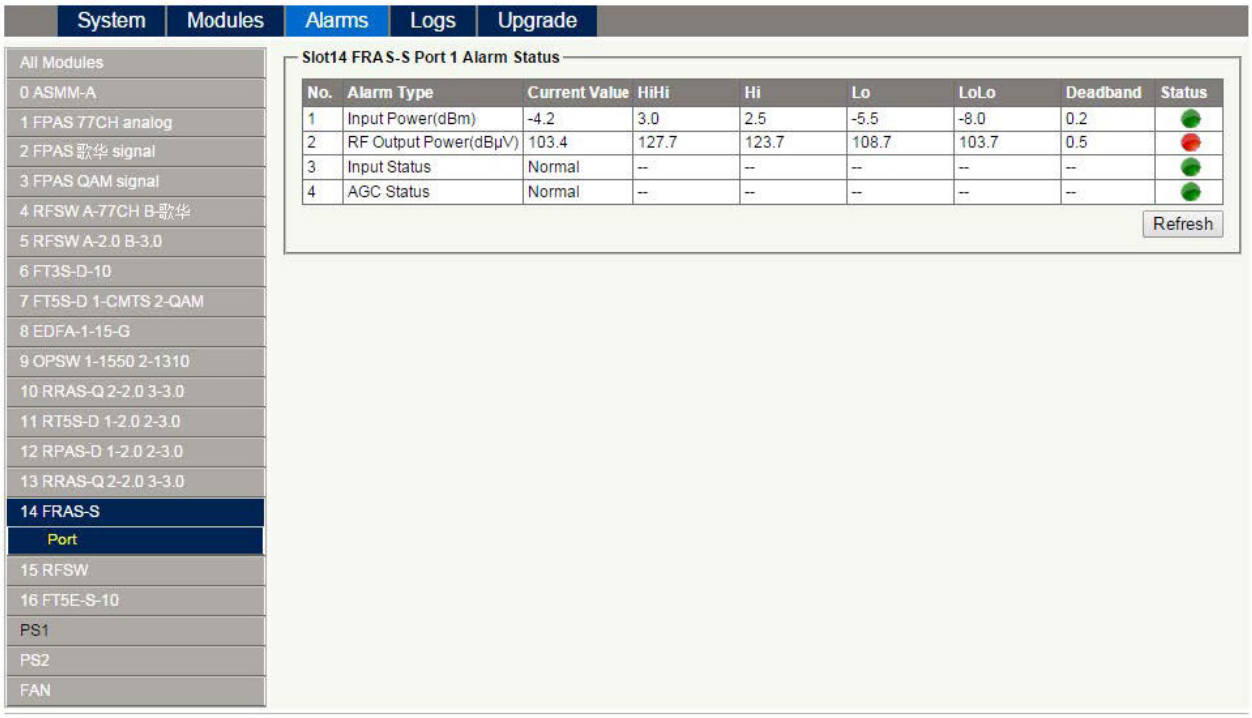


Figure 6-7 Module port alarms page

6.4.4 Alarm monitoring configuration

Monitoring function ON/OFF

In Configuration section on **'Modules'** page, click **'Alarm Control'** to **'Enable/Disable'** monitoring function.

Temperature, +12V/+5V voltage alarm levels management

By default, the temperature and voltage alarms are enabled. The check box ☑ as shown in Figure 6-8, toggles the alarms. When the check box is checked, (detection ON), the associated alarm is enabled, the text in the textbox are always grey and cannot be changed. The default alarm parameters are shown in Figure 6-8, Table 6-4 below.

Table 6-4 modules page alarms threshold parameters instruction

Parameter	Units	HIHI	HI	Normal	LO	LOLO	Deadband	Threshold changeable by user	Default Alarm Enable
Temperature	℃	70	65	-	0	-5	2	N	ON
+12V Input voltage	Vdc	13.5	-	12	-	10.5	0.2	N	ON
+5V Input voltage	Vdc	6	-	5	-	4.4	0.1	N	ON

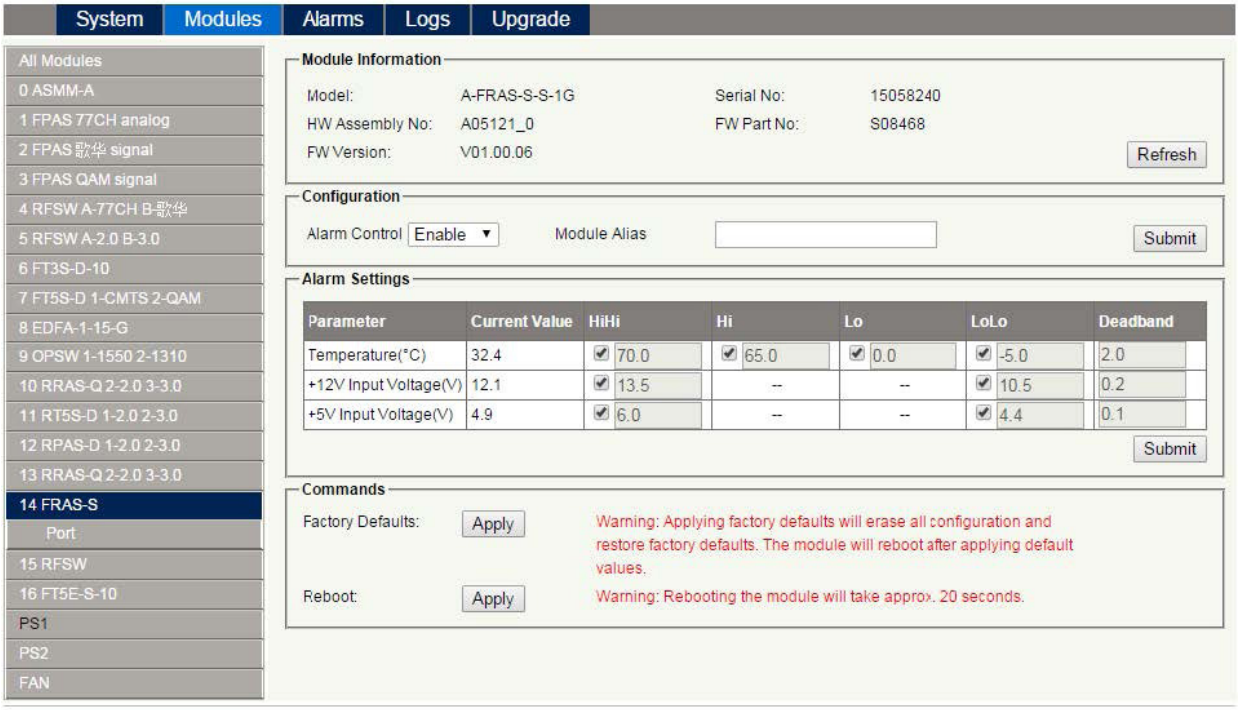


Figure 6-8 alarm configuration

6.4.5 Input/output status monitoring

To setup Input/output status monitoring, select the associated module's **'Port'** page from the left column. The monitoring parameters are listed under **'Alarm Settings'**, click the check box ☑ to toggle the various parameters. The monitoring thresholds can be changed. See Figure 6-9.

Table 6-5 port page alarms threshold parameters instruction

Parameter	Units	Critical high (HIHI)	Warning high (HI)	Normal	Warning low (LO)	Critical low (LOLO)	Deadband	Threshold changeable by user	Default Alarm Enable
Optical input power	dBm	3	2.5	-	-5.5	-8	0.2	Y	ON
RF output power	dBuV	127.7	123.7	-	108.7	103.7	0.5	Y	ON

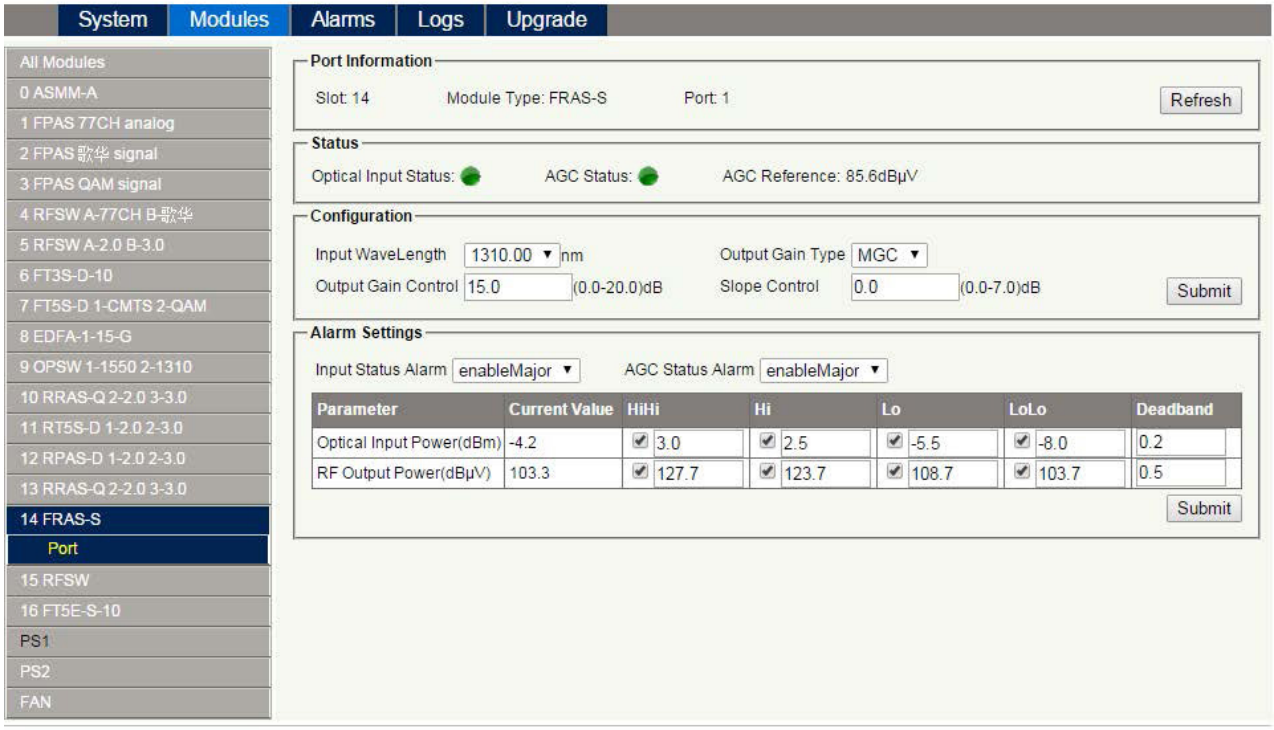


Figure 6-9 input/output status monitoring

Table 6-6 Module Alarm Indicator Definitions

Parameters (Common)	Description	Definitions	Related Indicators	Lighting Conditions
Power OFF	Power-off	Power-off	All	All OFF
Initiating AM	Power-on	Module power-on Ppocess	All	Green slowly flashes
No alarm	Normal operation	Normal	All	Green
AM-critical-ALM	Critical alarm	Module status major alarm	STAT	Red
AM-minor-ALM	Warning alarm	Module status minor alarm	STAT	Orange
RX-critical-ALM	Input optical power major alarm	Input optical power too high/too low	STAT OPT IN	Red
RX-minor-ALM	Input optical power minor alarm	Input optical power slightly too low/too low	STAT OPT IN	Orange

6.5 Logs management

The operator can view all the alarms of the modules in the chassis on the Logs Management page. Click **'Logs'** on the top menu to enter the Logs Management page. See Figure 6-10.

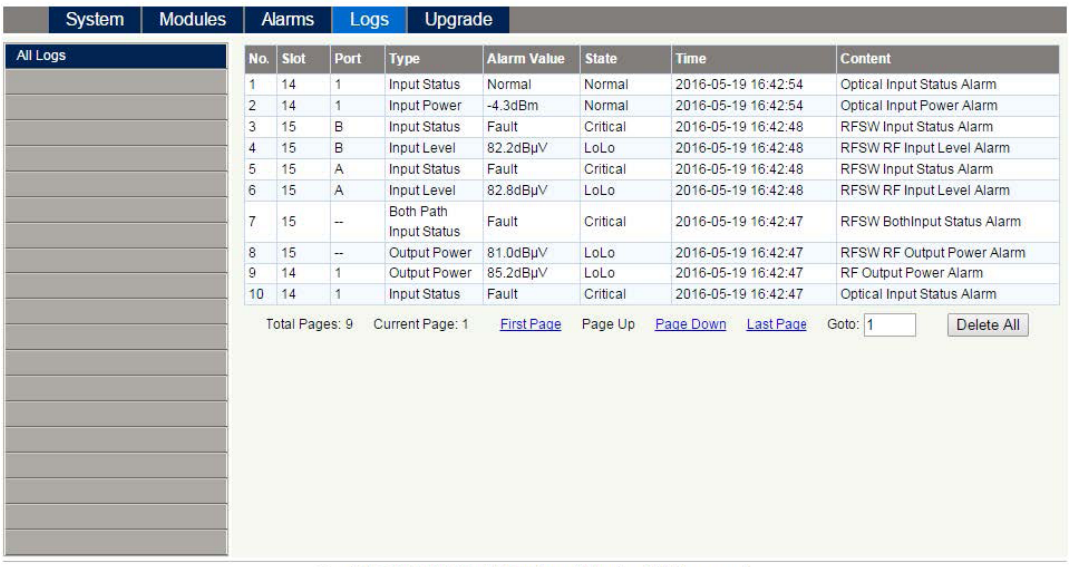


Figure 6-10 logs webpage

6.6 Device upgrade

You can upgrade the FRAS's firmware by performing the following steps:

- Click the **'Upgrade'** tab on the top menu bar
- On the left column, click the corresponding **'FRAS'** that needs to be upgraded
- Click **'Choose File'** button and navigate to the new firmware file
- Select the file and then click the **'Start Upgrade'** button. After the firmware has been upgraded, the FRAS module will reset and a message will appear confirming the upgrade process has been completed.
- For FBCM upgrade, open the web as below, click **'Choose File'** button at upgrade FBCM in slot x and navigate to the firmware file
- Select the file and then click the **'Start Upgrade'** button. After the firmware has been upgraded, the FBCM module will reset and a message will appear confirming the upgrade process has been completed. The reset will take approx. 3.5 minutes.

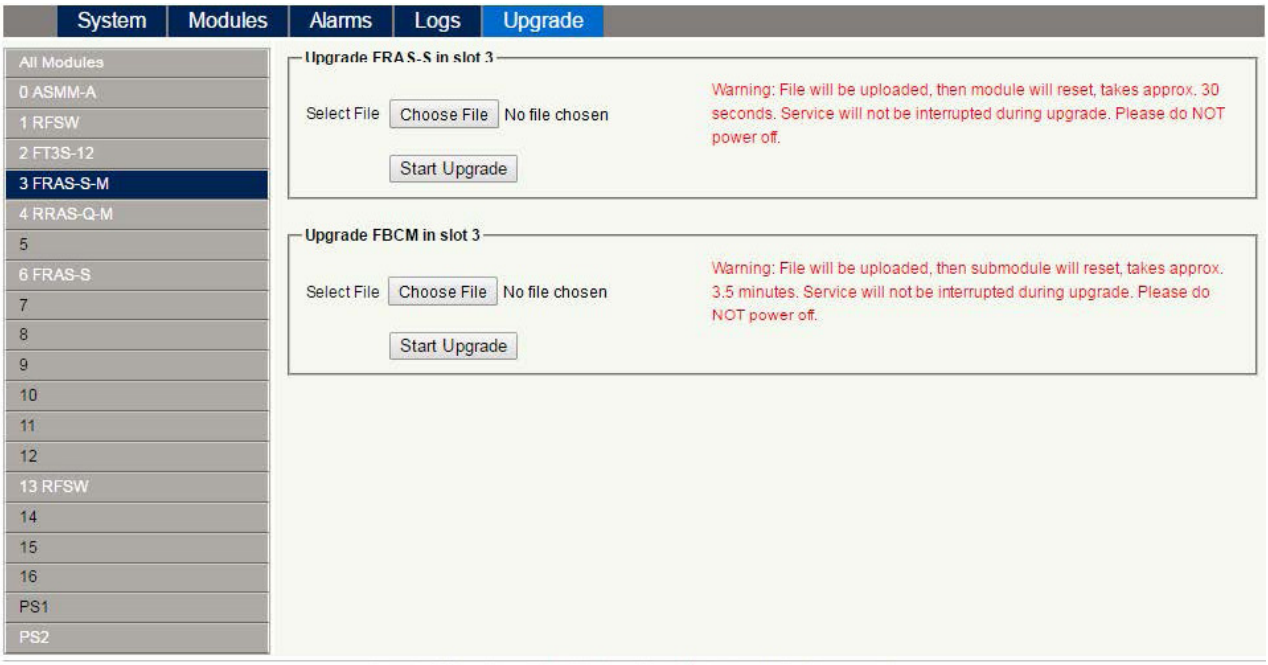


Figure 6-11 FRAS-S-M upgrade webpage

* The upgrade file needs to be located on a PC that is connected to ASMM
* The web GUI above only supports the manual operation from a local PC.
* The FRAS supports automated firmware updates and automatic backup and restore features via TFTP when managed via the NMSE management software. Please refer to the NMSE product user manual for more information.

GENERAL WARNING

CAUTION!

Module will be upgraded after the firmware is uploaded. The upgrading and reboot process will take about 30s. During the upgrading, please don't power off the device and don't plug any module in the same chassis, or it may lead to upgrade fail or data sync error.

6.7 FBC Function Description (Only for FRAS-S-M)

With the optional embedded Full Band Capture (FBC) module, it enables the operator to capture and monitor the spectrum and QAM demodulation data, including level of each channel, SNR, MER, BER, constellation and so on. Operators can get the metric of each QAM channel remotely.

Via the AIMA3000 configuration system interface, click the top left **'system'**, you can see the FBC function includes three parts: Spectrum, QAM Analyzer and Constellation

6.7.1 Spectrum

Click **'spectrum'** on the left, open the spectrum interface, as Figure below.

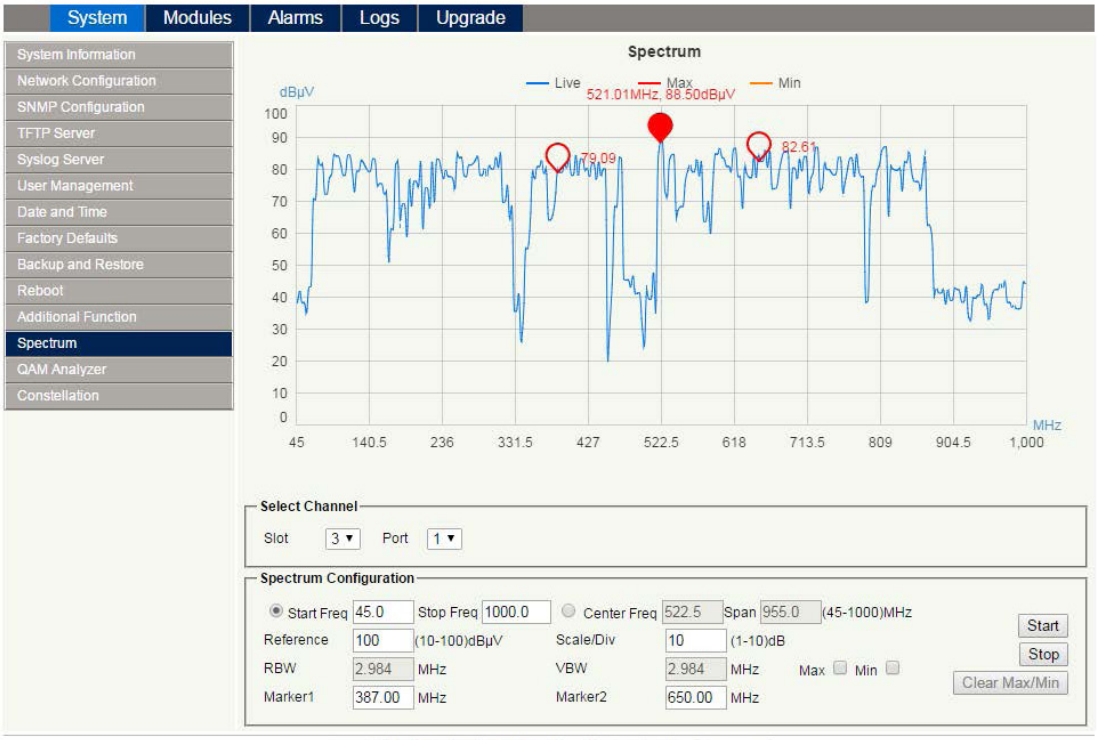


Figure 6-12 FRAS-S-M spectrum webpage

Spectrum includes three parts: **'Spectrum'**, **'Select Channel'** and **'Spectrum Configuration'**.

For Select Channel, the items and buttons are shown as below:

- Slot means choose the slot number in the chassis, **'Port'** means choose the port number that you need to see the spectrum of the module.
- For Spectrum Configuration, the parameters and buttons are shown as below:
- Start Freq: Set the start frequency of spectrum, range is 45 - 1000 MHz.
- Stop Freq: Set the stop frequency of spectrum, range is 45 - 1000 MHz.
- Center Freq and Span: Set the center frequency and span, the center frequency is shown at the center of spectrum.
- Reference: Set the reference level of the spectrum based on the fact. And the spectrum peak need lower than the reference level so that the spectrum can be fully shown in the spectrum. The range is 10 - 100 dBuV.
- Scale/Div: Range is 1 - 10 dB.
- RBW/VBW: Auto adaptable.
- Marker1/Marker2: Two Markers can be shown in the spectrum. Set the marker frequency, the level of the marker can be shown in the spectrum. The red solid ball is the maximum level captured in realtime.
- Start: Stick ‘Start’ button to start capture spectrum.
- Stop: Stick ‘Stop’ button to stop capture spectrum.
- Choose Max/Min, and then stick ‘Start’ button, 3 Spectrum Lines 3, including live, max hold and min hold curves will be shown in the spectrum.
- Clear Max/Min: Clear the maximum hold and the minimum hold.

6.7.2 QAM analyser

Click **'QAM Analyser'** on the left, open the QAM Analyser interface, as figure 6 - 13 below.

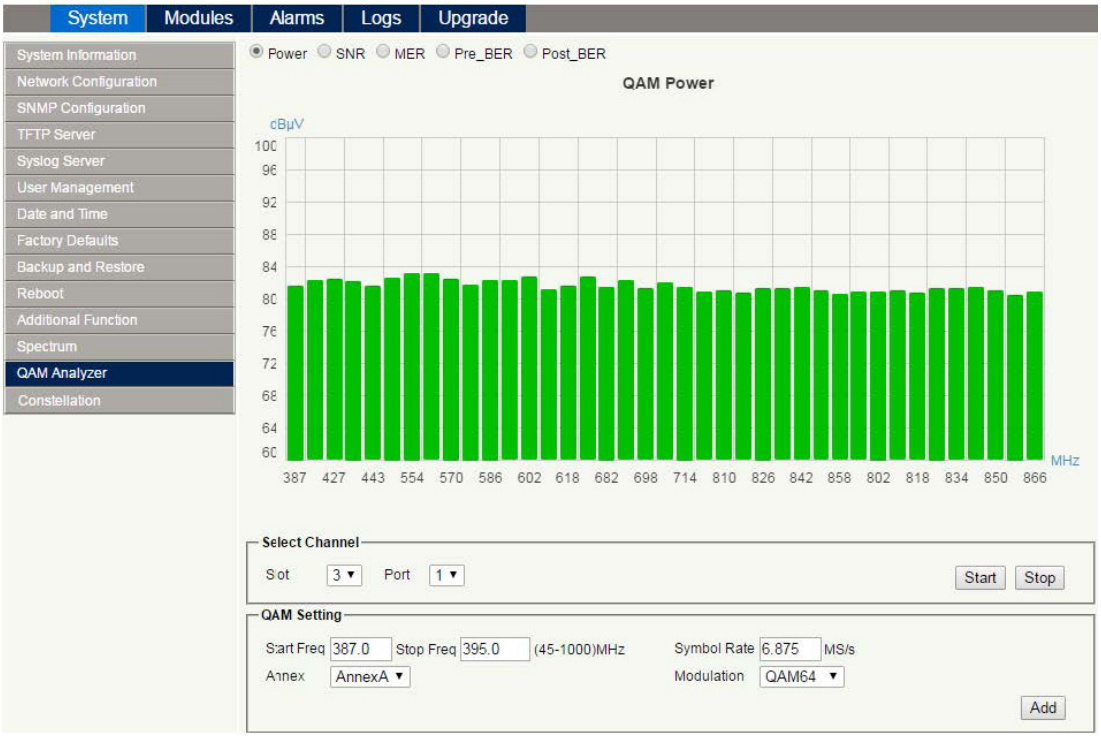


Figure 6 - 13 FRAS-S-M QAM analyser webpage

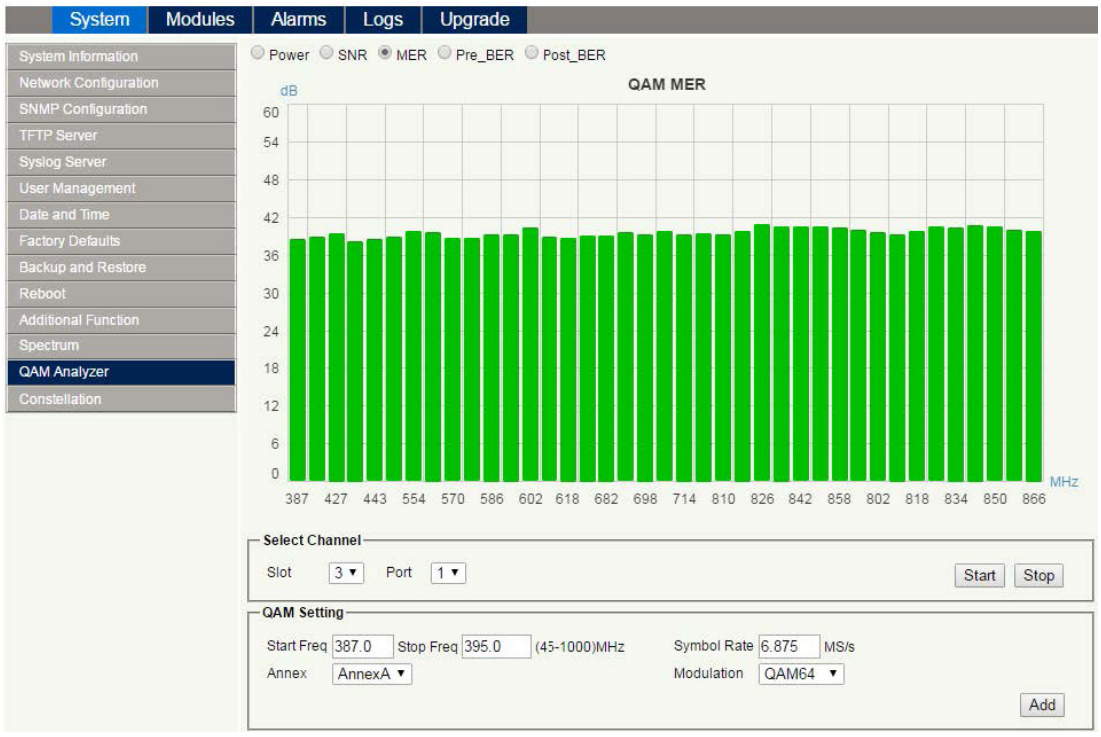


Figure 6 - 14 FRAS-S-M QAM MER webpage

- QAM Analyser includes a column chart, Select Channel, QAM Setting, QAM List, Restore and Backup.
- The column chart contains QAM Power, QAM SNR, QAM MER, QAM BER-Pre, BER-Post. Different column chart will be displayed after click the different items.
- For **'Select Channel'**, the items and buttons are shown as below:
- Slot means choose the slot number in the chassis, **'Port'** means choose the port number that you need to see the QAM column chart of the module.
- For QAM setting, the parameters and buttons are shown as below:
- Start Freq/Stop: Set the start center frequency and stop center frequency of QAM, the range is 45 - 1000 MHz.
- Symbol Rate: Set QAM symbol rate, the symbol rate should be the same as the QAM signal source.
- Annex: Annex A/Annex B. Annex A is European standard, Annex B American Standard. Annex should be the same as the QAM signal source.
- Modulation: Set modulation mode, 64 QAM and 256 QAM is optional.
- Stick **'Add'** after set, the channel set is shown in QAM List. If the channels are not continuous, more than one segment can be added. Please note the later frequency should be higher at least 7 MHz than the current stop frequency. Stick **'Start'** or refresh the web to see the column chart.
- The frequency value of each segment are displayed by a **'+'** button, and hidden by a **'-'** button.

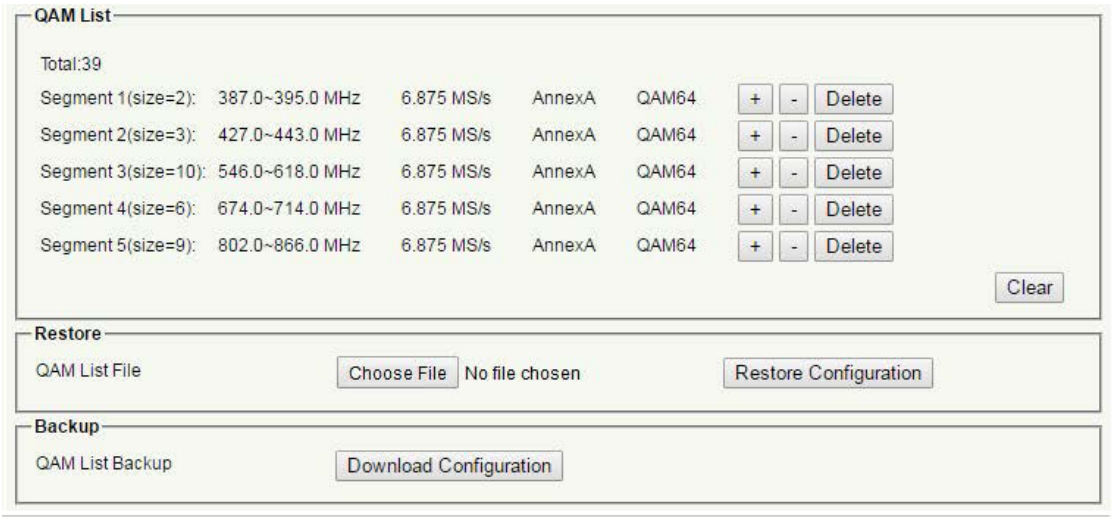


Figure 6 - 15 QAM list webpage

- Restore: Click **'Choose File'** to find the directory where the profile is located, and then click **'Restore Configuration'**, you can restore the configuration.
- Backup: Click **'Download Configuration'** to download the current channel configuration.

6.7.3 Constellation

Click **'Constellation'** on the left, open the Constellation webpage as Figure 6-16 below. **'Constellation'** includes QAM Constellation, Select Channel, Cons Setting and QAM Result.

Choose the slot number and port number that you want to see the constellation of the module. Set the center frequency, symbol rate, annex and modulation mode and then stick **'Start'** button, you can see the locked constellation result. The points are increased and it will count again via sticking **'Start'** or refresh the web.

The QAM results show the RF level, SNR, MER, Pre-BER and Post-BER results.

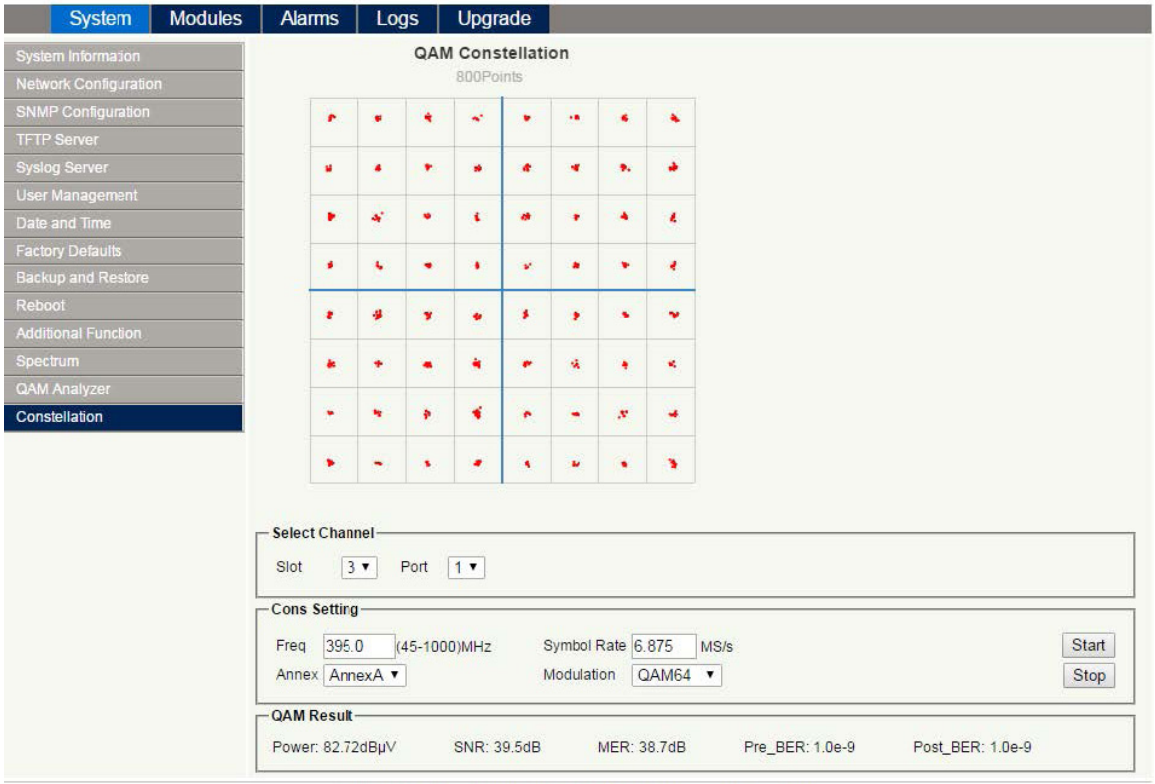


Figure 6 - 16 constellation webpage

FBCM module factory defaults and reboot.

Factory default settings and Reboot can be operated from the main FRAS-S-M page FBCM commands.

You can apply the factory default configuration and reboot the FBCM module by clicking the associated **'Apply'** button.

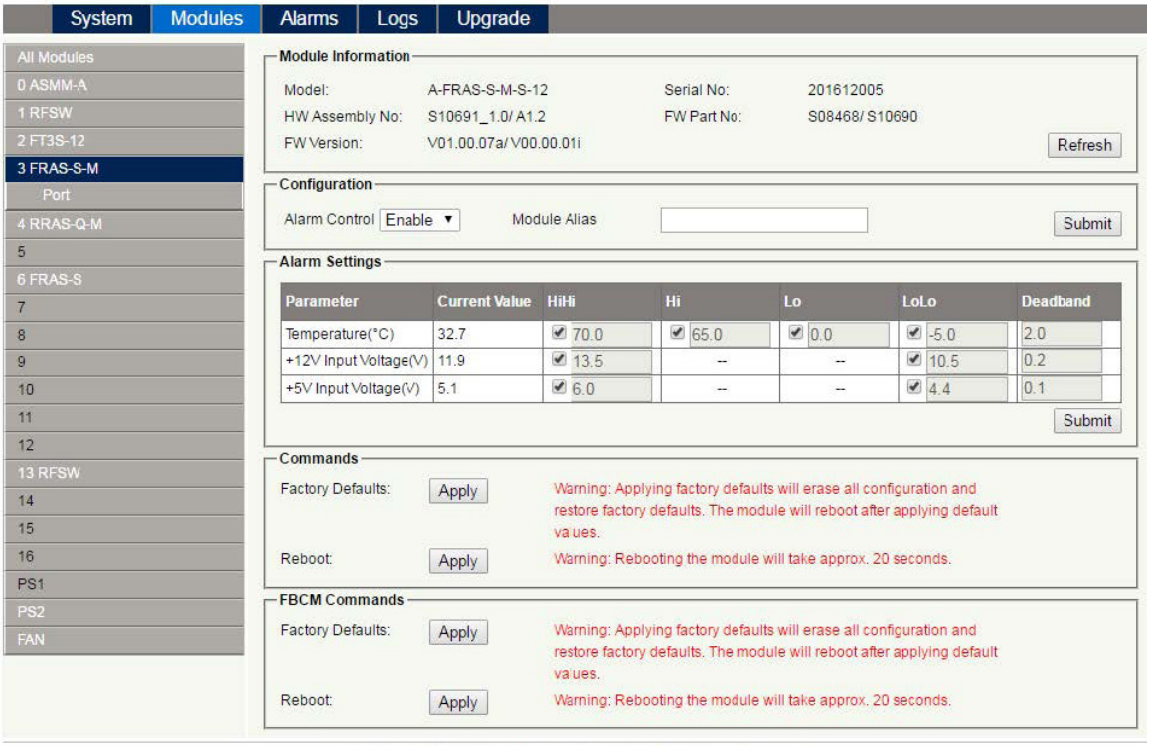


Figure 6 - 17 FBCM factory defaults and reboot webpage

Factory Defaults: After pressing **'Apply'**, you will be prompted **'Are you sure you want to do Factory Defaults?'** press **'Yes'**, it will clear the spectrum configuration of FBCM and restore factory defaults. It will reboot FBCM after restoring factory defaults.

Reboot: Only reboot the FBCM module.

Additional instructions:

If there are multiple FRAS-S-M modules, the FBC port discovery time will be longer.

Refreshing each spectrum port needs two seconds. If there are multiple spectrum ports enabled, each port will be refreshed in turn, so the refreshing time will be longer. If you want to see the spectrum quickly, please disable the spectrum ports that you don't want to see.

If more than one user has access to the webpage, it may make the spectrum capture incomplete, Please press the **'start'** button if you see the incomplete spectrum.

When using the FBC function, it recommended that the RF output power of the main port is no less than 90 dBuV/ch.

6.8 Redundancy configuration and alarms (for FRAR only)

Click on **'Modules'** → **'FRAR-S'**(the module name), the port numbers and **'Redundancy'** button will appear. The port configuration pages and alarm pages are completely same to FRAS.

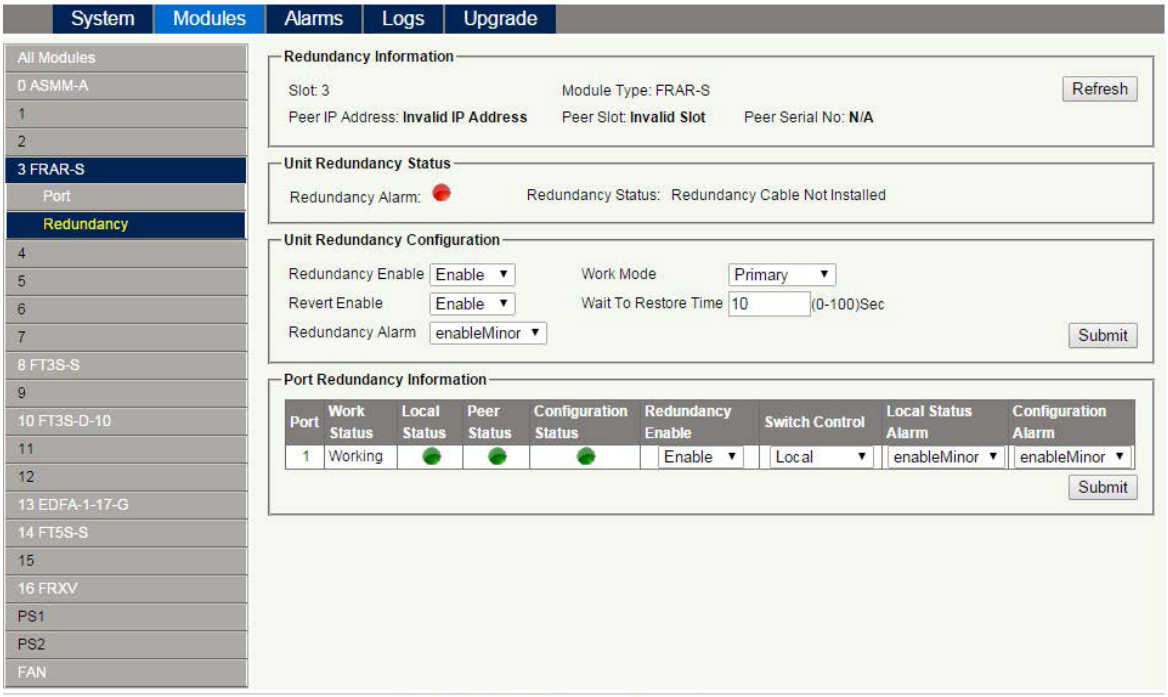


Figure 6 - 18 FRAR Redundancy webpage

- Click on **'Redundancy'** on the left, the redundancy configuration page will appear.
- In the box of **'Redundancy Information'**, you can check not only the local module's slot number and module type, but also the peer module's IP address, slot number and serial number.
- In **'Unit Redundancy Status'** box, **'Redundancy Alarm'** indicator and **'Redundancy Status'** show the module's redundancy status.
- You can configure the module's redundancy in the box **'Unit Redundancy Configuration'**:
- **'Redundancy Enable'** is for enabling or disabling the function of redundancy of this module;
- **'Work Mode'** is for setting this module to work in primary or secondary mode;
- **'Revert Enable'** is for setting whether or not the primary path will be reconnected when its signal becomes normal.
- **'Wait to Resore Time'** is the revert delay of the primary path when it becomes normal.
- **'Redundancy Alarm'** is for setting the alarm level as major, minor or disabled.
- In the box of **'Port Redundancy Information'**, you can enable or disable each port's redundancy, set their local status alarm level and configure the alarm level individually.
- Please click on **'Submit'** to save your configurations whenever you make changes to the settings.

Click on **'Alarms'** ➔ **'FRAR-S'**(the module name) ➔ **'Redundancy'**, the redundancy alarm page will appear.
In this page, you can see the redundancy alarm status of the module, and each port's local status and configuration status.
Click on 'Refresh' to update the current alarm status.

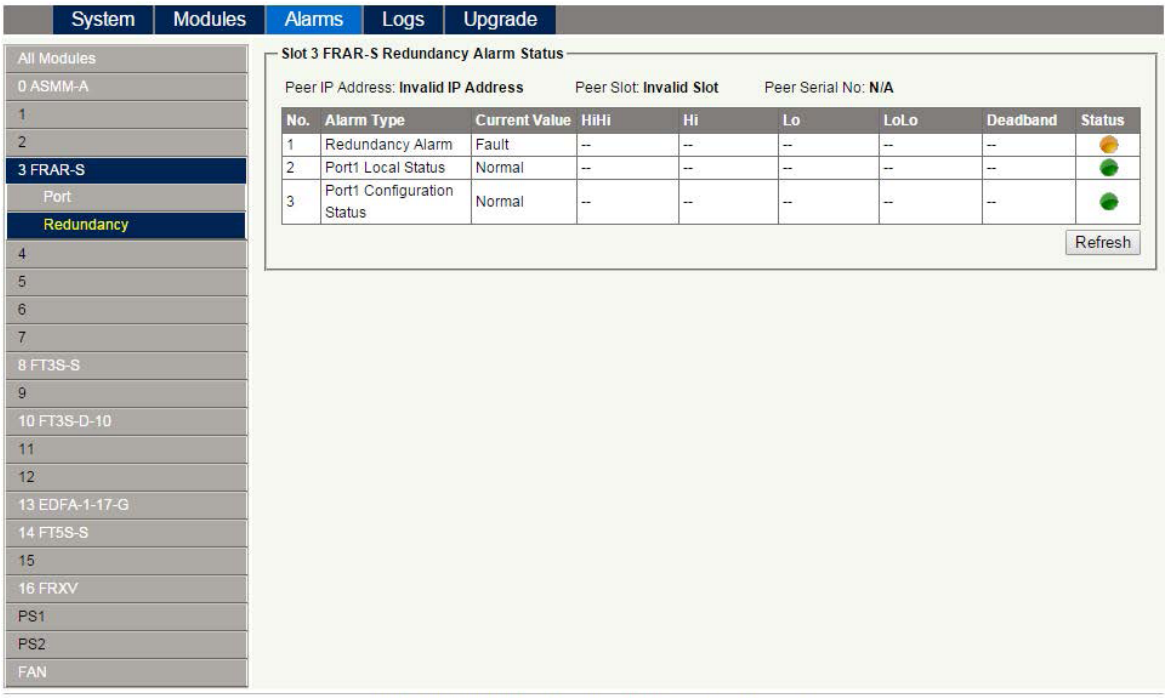


Figure 6-19 FRAR redundancy alarm webpage

7 Troubleshooting

7.1 Indicator for determining faults

If there is a fault, the operator can use the status LEDs to determine the location and condition of the fault. Please see **Table 7-1** below:

Table 7-1 Fault judgment table

Alarm light status	Common faults	Troubleshooting
Input optical port status is orange	Input port optical power slightly low	Clean the optical port and fiber end, measure the input optical power to ensure that the input optical power is within the normal range; If this fault still exists when the input optical power is normal, contact Technetix Technical Support Staff.
Input optical port status is red	Input port optical power too high/too low	Measure the input optical power to ensure that the input optical power is within the normal range. If this fault still exists when the input optical power is normal, contact Technetix Technical Support Staff.
STAT is Red	Input optical power abnormal	Bias current abnormal, contact Technetix Technical Support Staff.
	Power failure	Contact Technetix Technical Support Staff.
	Temperature too high	Reduce the room temperature. If the room temperature is normal, contact Technetix Technical Support Staff.

technetix