AIMA3000.RRAS-G-R

User Manual

technetix

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AIMA3000.RRAS/G/R

Analogue Return Receiver Series

Product User Manual

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1 About This Manual

1.1 Related Documentation

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

- Technetix.AIMA3000 - Product User Manual
- Technetix.AIMA ASMM - Product User Manual
- AIMA3000 NMS Web Management System Product User Manual
- Technetix.NMS3-EPSM - Basic Inventory Management
- Technetix.NMS3-EPSM - Basic Alarm Management
- Technetix.NMS3-EPSM - Basic System Management
- Technetix.NMS3-EPSM - Basic Template Management

1.2 Technical Support

If you need help in the process of setting up and maintaining an RRAS/G/R, please contact Technetix 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 8°. Note: An 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 for cleaning 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 Technetix qualified service personnel only.

Servicing and repairs

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

WARNING!

Exposure to class 1M laser radiation is possible. Access should be restricted to trained personnel only. Do not view exposed fibre or connector ends when handling optical equipment.

3 Overview

3.1 RRAS Overview

3.1.1 About the RRAS

The Technetix AIMA3000 RRAS series Analogue Return Receiver - Standard is designed for multi-services operators to increase network-return capacities for the ever-growing demand for bandwidth, while minimising physical headend space and power usage.

With the optional embedded Full Band Capture (FBC) module, it enables the operator to capture and monitor the return path spectrum helping the operator to quickly find and locate the upstream noise and the related upstream signal levels. Advanced spectrum analysing software is available as in a standalone version or as module within Technetix NMSE Software suite. It also can be easily integrated into operators exist network management system.

Next to above mentioned online management and controlling capabilities the can also be conveniently monitored and controlled through a computer directly connected to one of the Ethernet ports of the ASMM module.

All module settings are retained in non-volatile memory to ensure trouble-free operation. Bulk updating, automatic uploading and downloading of configuration files is possible using Technetix NMSE web-based management system.

3.1.2 Features for the RRAS

- Bandwidth 5 ~ 204 MHz to meet EuroDOCSIS and DOCSIS 3.0 / 3.1 frequency band requirements
- RF output 48 dBmV with a -6 dBm optical input and an OMI of 6%
- Wide band receiver (1260~1620nm) to suit CWDM and DWDM applications
- Allows up to 64 receivers (4x16 Modules) in only 4 RU of space
- User-selectable MGC or AGC
- Easy to install due to RF-Paddle board backplane design
- Plug-and-play and hot-swappable
- Dedicated testport per return channel
- Full Band Capture offers automated and 7*24 return path/upstream RF and data performance monitoring and analysis
- Help operators pre-emptively identify and address spectrum variances
- Lower capital expenses by eliminating the need for expensive test equipment
- Web-browser access eliminates the need for a thick client and a mobile APP is available
- An intuitive user interface similar as meter adapt to user's operating habits
- Improve network maintenance efficiency and Increase customer satisfaction
- FBC software which can work independently, in Technetix NMSE or be integrated into third-party systems
- FCC, CE and RCM (1) compliant

(1) See Declaration of Conformity for current status.

3.1.3 Order Details for RRAS

A-RRAS–[W]-[X]-[Y]-[Z] **Analogue Return Receiver - Standard**

Options:

W Optical ports
- **Q** Quad (4)

X FBC function (1)
- **M** With FBC Management

Y Optical Connector Type
- **S** SC/APC (2)
- **E** E2000/APC
- **F** FC/APC
- **L** LC/APC

Z Bandwidth
- **20** 5~204 MHz (Standard)

(1) Option for FBC Management configurations only, if not used omit X when making an order.

(2) Standard option. Contact a Technetix Sales Representative for availability of other options.

3.1.4 Specifications for the RRAS

Optical Performance

Optical wavelength	1260 ~ 1620 nm
Optical inputs	-18 ~ +2 dBm
Optical return loss	> 50 dB
Optical connectors	4 x SC/APC (1), FC/APC, LC/APC, E2000/APC

RF Performance

RF bandwidth	5 ~ 204 MHz
RF output level (2)	48 dBmV
RF flatness	± 0.75 dB (5 ~ 204 MHz)
Gain adjustment	0 ~ 52 dB in 0.5 dB increments (default 42 dB)
RF impedance	75 Ω
RF return loss	> 16 dB
Receiver isolation	> 60 dB
RF test point relative to RF Output port	-20 ±1 dB
RF connectors	4 x GSK-type female
RF test points	4 x 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 -6 dBm optical input, 6 % OMI, gain setting adjusted to maximum (the stated RF output level does not necessarily apply with other optical input levels). dBuV= 60 + dBmV.

Link Performance

CNR (3)	> 48 dB
IMD2 (4)	< -52 dBc
NPR (5)	> 35 dB (over dynamic range of 15 dB)

Notes:

(3) Measured @ -2 dBm ,6% OMI, 4 Channels

(4) RRAS: Measured in a typical system with Technetix ODN4P-RT, 4 channels, (11.5 MHz, 26.5 MHz, 45.5 MHz, and 58.5 MHz), 0 dBm, 6 % OMI. IMD2 is measured at f1 ± f2.

(5) RRAS: Measured in a typical system with Technetix ODN4P-RT, 10 km single mode optical fibre using 35 MHz noise loading.

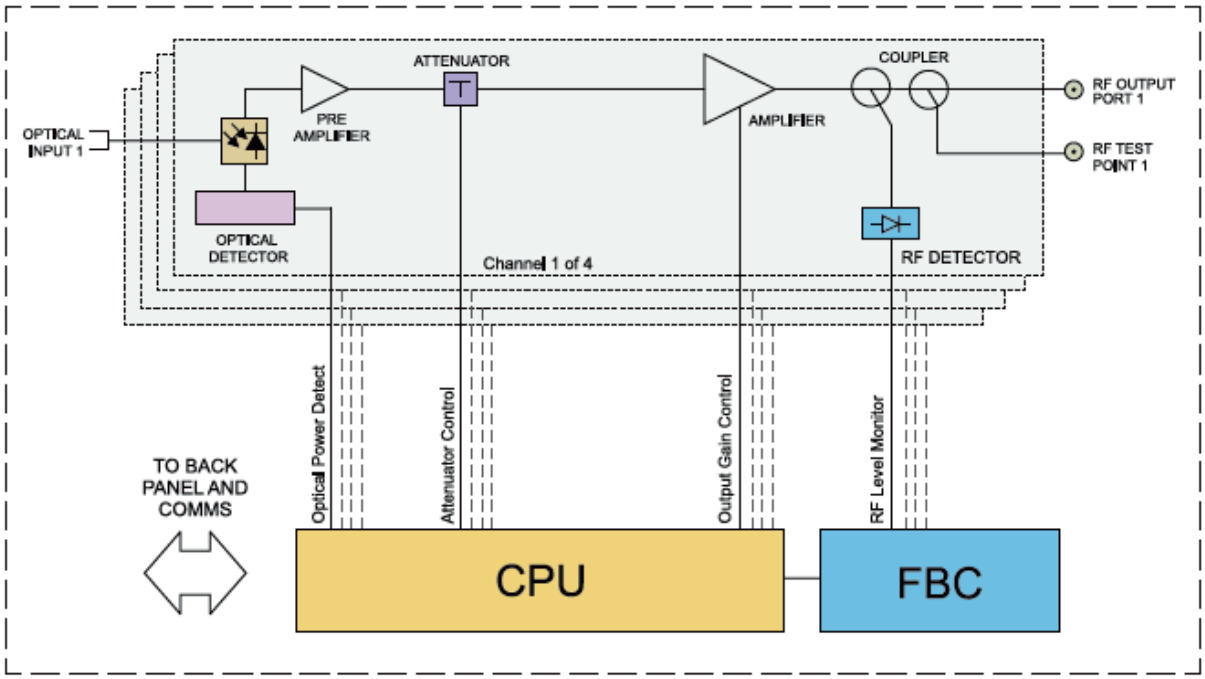
General

Power supply	Powered via AIMA3000 backplane
Power consumption	< 8.5 W
Operating temperature	-5 ~ +55 °C
Storage temperature	-25 ~ +70 °C
Operating/storage humidity	Max. 90% RH (non-condensing)
Dimensions (W*D*H)	24.6 * 410 * 152.5 mm
Weight	0.95 kg
Network management	Technetix NMSE or through ASMM's Web Interface

With the FBC module

Frequency Capture	5 to 204 MHz
Dynamic range	60 dB
Spectrum Lines	3, including live, max hold and min hold
RBW	UP from 30 KHz
VBW	Auto adaptable
Vertical Markers	2

3.1.5 Block Diagram for RRAS



3.2 RRAG Overview

3.2.1 About the RRAG

The Technetix AIMA3000 RRAG series Analogue Return Receiver- RFoG are designed for multi-service operators to increase network return capacity and meet an ever-growing demand for bandwidth, while minimising physical headend space and increasing power efficiency.

The RRAG is designed to plug into Technetix latest generation Advanced Intelligent Multi-Service Headend Platform (AIMA3000). The RRAG is specially designed to accommodate low power optical input as low as -28 dBm. The RRAG incorporates four independent optical return-path receivers that operate at wavelengths between 1260-1620 nm. The design allows up to 64 independent receivers in 4 RU of space. The user can set each receiver individually for manual gain control (MGC) mode. The unit has a low noise profile and high-performance amplifiers to ensure good signal-to-noise ratio as well as low distortion characteristics. The RRAG is compatible with RFoG ONU (R-ONU) as well as Technetix micro nodes DPON. With versatile RF outputs, the RRAG is flexible for various headend configurations.

The RRAG can also be conveniently monitored and controlled through a computer connected to one of the Ethernet ports via the ASMM module. All module settings are retained in non-volatile memory to ensure trouble-free operation. Bulk updating is possible using Technetix NMSE web-based management system.

3.2.2 Features for the RRAG

- Upstream bandwidth 5 - 85 MHz with DOCSIS 3.0 support
- RF output 48 dBmV with a -20 dBm optical input and an OMI of 10%
- 1260 - 1620 nm operating wavelength, to suit CWDM, DWDM, and RFoG applications
- Wide optical input from -28 dBm to -12 dBm
- 19-inch 4RU chassis supports up to 16 Application Modules
- A single RRAG module has 4 optical inputs; a full chassis supports up to 64 channels
- Real-time alarm monitoring
- Remote firmware upgrade and auto upload/download of configuration files through ASMM web interface or using Technetix NMSE
- Plug-and-play hot-swappable
- Easy to install, with blind mate RF connectors
- Independent RF test points for ease of setup and maintenance
- A single receiver consumes less than 2 W of power
- FCC, CE and RCM [1] compliant

[1] See Declaration of Conformity for current status.

3.2.3 Order details for RRAG

A-RRAG–[X]-[Y]-[Z] **Analogue Return Receiver - RFoG**

Options:

W Optical ports
- **Q** Quad (4)

Y Optical Connector Type
- **S** SC/APC *
- **E** E2000/APC
- **F** FC/APC
- **L** LC/APC

Z Bandwidth
- **20** 5~85 MHz (Standard)

* Option for FBC Management configurations only, if not used omit X when making an order.

3.2.4 Specifications for the RRAG

Optical Performance

Optical wavelength	1260 ~ 1620 nm
Optical inputs	-28 ~ -12 dBm
Optical return loss	>50 dB
Optical connectors	4 x SC/APC (1), FC/APC, LC/APC, E2000/APC

RF Performance

RF bandwidth	5 ~ 85 MHz
RF output level (2)	48 dBmV (108 dBuV) @-20 dBm optical input 10% OMI, full gain.
RF flatness	± 0.75 dB
Gain range	42 ~ 52 dB in 0.5 dB increments
RF impedance	75 Ω
RF return loss	> 16 dB
Receiver isolation	> 55 dB
RF test point relative to RF output port	-20 ±1 dB
RF connectors	4 x GSK-type female
RF test points	4 x Mini-SMB
Alarms and status	Front-panel LEDs, SNMP Traps
Equivalent Input Noise Current	4 pA/sqr(Hz)

Link Performance

CNR (2)	> 38 dB
IMD2 (2)	< -47 dBc
NPR (@ -22 dBm)	> 30 dB (over 10 dB dynamic range)

General

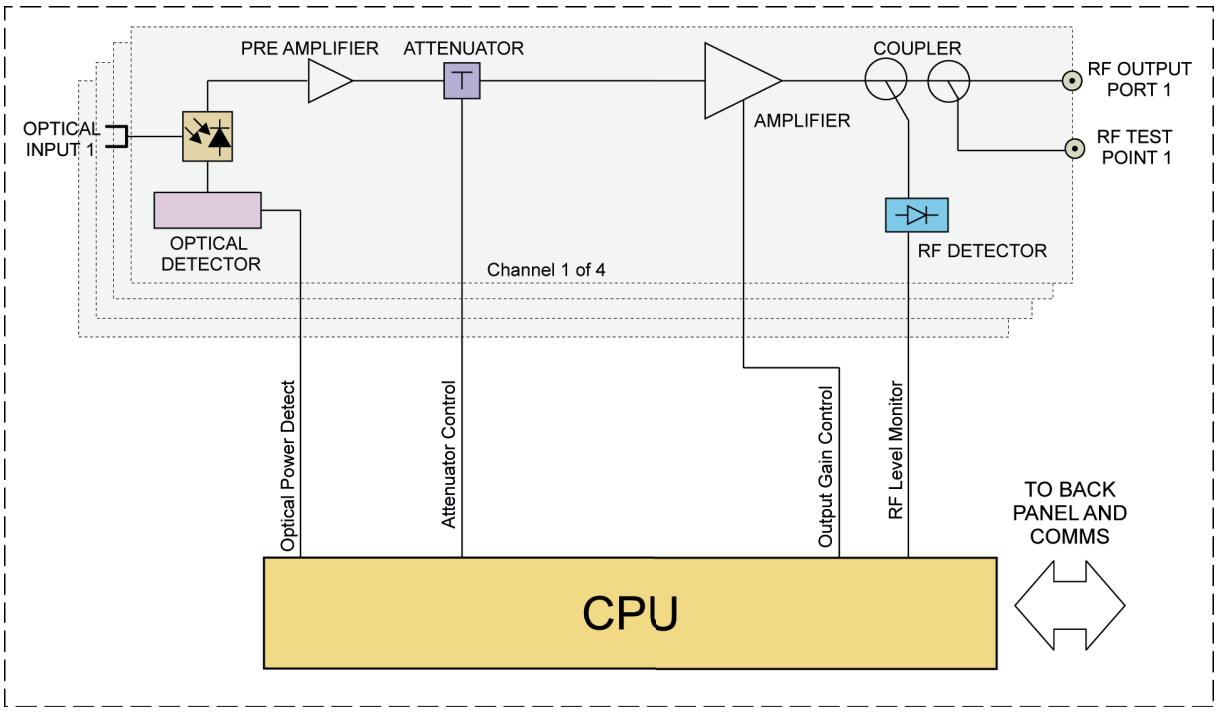
Power supply	Powered via AIMA3000 backplane
Power consumption	< 8.0 W
Operating temperature	0 ~ +55 °C
Storage temperature	-20 ~ +70 °C
Operating/storage humidity	Max. 90% RH (non-condensing)
Dimensions (W*D*H)	24.6 * 410 * 152.5 mm
Weight	0.87 kg
Network management	Technetix NMSE or through ASMM's Web Interface

Notes:

(1) Standard option. Contact a Technetix Sales Representative for availability of other options.

(2) Measured in a typical system with a -20 dBm optical input, an OMI of 10%, and gain set to maximum (the stated RF output level may differ with other optical input levels). And dBuV= 60 + dBmV.

3.2.5 Block Diagram for RRAG



3.3 RRAR Overview

3.3.1 About the RRAR

The Technetix AIMA3000 RRAR series Analogue Return Receiver - Redundant (RRAR) are designed for multi-services operators to increase network-return capacities for the ever-growing demand for data and voice bandwidth, while minimizing physical headend space and power requirements.

The RRAR, is designed to plug into Technetix latest generation Advanced Intelligent Multi- Service Headend Platform (AIMA3000). The RRAR incorporates four independent optical return-path receivers that can operate at any wavelength between 1260~1620 nm. This density allows up to 64 independent receivers in only 4 RU of space. The user can set each receiver individually for operation in either manual gain control (MGC) mode or automatic gain control (AGC) mode based on optical input power. The unit has a low-noise profile and high performance amplifiers to ensure a good signal-to-noise ratio as well as low distortion characteristics. The RRAR is compatible with Technetix existing optical nodes including the ODN1P, ODN2P, ODN4P, and ODN2000. With high RF outputs, the RRAR can be adapted to work with various headend configurations.

The RRAR can also be conveniently monitored and controlled through a computer connected to one of the Ethernet ports via the ASMM module.

All module settings are retained in non-volatile memory to ensure trouble-free operation. Bulk updating, automatic uploading and downloading of configuration files is possible using Technetix NMSE web-based management system.

3.3.2 Features for the RRAR

- Bandwidth 5 ~ 204 MHz to meet EuroDOCSIS and DOCSIS 3.1 frequency band requirements
- RF output 48 dBmV with a -6 dBm optical input and an OMI of 6%
- Operates between 1260 ~ 1620 nm wavelength, to suit CWDM and DWDM applications
- 19-inch 4RU chassis supports up to 16 Application Modules
- A single RRAR module has 4 optical inputs; the full chassis supports up to 64 channels
- User-selectable MGC or AGC
- Real-time alarm monitoring
- Remote firmware upgrade and auto upload/download of configuration files through ASMM web interface or using Technetix NMSE
- Plug-and-play and hot-swappable
- Easy to install, with blind mate RF connectors
- Independent RF test points for ease of setup and maintenance
- A single receiver consumes less than 3 W of power
- Fully FCC, CE, and RCM compliant

3.3.3 Order Details for RRAR

A-RRAR–[X]-[Y]-[Z] **Analogue Return Receiver - Redundant**

Options:

W Optical ports
- **Q** Quad (4)

Y Optical Connector Type
- **S** SC/APC (1)
- **E** E2000/APC
- **F** FC/APC
- **L** LC/APC

Z Bandwidth
- **20** 5~204 MHz (Standard)

(1) Option for FBC Management configurations only, if not used omit X when making an order.

3.3.4 Specifications for the RRAR

Optical Performance

Optical wavelength	1260 ~ 1620 nm
Optical inputs	-20 ~ +2 dBm
Optical return loss	> 55 dB
Optical connectors	4 x SC/APC (1), FC/APC, LC/APC, E2000/APC

RF Performance

RF bandwidth	5 ~ 204 MHz
RF output level (2)	35 dBmV per channel (Full Gain)
RF flatness	±0.75 dB (5 ~ 204 MHz)
Gain adjustment	0 ~ 45 dB in 0.5 dB increments (default 42 dB)
RF impedance	75 Ω
RF return loss	> 18 dB
Receiver isolation	> 60 dB
RF test point relative to RF output port	-20 ±1 dB
RF connectors	4 x GSK-type female
RF test points	4 x Mini-SMB
Alarms and status	Front-panel LEDs, SNMP Traps
Redundant switching time	< 50 ms
Equivalent Input Noise	4 pA/sqr(Hz)

Link Performance

CNR (3)	> 53 dB
IMD2 (4)	< -60 dBc
NPR (5)	44 / 15 dB (over dynamic range of 15 dB)

General

Power supply	Powered via AIMA3000 backplane
Power consumption	< 5 W per receiver
Operating temperature	-5 ~ +55 °C
Storage temperature	-40 ~ +70 °C
Operating/storage humidity	Max. 90% RH (non-condensing)
Dimensions (W*D*H)	24.6 * 410 * 152.5 mm
Weight	0.87 kg
Network management	Technetix NMSE or through ASMM's Web Interface

Notes:

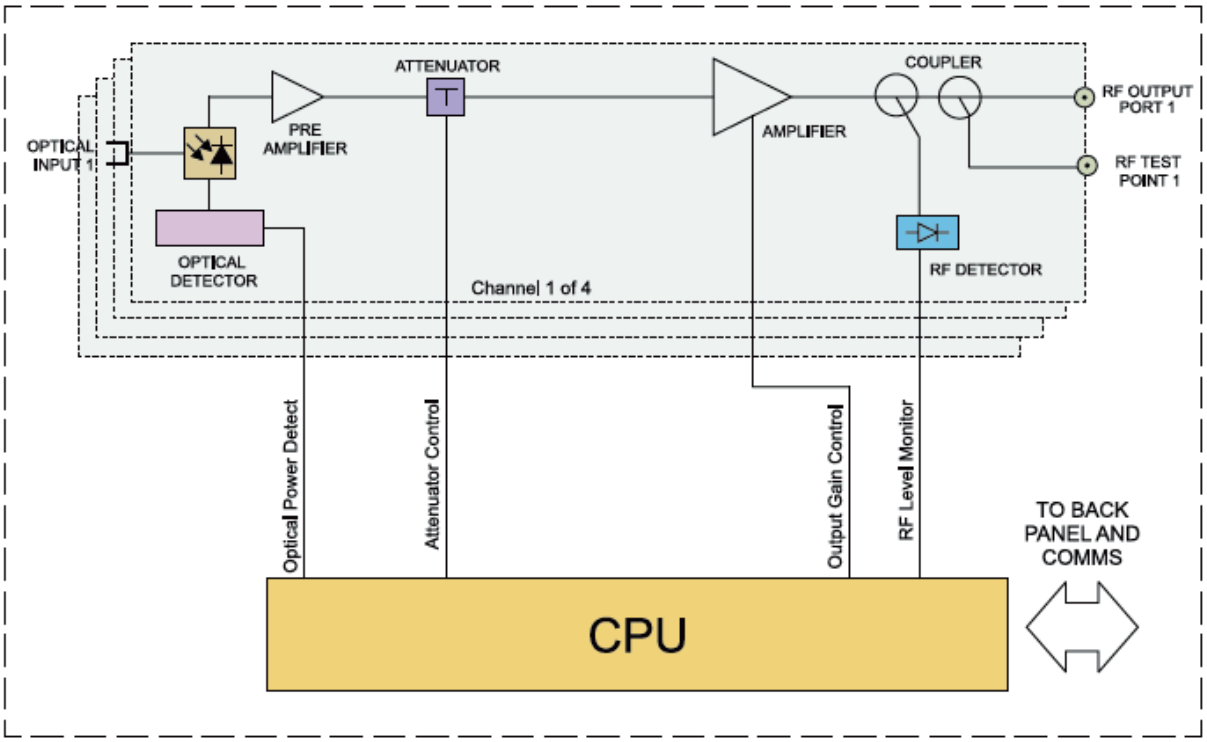
(1) Standard option. Contact a Technetix Sales Representative for availability of other options.

(2) Measured in a typical system with -13 dBm optical input, 7% OMI, gain setting adjusted to typical (the stated RF output level does not necessarily apply with other optical input levels). dBuV= 60+dBmV.

(3) Measured in a typical system with Technetix Standard Return Transmitter, 4 channels (11.5 MHz, 26.5 MHz, 45.5 MHz and 58.5 MHz), -6 dBm, 7% OMI, Output level 44 dBmV per Channel.

(4) Measured in a typical system with Technetix Standard Return Transmitter, -13 dBm optical input, 35 MHz noise loading.

3.3.5 Block Diagram for RRAR



4 Functional Overview

4.1 Automatic Gain Control

The micro-controller monitors the optical input power and controls the gain. Alarms are activated if the levels are outside the normal working range.
In AGC mode, the output gain automatically adjusts according to the optical input signal level (within a range of ± 5 dBm) to ensure RF output stability.

4.2 Manual Gain Control

The user can select the MGC mode when the input power is relatively stable or the user has special requirements based off the input signal. The user can regulate the gain to accommodate a wide range of input signals and ensure an ideal output index.

4.3 Output Level Control Chart for RRAS

The output signal level depends on the transmitter configuration, transmitter laser, the received optical RF input signal level, the receiving device configuration and the link loss.
With the Technetix optical transmitter, when the optical input signal has an OMI of 6% and the module output gain is 42 dB, the corresponding relationship between the optical input signal power and the output level is shown in the diagram below.

OMI 6%, Gain 42 dB **OPT dBm input**	**RF OUT (dBmV)**
2	64
1	62
0	60
-1	58
-2	56
-3	54
-4	52
-5	50
-6	48
-7	46
-8	44
-9	42
-10	40
-11	38
-12	36
-13	34
-14	32
-15	30
-16	28
-17	26
-18	24

4.4 Output Level Control Chart for RRAG

The output signal level depends on the transmitter configuration, transmitter laser, the received optical RF input signal level, the receiving device configuration and the link loss.

With the Technetix optical transmitter, when the optical input signal has an OMI of 15% and the module output gain is 42 dB, the corresponding relationship between the optical input signal power and the output level is shown in the diagram below.

OMI 15%, Gain 42 dB **OPT dBm input**	**RF OUT (dBmV)**
-12	56
-13	54
-14	52
-15	50
-16	48
-17	46
-18	44
-19	42
-20	40
-21	38
-22	36
-23	34
-24	32
-25	30
-26	28
-27	26
-28	24

4.5 FBC Function Description (Only for RRAS-Q-M)

With the optional embedded Full Band Capture (FBC) module, it enables the operator to capture and monitor the return path spectrum helping the operator to quickly find and locate the upstream noise and the related upstream signal levels.

Through the AIMA3000 configuration system interface, click the top left 'system configuration', and then click 'spectrum' on the left, open the spectrum interface, as Figure below.

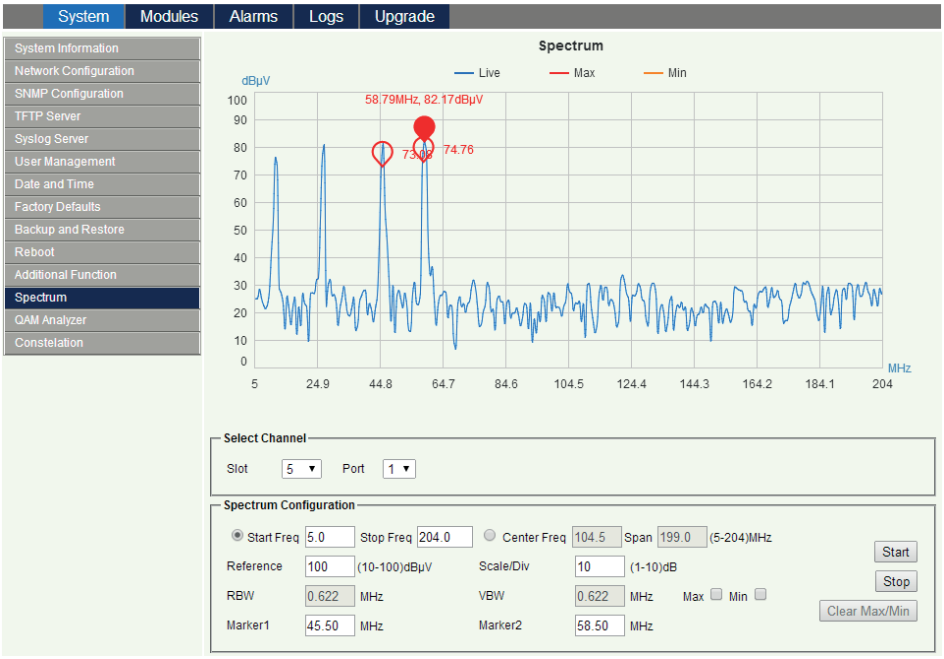


Figure 4-1 RRAS-Q-M spectrum webpage

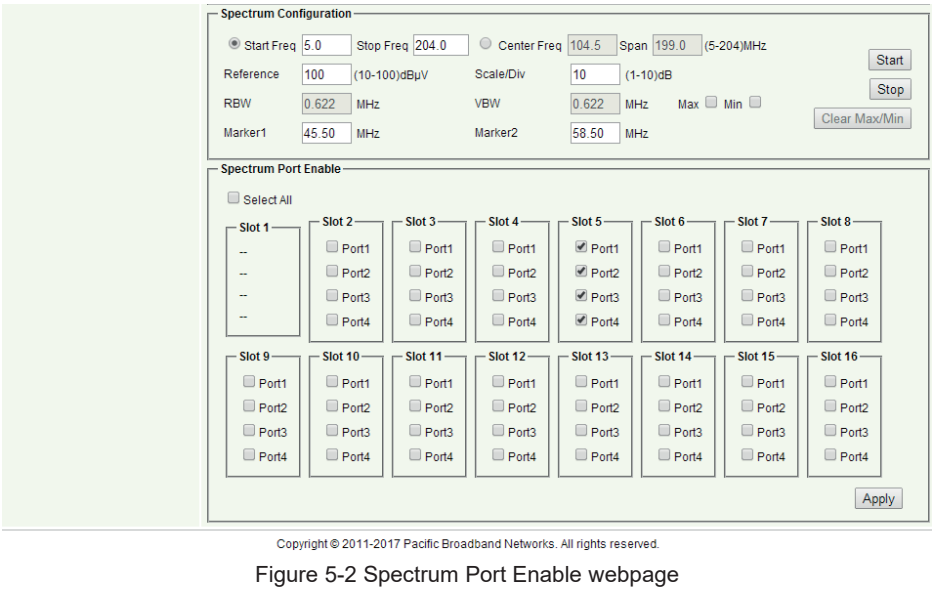


Figure 5-2 Spectrum Port Enable webpage

Spectrum interface 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 5~204 MHz.
Stop Freq: Set the stop frequency of spectrum, range is 5~204 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 10-100dBuV.
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.
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 max hold and min hold.
For Spectrum Port Enable, the parameters and buttons are shown as below:
The webpage shows all the slots and ports of the RRAS-Q-M modules.
Choose the port that you want to see the spectrum analysis, click "application", the port of spectrum analysis is enable.
Cancel the hook, click 'application', and then it will stop the port spectrum analysis.
Click the 'select all' and then click 'application', all spectrum ports are enable.
Cancel 'select all' and then click 'application', then then it will stop all the port spectrum analysis.

FBCM module Factory defaults and Reboot.

Factory default settings and Reboot can be operated from the main RRAS-Q-M page FBCM commands.
You can apply the factory default configuration and reboot the FBCM module by clicking the associated **'Apply'** button.

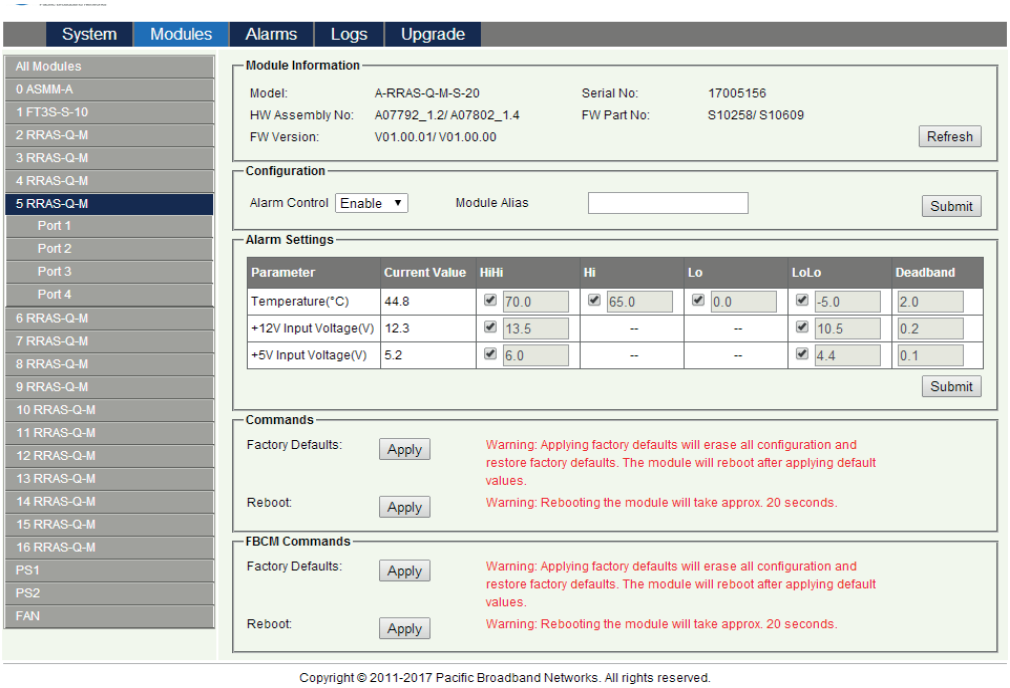


Figure 4-3 FBCM factory defaults and reboot webpage

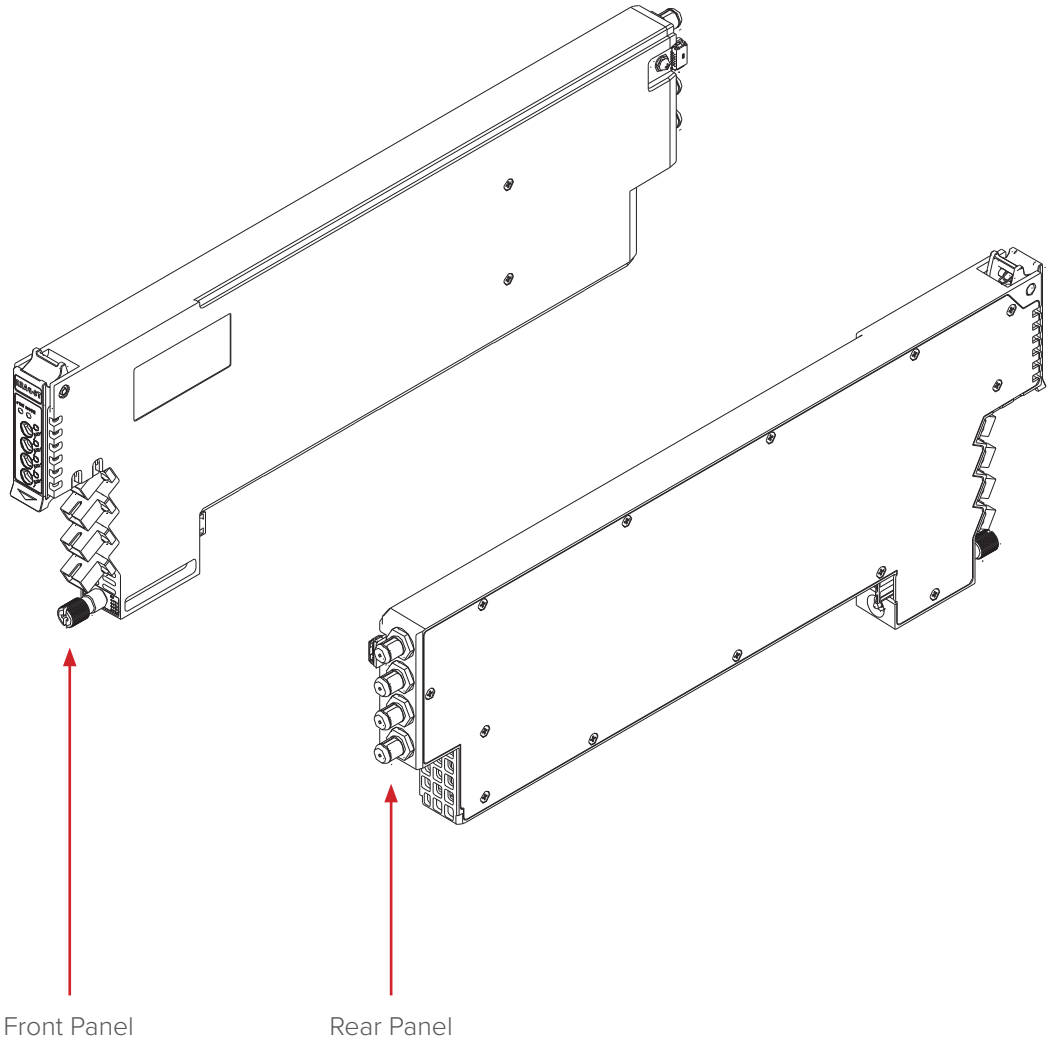
Factory Defaults: After stick 'Apply', it will be prompted 'Are you sure you want to do Factory Defaults?' Stick 'Yes', it will clear all the Spectrum Configuration of FBCM and restore factory defaults. It will reboot FBCM after restore factory defaults.
Reboot: It means only reboot the FBCM module.
Additional instructions:
If there are many RRAS-Q-M modules, the FBC port discovering time is longer.
Refreshing each spectrum port needs 2 seconds. If there are many the spectrum ports enabling, each port will be refreshed on turn, so the refreshing time is long. 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 access to the webpage, it may make the spectrum capture incomplete, Please re-stick the 'start' button if you see the incomplete spectrum.

4.5 Hot-Swap Function Overview

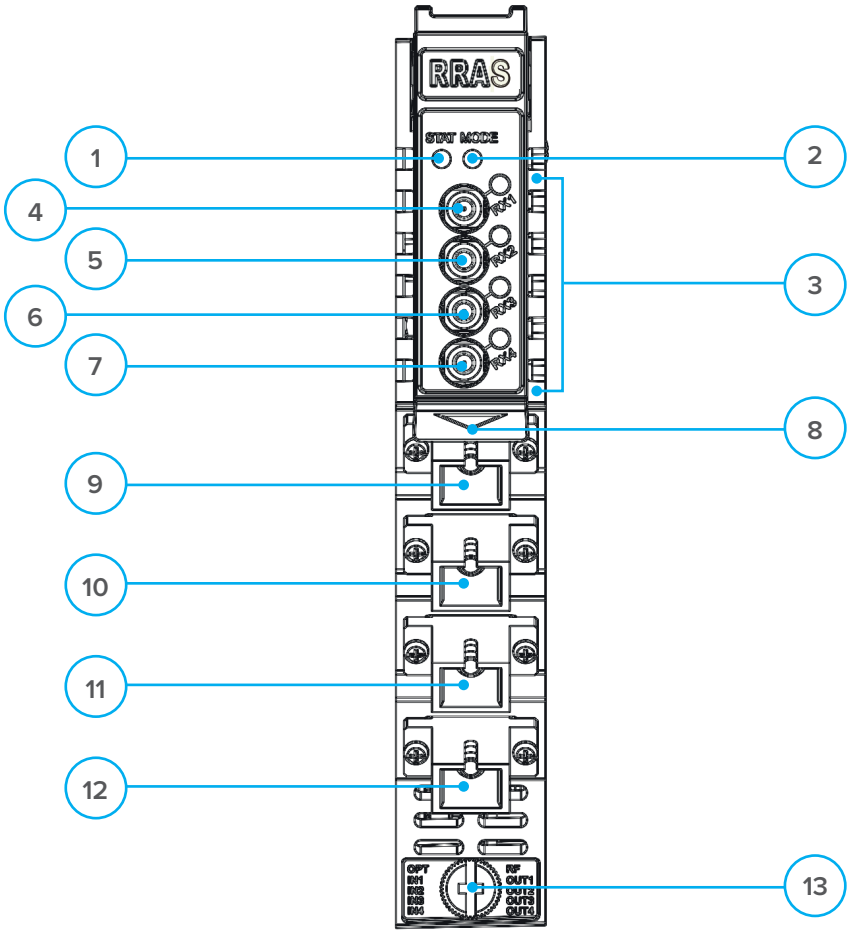
The Hot-Swap function enables quick replacement of a module while the chassis is powered on. The replacement module automatically downloads the configuration parameters of the previous module after powering on. This works only for modules of the same type. The ASMM management module stores all configuration parameters for each inserted module. The inserted module needs to be set to download configuration for settings and parameters to be automatically configured.

5 Module details

5.1 Front Panel and Rear Panel View

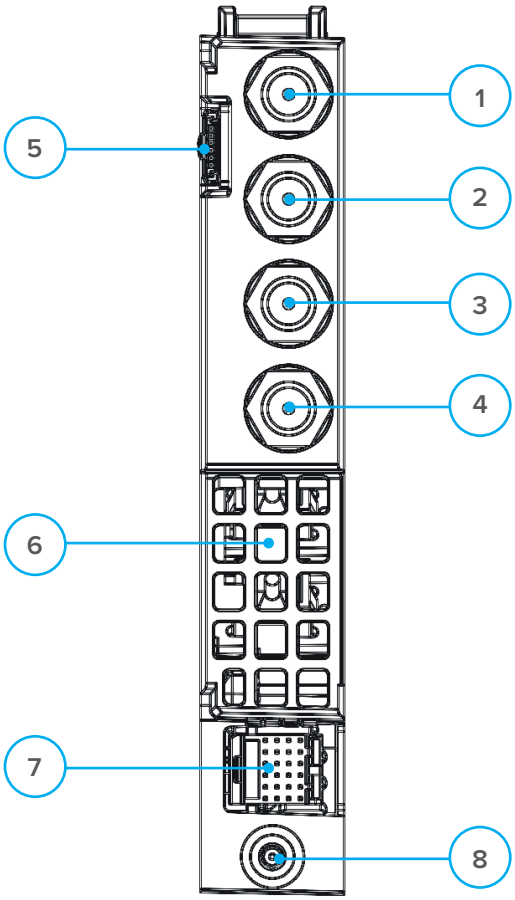


5.1.1 Front Panel View



Item	Description
1	STAT LED
2	MODE LED
3	LED status indicators (see Chapter 6.7.3)
4	RX1 Test Point (Mini-SMB connector)
5	RX2 Test Point (Mini-SMB connector)
6	RX3 Test Point (Mini-SMB connector)
7	RX4 Test Point (Mini-SMB connector)
8	Orange Tab-Retaining Clip
9	OPT IN 1 (Optical Input 1)
10	OPT IN 2 (Optical Input 2)
11	OPT IN 3 (Optical Input 3)
12	OPT IN 4 (Optical Input 4)
13	Module Retaining Screw

5.1.2 Rear Panel View



Item	Description
1	RF OUT 1 (RF output port with GSK-type female connector)
2	RF OUT 2 (RF output port with GSK-type female connector)
3	RF OUT 3 (RF output port with GSK-type female connector)
4	RF OUT 4 (RF output port with GSK-type female connector)
5	Redundancy connector
6	Air Vent
7	Multi-pin connector
8	Placement Pin

Notes:

(1) RF1 ~ RF4 OUT connect with the blind RF connectors at the rear of the AIMA3000 chassis.

(2) Redundancy connector is available for RRAR only.

6 Installation

6.1 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
RRAS / RRAG / RRAR Module	The module to install into the AIMA3000 chassis

6.2 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 6-2 Packing Manifest

No.	Description	Qty
1	RRAS / RRAG / RRAR Module	1
2	Individual test sheet (Certificate of Performance)	1

6.3 Power and Cooling Requirements

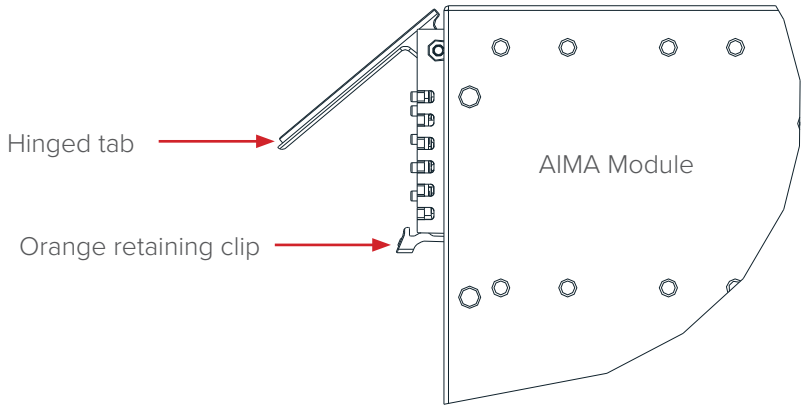
The RRAS / RRAG / RRAR module is powered by the power supply in the AIMA3000 chassis. The module can consume up to 8 W.

The RRAS / RRAG / RRAR module and its corresponding AIMA3000 chassis should be located in an environment where the temperature range is from -5 °C to +55 °C with the AIMA3000 fans running.
If the temperature exceeds these limits, the AIMA3000 should be relocated in the equipment rack where the ambient temperature is less than +55 °C.

The AIMA3000 chassis should have adequate ventilation clearance. See the installation and operating instructions for your AIMA3000 chassis.

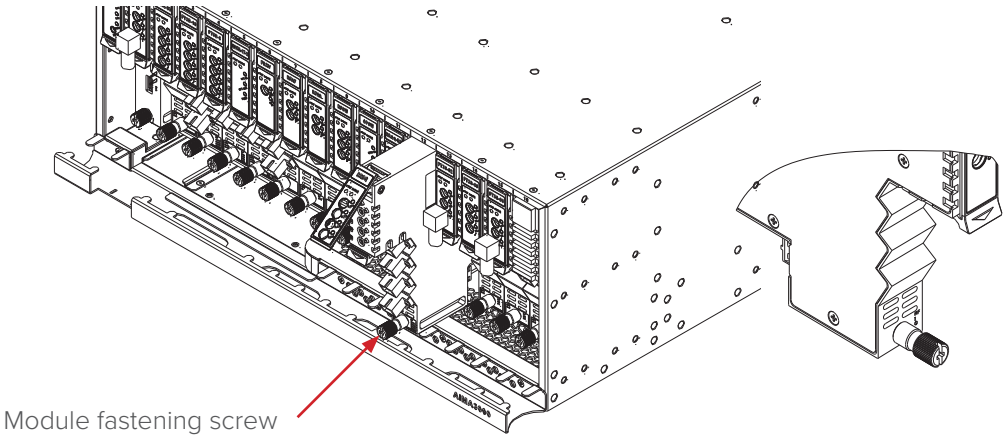
6.4 Module Installation

1. Gently depress the orange retaining 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 with the chassis's RF connectors.



CAUTION!

The module MUST be installed correctly to ensure a proper connection of the module's multi-pin connector and the backplane.

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 orange retaining clip. While pushing down on the hinged tab, the AIMA module will mate with the power bus and will lock in 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 bottom of the AIMA module, fasten the spring-loaded mounting screw. Only use fingers to fasten the mounting screw. DO NOT use a screwdriver.

6.4.1 Connecting Optical Cables

Before connecting optical cables to the RRAS / RRAG / RRAR module, the input-signal level must be checked using an optical power meter, to ensure it is within the specifications. All optical inputs must be checked.

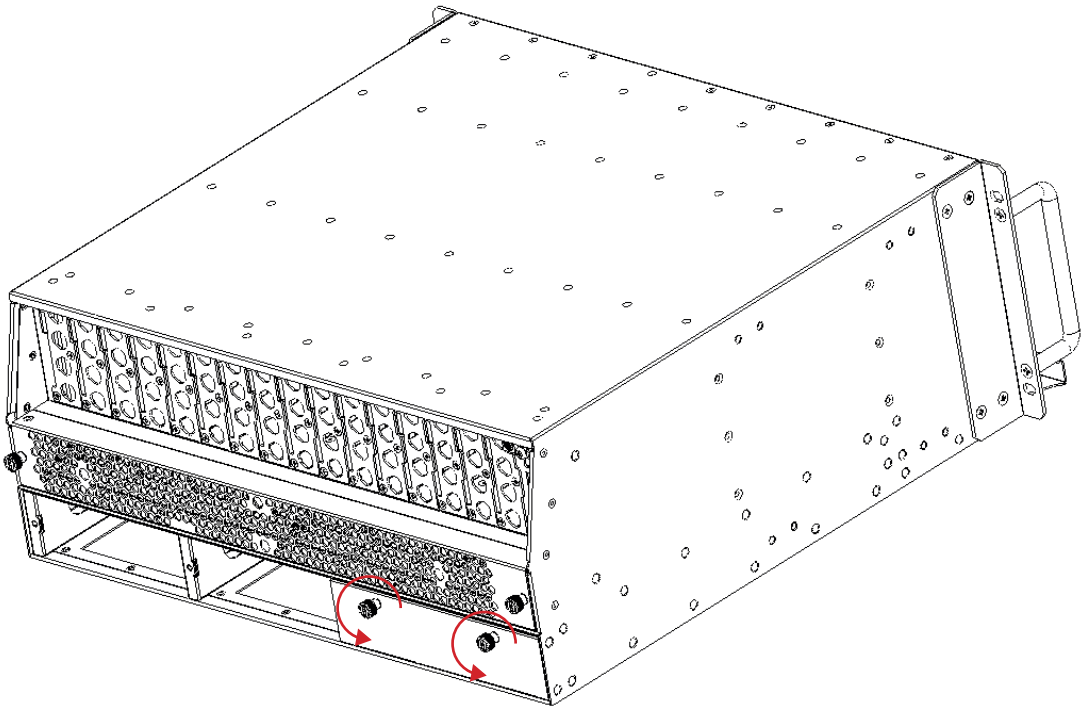
6.5 Connecting the optical cables

For the convenience of the user, the AIMA3000 Chassis has a Sliding Fibre 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.

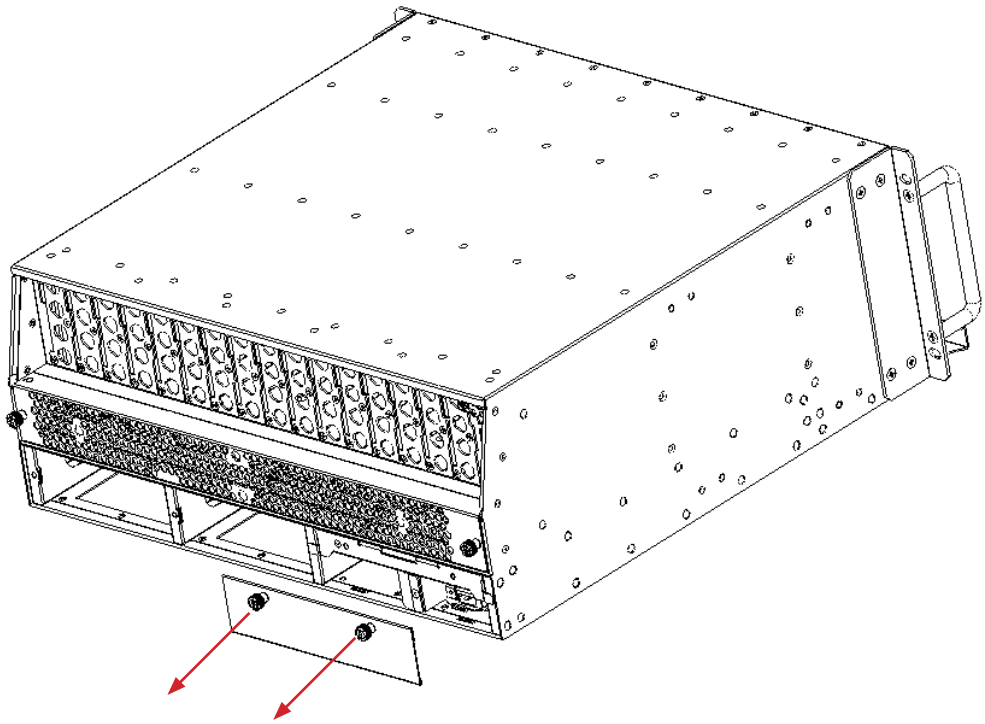
6.5 .1 Using the Sliding Fibre Guide

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 first remove the rear panel located on the back of the chassis.

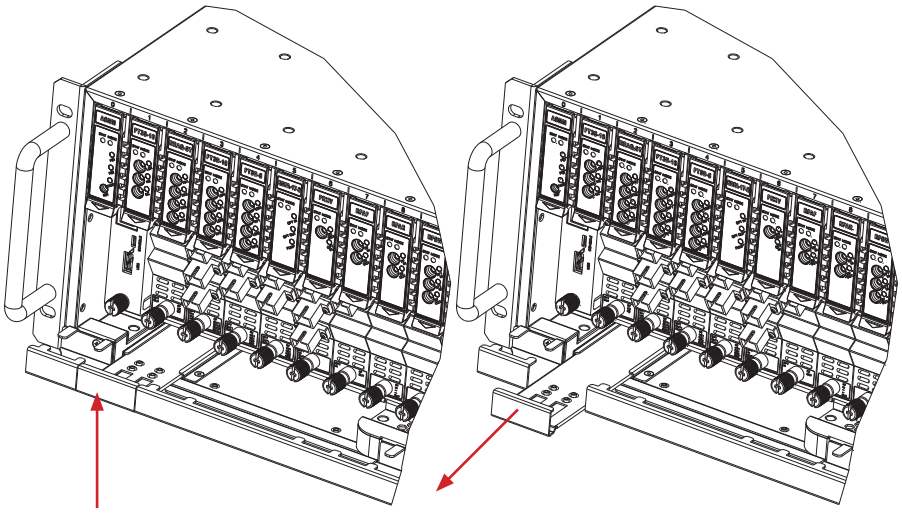
1. Unscrew the two thumbscrews on the rear panel.



2. Then, pull the panel forward.

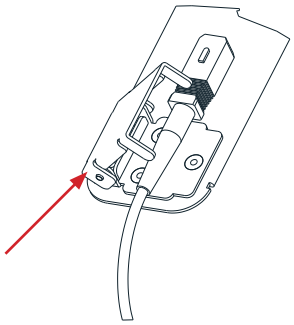


3. Then lift up the handle and slide the fibre guide out of the front of the chassis.



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.



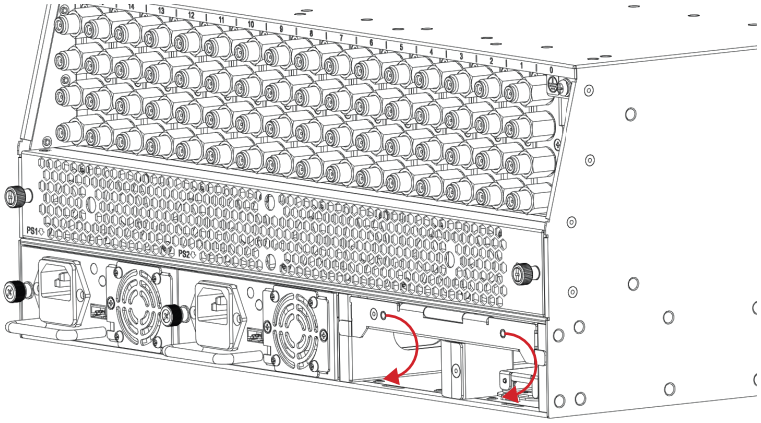
When using the sliding guide, put the fibre connector in the clip and slide it in from the rear to the front, through the chassis. Ensure that the optical fibre tail does not become trapped or pulled tightly.

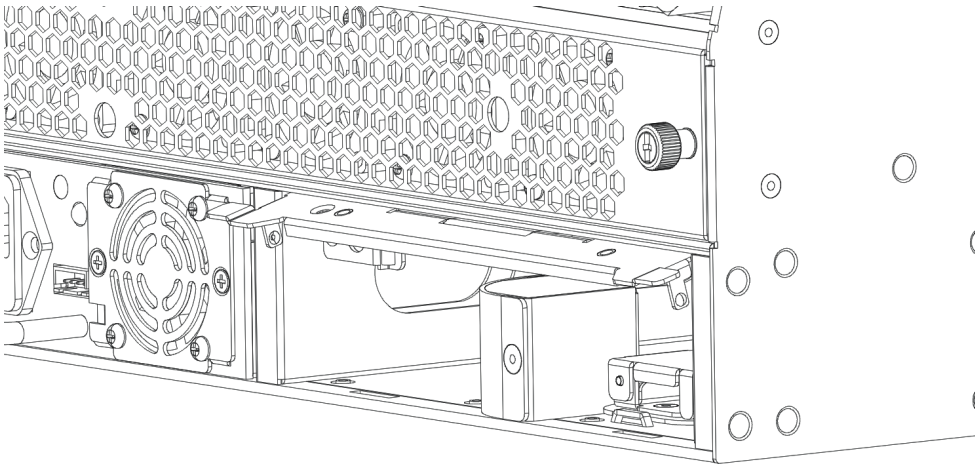
Fibre clip (at rear, for up to two connectors) **Handle (at front)**

6.5.2 Using the Fibre Tray

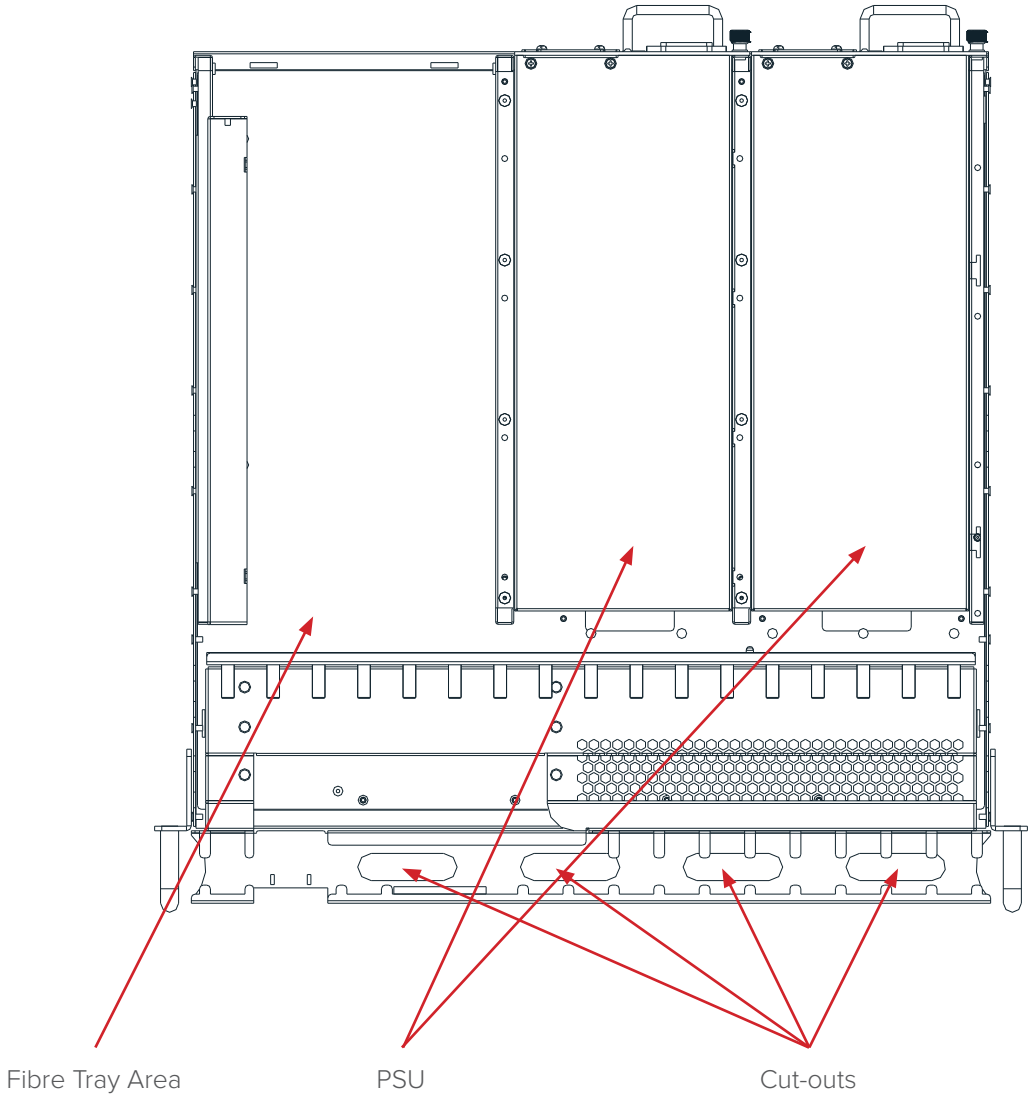
All optical fibres must be organised in a tidy manner in the chassis's fibre tray, which provides enough space for up to 64 optical fibres. This allows for easy positioning and future replacement of optical fibres. Along the front of the chassis, there are cut-outs for keeping the optical fibres in position.

1. When organising 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 away from the sliding guide rails.



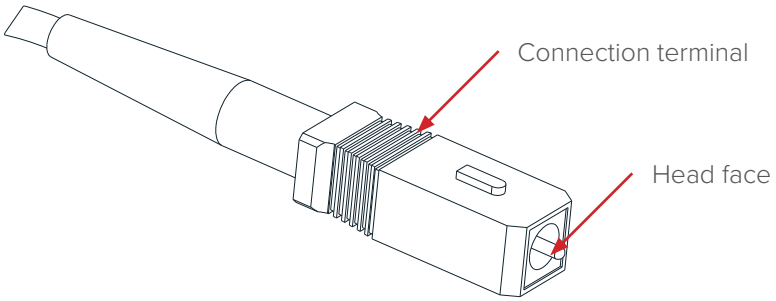


2. Use the Fibre Guide Tool to organise the cables and wires in the fibre tray to prevent tangles and the blocking of the guide rails.



6.5.3 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.



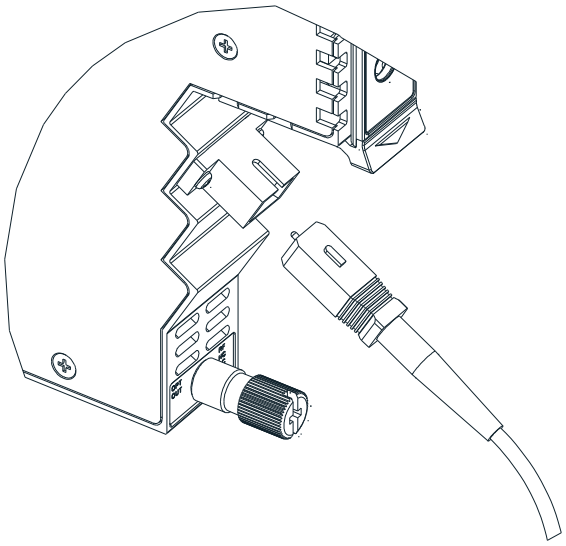
When cleaning the optical fibre-connector end, remove the dust cap and then use a lint-free cloth dampened with a static dissipative solvent to clean the angled surface. Dry the surface using a dry lint-free cloth.
To clean the front-panel optical port, use a special lint-free swab that is designed for 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

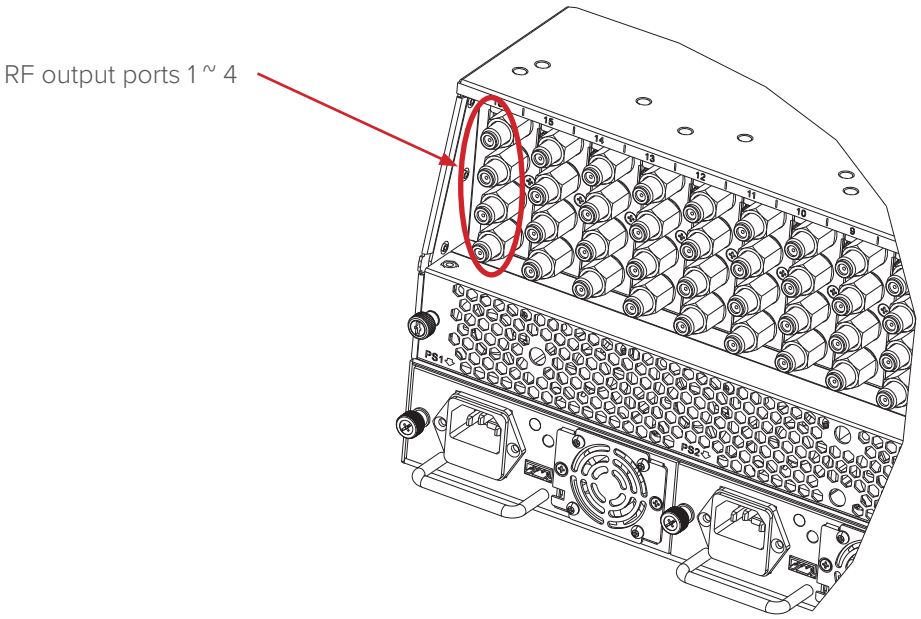
www.oneclickcleaner.com

6.5.4 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.



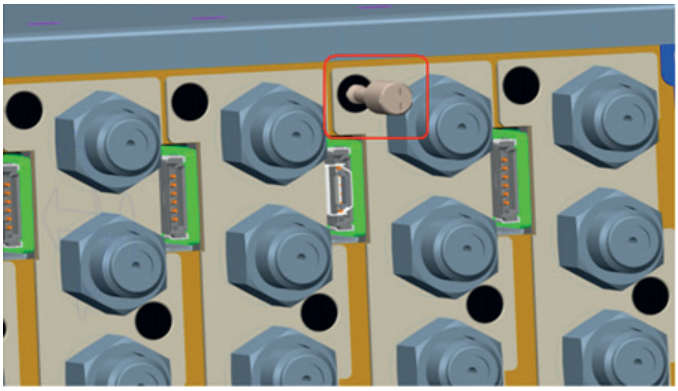
6.6 Connecting RF cables



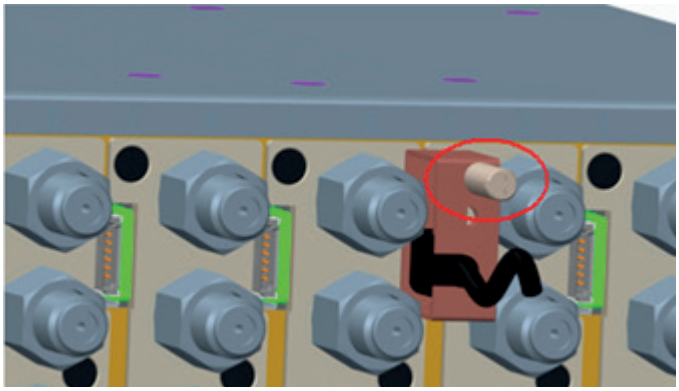
Rear of the AIMA3000 chassis

Connect the RF cables to the F-type connectors at the rear of the AIMA3000 chassis. The connectors are numbered 1 ~ 4 from top to bottom. If any RF connectors are unused, use a 75 Ω terminator to cover the port.

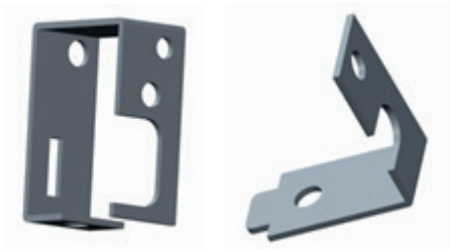
6.7 Redundancy Connection (for RRAR only)



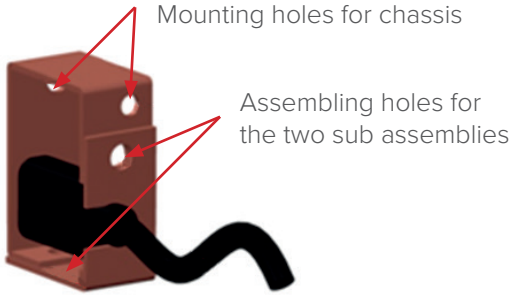
(a) Redundancy Cable Brace Mounting Hole on Chassis



(d) Mounting the Redundancy Cable Assembly to the Chassis



(b) Redundancy Cable Brace



(c) Redundancy Cable and its Brace

1. Unfasten the screw in figure (a);
2. Fasten the sub assemblies 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 tightening the securing screw, as shown in figure (d).

6.8 Power-on testing

After installing the module, power-on the chassis.
When the module has been installed, if the chassis is powered, all LED indicators on the front panel will show a blinking green light, indicating the module is initiating.
If the input signals are normal, the “STAT” LED indicator will cease to blink in about 5 seconds and remain constant green afterwards. At the same time, the “RX” LED indicators will also remain constant green when the signals are normal.
If the optical input signal is out of the expected range, the “STAT” and “RX” LED indicator will show constant orange or red.

6.9 Module Removal

1. Disconnect the optical cables from the front panel of the module and place dust caps on the exposed ports.
2. Unscrew the module retaining screw until it releases.
3. Gently press the orange retaining clip to release the hinged tab.
4. Lift the hinged tab to remove the module from the multi-pin connector.
5. Carefully use the hinged tab to initially pull the module out of the chassis.
6. Then, grasp the module's casing and continue to remove the module from the chassis.

CAUTION!

DO NOT completely pull the module only by the hinged tab, to avoid damage. Once the module is removed from the chassis, secure the hinged tab in the closed position behind the orange tab-retaining clip.

Note:

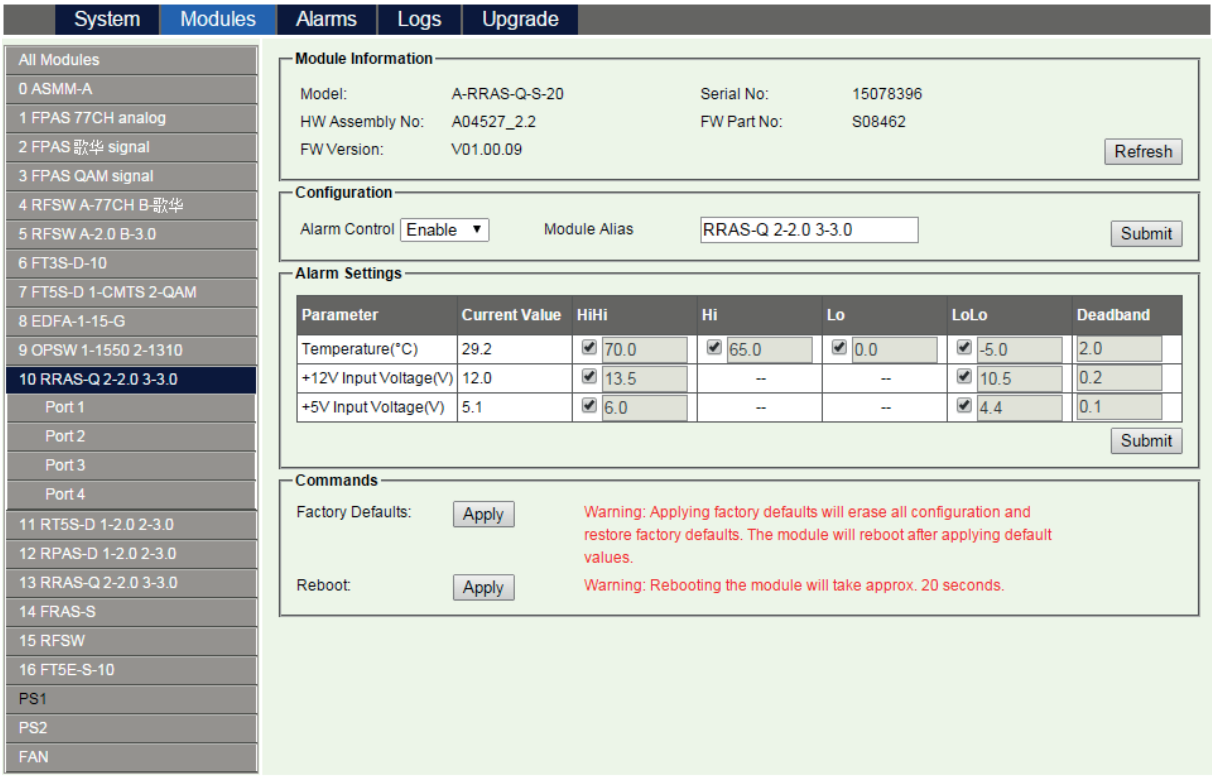
A module can be removed from or inserted into the AIMA3000 chassis while power is being supplied to the AIMA3000. Always place protective dust caps on all optical connectors when not in use.

7 Module Configuration & Alarms

The module configuration settings can be configured using the web interface and Technetix NMSE network management software. This manual only provides details on the web interface. For login details and network setup, please refer to the AIMA-ASMM user manual. If the same module is reinserted in the same slot, the ASMM will restore the previous settings if the module is set to “Auto Download” the configuration.

7.1 Port configuration

To set up the RF output, go to **“Modules”** tab, and then select the **“RRAS”** or the **"RRAG"**. The RRAS / RRAG is equipped with four individual receivers, these are listed as **”Port 1”**, **”Port 2”**, **”Port 3”**, and **”Port 4”**.



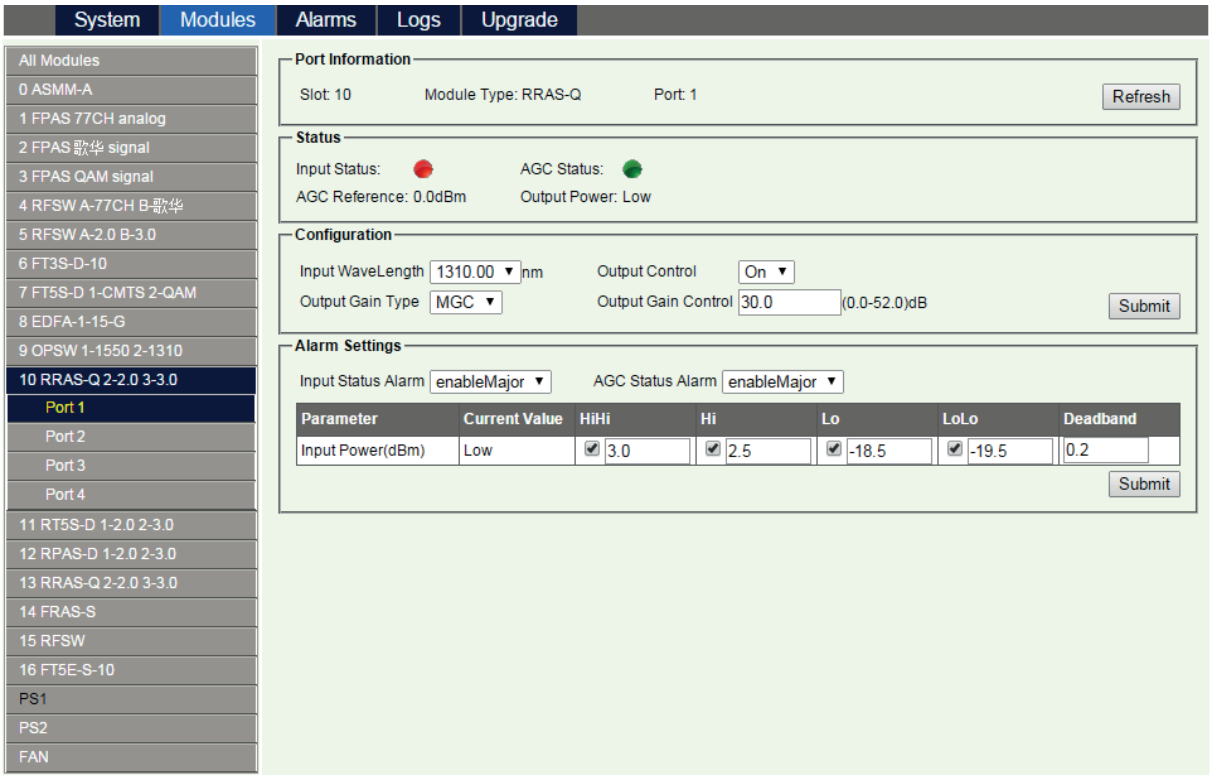
On the main settings page, alarms can be toggled.

Table 7-1 RRAS Common parameters (non configurable)

Parameter	Units	HIHI	HI	Normal	LO	LOLO	Dead Band	Threshold changeable by user	Default Alarm Enable
Temperature	°C	70	60	-	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

7.2 Setting up the RF Input level

When the main RRAS / RRAG web interface is opened, on the left toolbar each port can be selected and configured individually. The ports are listed as port 1 – 4. In the example below, **"Port 1"** is selected.



In the setup page for **"Port 1"** the operator can view the module's status for the RRAS:

Field	Description	Factory Default Setting (bold) and range if applicable
Input Status Alarm	Monitors Optical Input Level	**Enable Major** Enable Minor Disable
AGC Status Alarm	Monitors the mode for gain control	**Enable Major** Enable Minor Disable

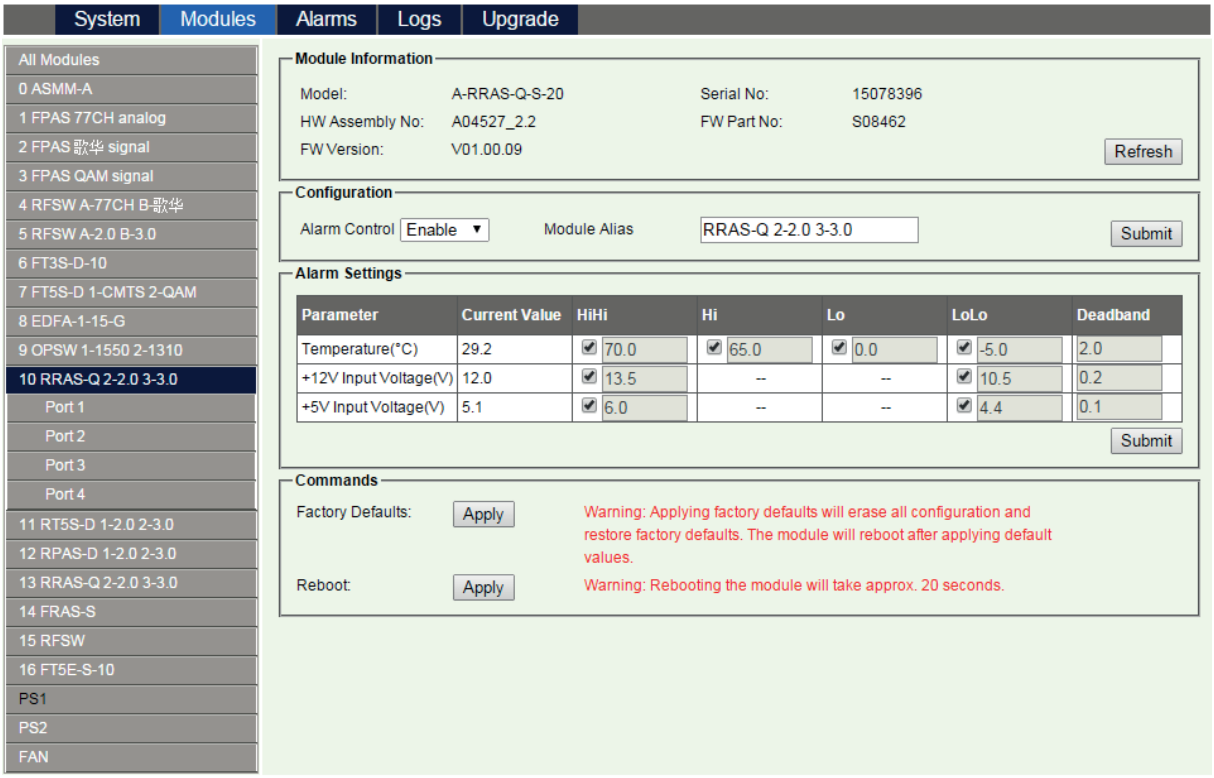
Parameter	Units	HIHI	HI	Normal	LO	LOLO	Dead Band
Input Power	dBm	3	2,5	-	-18,5	-19,5	0,2

On the configuration section of the page, following settings can be changed.

Setting	Description
Input Wavelength	Can specify the input wavelength for DWDM and CWDM applications
Output Gain Type	Set Automatic Gain Control or Manual Gain Control
Output Gain Control	Can configure attenuators to set proper RF output. Maximum 48 dBmV.
Output Control	Allows RF output to be toggled

7.3 Factory Default Settings

Factory default settings can be restored from the main RRAS / RRAG page.



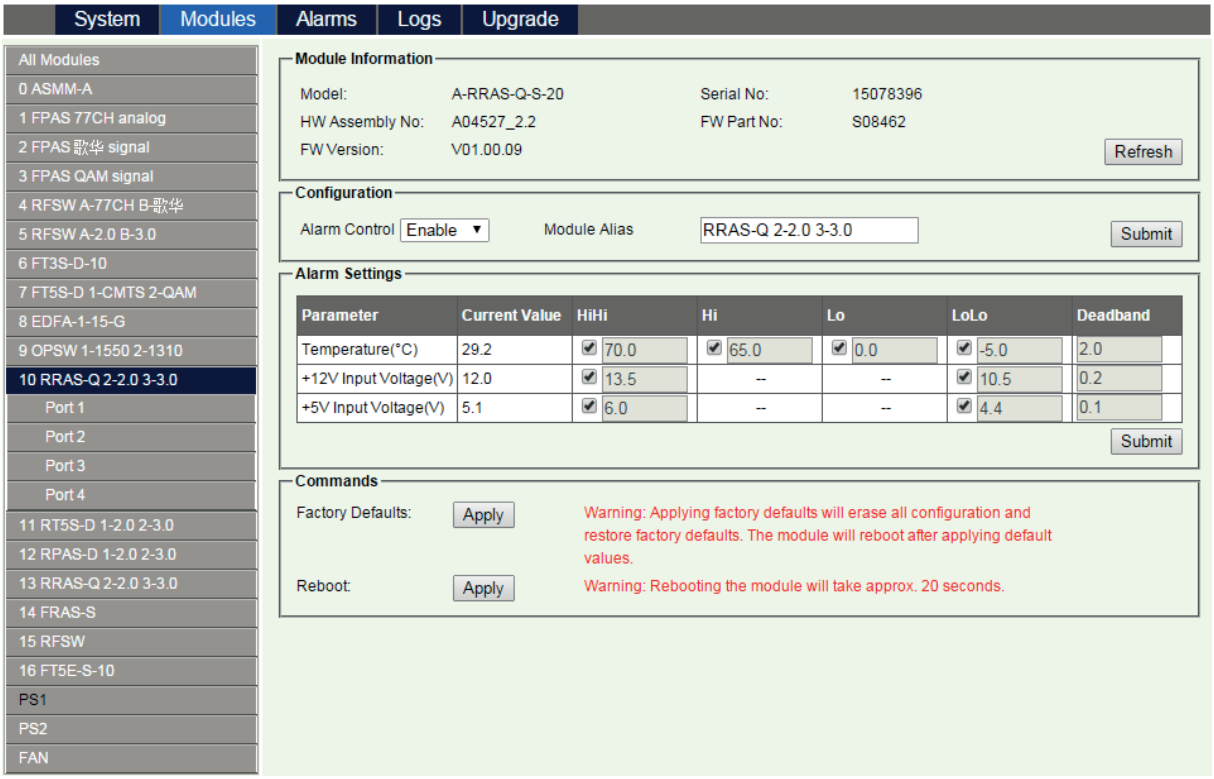
You can apply the factory default configuration by clicking the associated **"Apply"** button.

Factory default settings

Name	Options	Default Value
Alarm Control	Enable / Disabled	Enabled
Output Control	Enable / Disabled	Enabled
Output Gain Type	MGC / AGC	MGC
Output Gain Control	0 ~ 52	42
Input Status Alarm	Enable Major Enable Minor Disable	Enable Major
AGC Status Alarm	Enable Major Enable Minor Disable	Enable Major

7.4 Reboot RRAS / RRAG Module

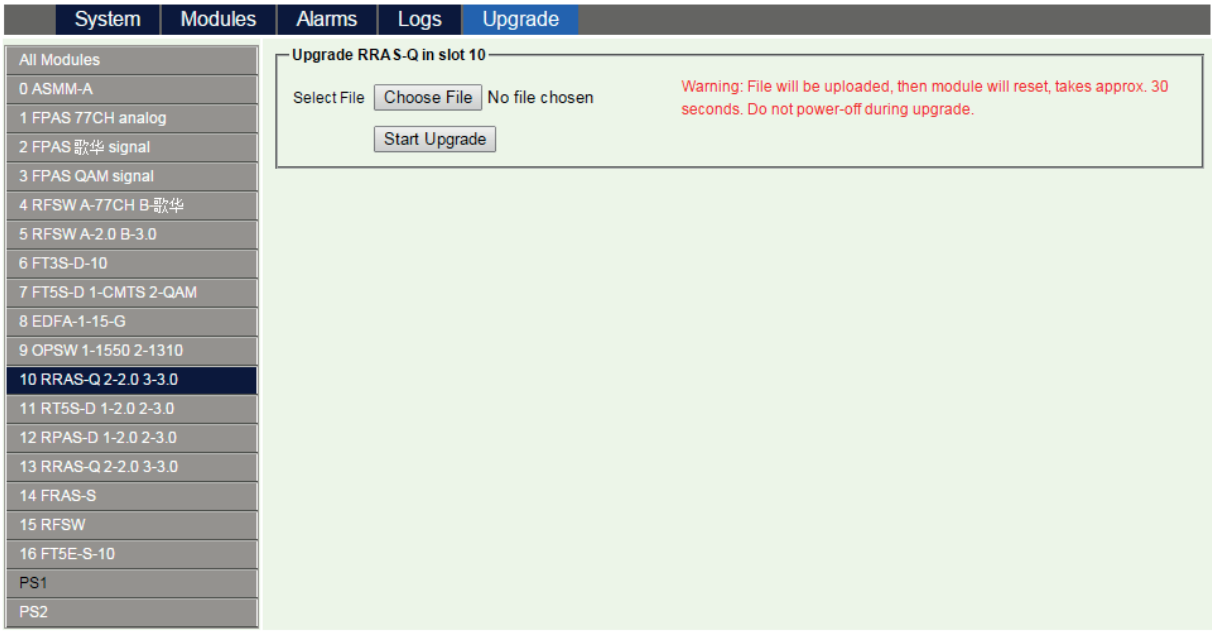
You can reboot the RRAS / RRAG module by clicking the associated **"Apply"** button in the **"Commands"** section of the RRAS / RRAG's main configuration page.



The module's current configuration settings will be retained after rebooting.

7.5 Upgrade RRAS / RRAG Firmware

You can upgrade the RRAS / RRAG's firmware by performing the following steps:
Click the **"Upgrade"** tab on the top menu bar.
On the left column, click the corresponding **"RRAS"** that needs to be upgraded.



Click **"Choose File"** button and navigate to the new firmware file.

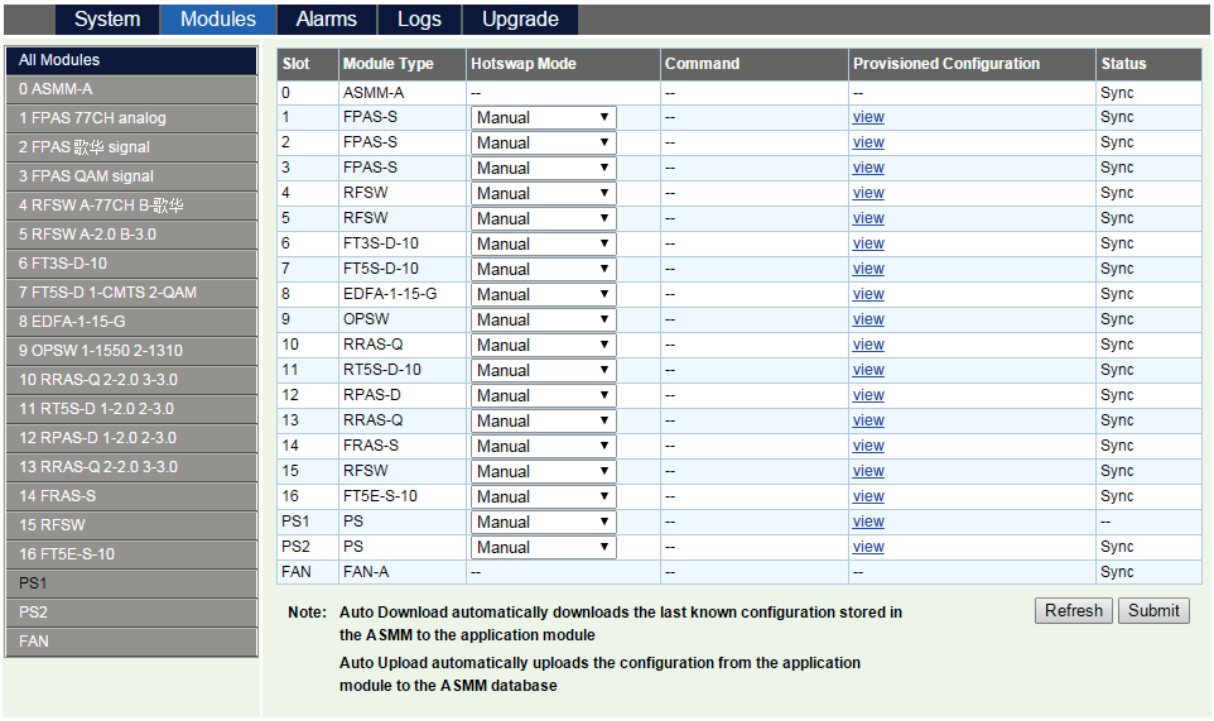
Select the file and then click the **"Start Upgrade"** button. After the firmware has been upgraded, the RRAS / RRAG module will reset and a message will appear confirming the upgrade process has been completed.

* The upgrade file will need to be located in the PC that is connected to ASMM
* The web interface only supports the manual upgrades from a locally connected PC.
* The RRAS / RRAG supports automated firmware updates and automatic backup & restore features via TFTP when managed by Technetix NMSE management software. Please refer to the NMSE Product User Manual for more information.

7.6 Hot-swap Configuration

Click the **“Modules”** tab on the top menu bar.

Click the **“All Modules”** label on the left column of the **“Modules”** page.



For each chassis slot (1 ~ 16), you can configure the application module’s hot-swap mode. There are three possible settings in the drop-down list for each slot:

Hot-swap mode	Description
Auto Download	When a new application module is inserted into a slot that previously contained the same type of module, the last known configuration is automatically downloaded from the ASMM module
Auto Upload	When you insert an application module into the slot, its settings are automatically uploaded to the ASMM module
Manual	Automatic transfer of the module’s configuration is disabled.

Note:

You can use this feature to configure identical application modules to automatically have the same settings.

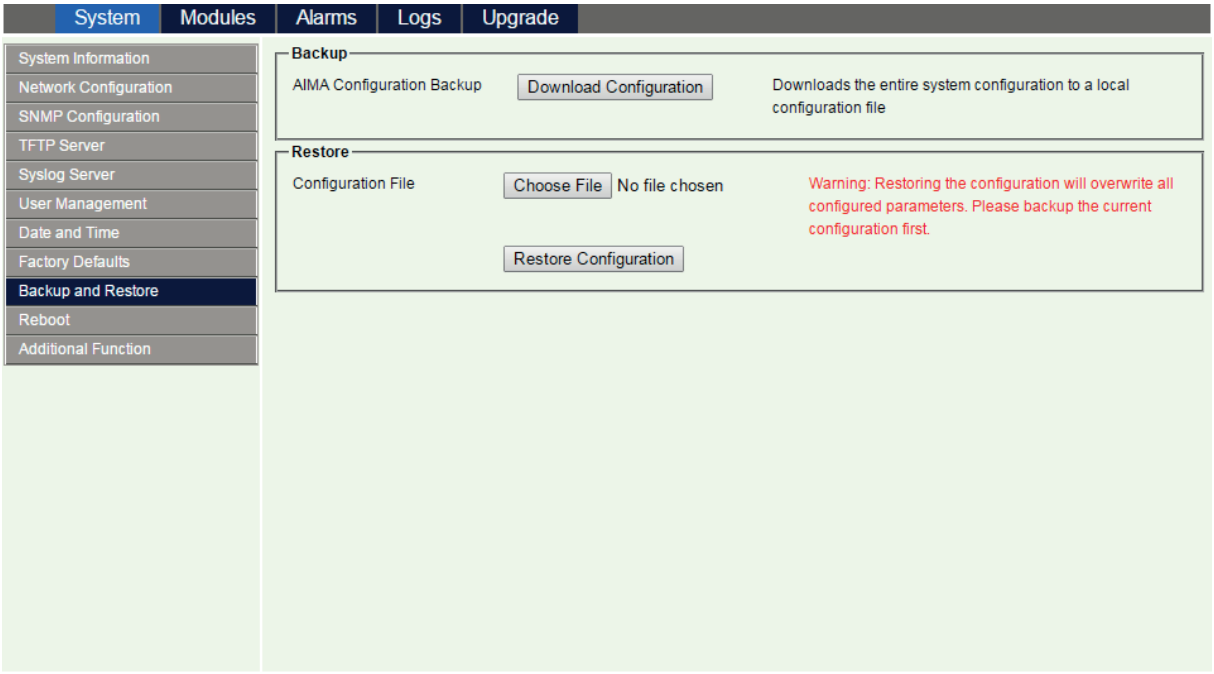
First, automatically upload the configuration settings you want from a pre-configured module. Then remove the module and change the slot’s Hot-swap Mode from **“Auto Upload”** to **“Auto Download”**.

Now, each new module of the same type that is inserted into this slot will automatically be configured with the previously uploaded settings.

7.7 Backup and Restore Feature

Click on the “System” tab on the top menu bar.

Click the “Backup and Restore” label on the left column of the System page.



Backup

You can use this feature to backup the entire AIMA3000 system’s configuration settings to a local file.

Click the **“Download Configuration”** button and then choose the file name and destination folder.

Click **“OK”** to save the file.

Restore

CAUTION!

Restoring the configuration will overwrite all configured parameters. Ensure that you first backup the current system configuration.

To restore previously saved system configuration settings, first click the **“Choose File”** button. Navigate to the configuration file you want to restore.

Select the file, its name will appear in the box to the right of the **“Choose File”** button.

Click the **“Restore Configuration”** button.

* The backup and restore function will work with a device that is using the web interface and is connected to the ASMM
* The web interface only supports the manual backup and restoration of configuration files from a locally connected device.
* The RRAS / RRAG support automated firmware updates and automatic backup / restore via TFTP when managed by Technetix NMSE management software. Please refer to the NMSE Product User Manual for more information.

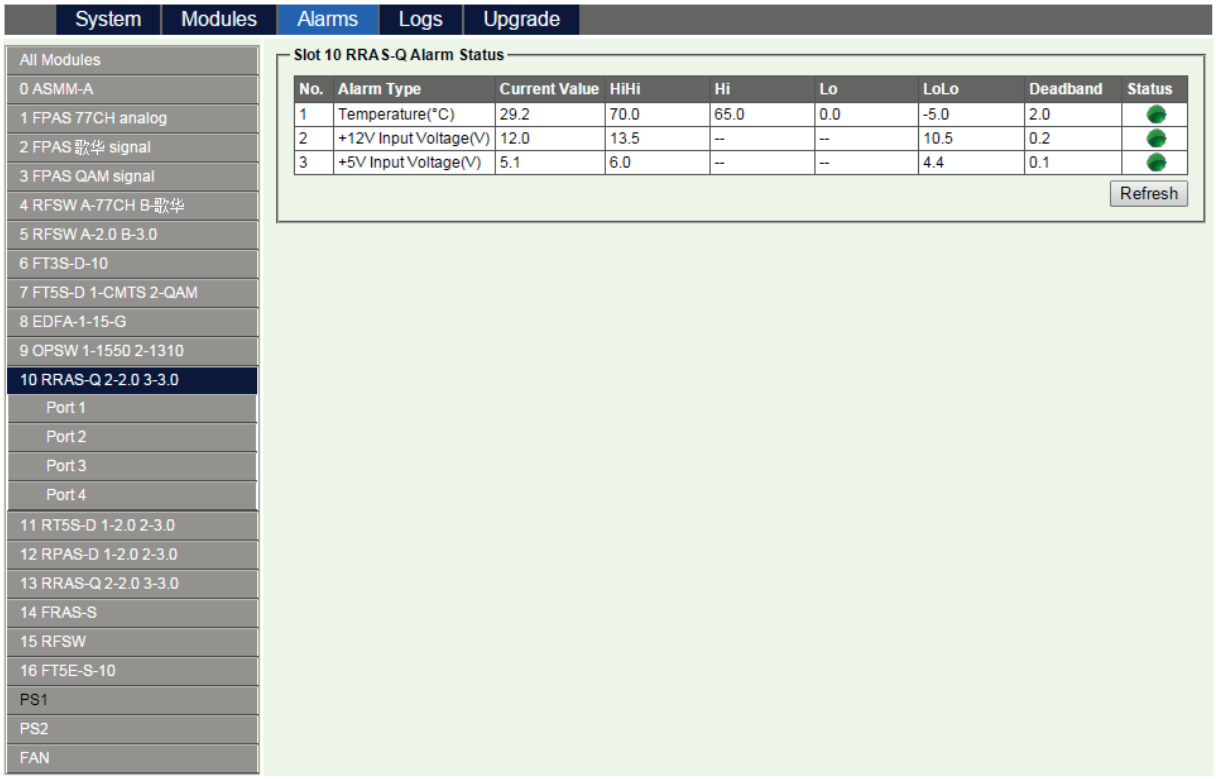
7.8 Alarm Monitoring

All alarm information is monitored by the ASMM module. If an alarm occurs, you can view the associated page to find information that is more detailed.

7.8.1 Alarm Status Pages

Click the **"Alarms"** tab from the top menu bar to display an overview of the alarm status of all the installed modules (normal: green; alarm: **red**).

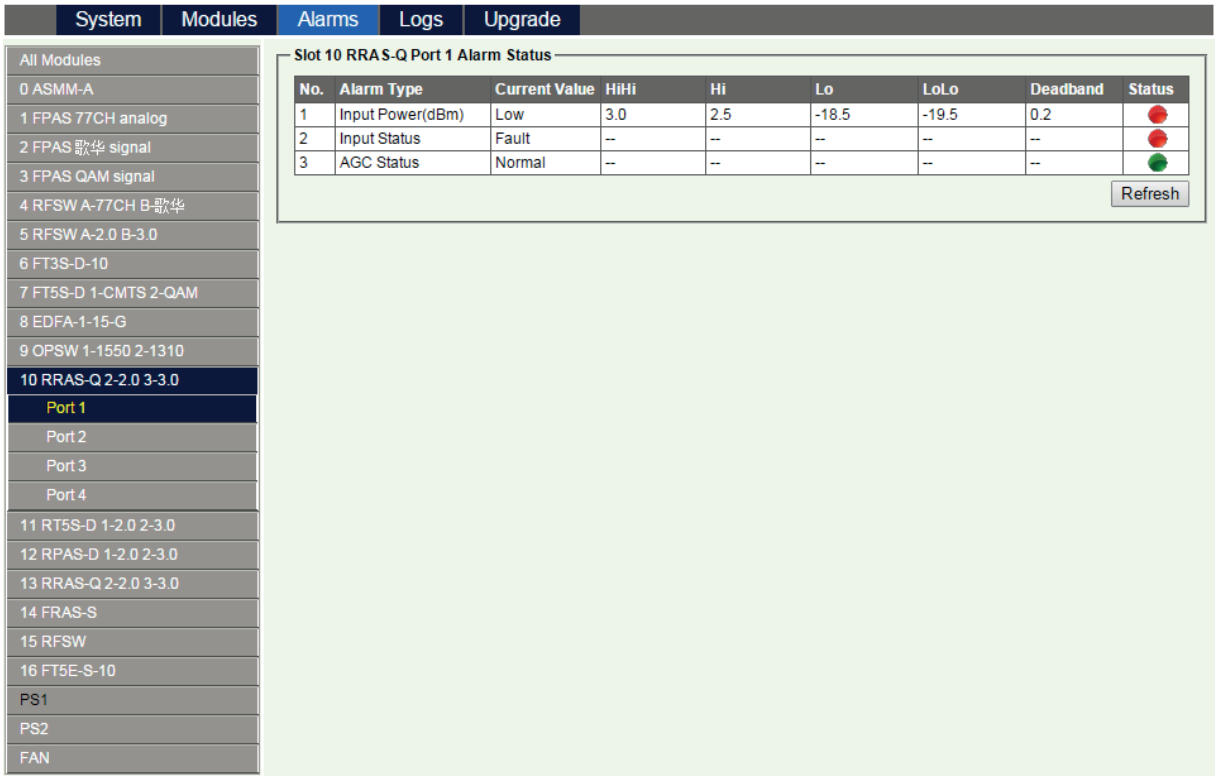
For more detailed alarm information, click on the associated RRAS / RRAG module in the left column of the **"Alarms"** page. This page shows temperature and input voltage alarms for the selected module.



Three types of alarm status are displayed:

- Normal: **Green**
- Minor Alarm: **Amber**
- Major Alarm: **Red**

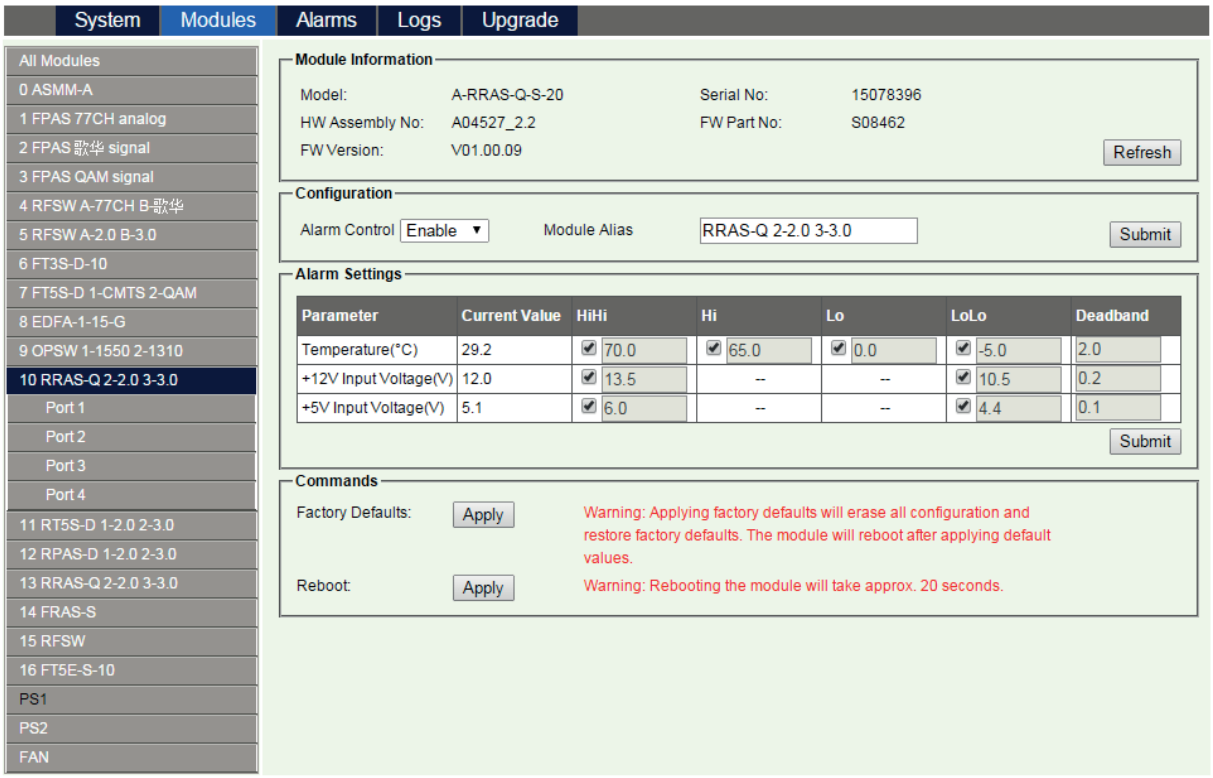
An individual port's alarm status can be viewed by clicking an RRAS / RRAG's Port Number, for example **"Port 1"**. This page shows input power, input status and the AGC status alarms.


System
Modules
Alarms
Logs
Upgrade
All Modules
0 ASMM-A
1 FPAS 77CH analog
2 FPAS 歌华 signal
3 FPAS QAM signal
4 RFSW A-77CH B-歌华
5 RFSW A-2.0 B-3.0
6 FT3S-D-10
7 FT5S-D 1-CMTS 2-QAM
8 EDFA-1-15-G
9 OPSW 1-1550 2-1310
10 RRAS-Q 2-2.0 3-3.0
Port 1
Port 2
Port 3
Port 4
11 RT5S-D 1-2.0 2-3.0
12 RPAS-D 1-2.0 2-3.0
13 RRAS-Q 2-2.0 3-3.0
14 FRAS-S
15 RFSW
16 FT5E-S-10
PS1
PS2
FAN
Slot 10 RRAS-Q Port 1 Alarm Status
No. Alarm Type Current Value HiHi Hi Lo LoLo Deadband Status
1 Input Power(dBm) Low 3.0 2.5 -18.5 -19.5 0.2
2 Input Status Fault -- -- -- -- --
3 AGC Status Normal -- -- -- -- --
Refresh

7.8.2 Alarm Settings Configuration

Click on the **"Modules"** tab on the top menu bar.

Click on the associated RRAS / RRAG module from the left column of the **"Modules"** page.



Module Information (read only)

This page displays the Model, Serial Number, HW Assembly Number, FW Part Number, and FW Version.
Click on the **"Refresh"** button to update the module's status.

Configuration

Alarm Control (Enable / Disable)
Choose the setting from the drop-down menu and then click the **"Submit"** button to confirm any changes.

Alarm Settings

You can toggle individual Temperature and Input Voltage alarms by checking or un-checking the associated boxes. Then, click on the **"Submit"** button to confirm any changes.

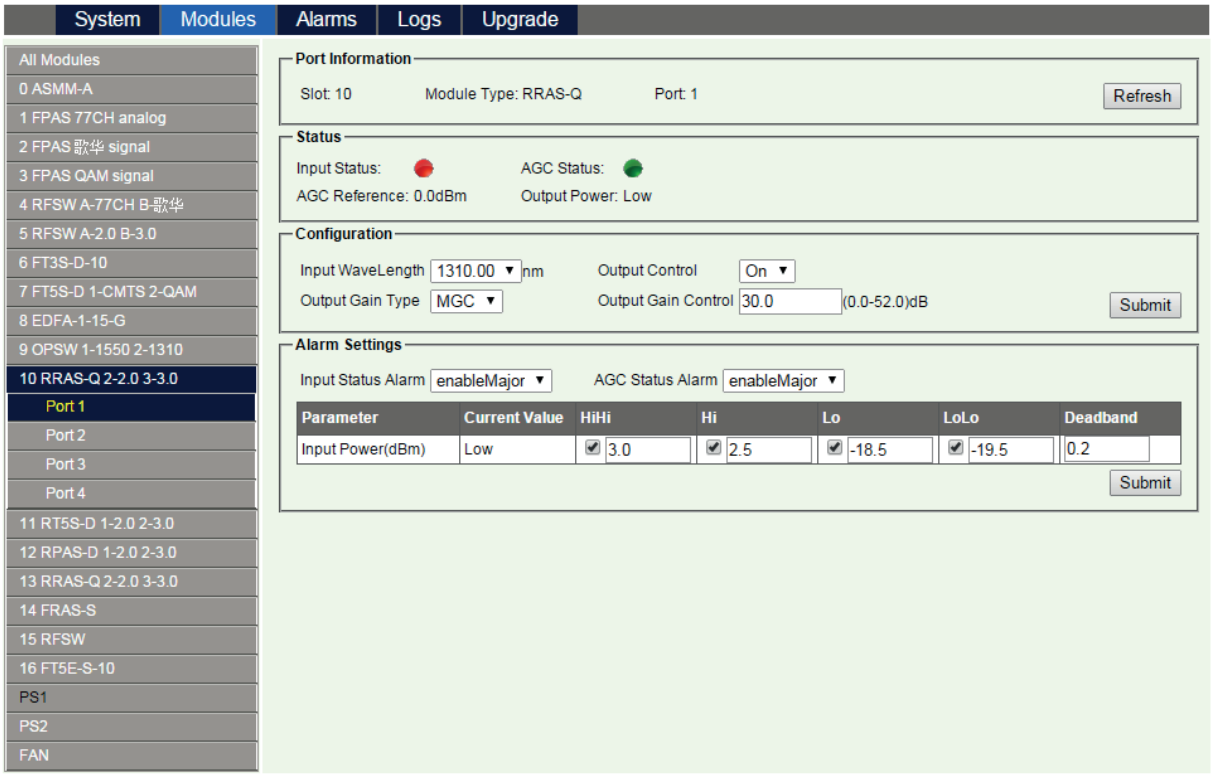
Note:

Temperature and Input Voltage alarm parameters cannot be changed by the user.

Factory default alarm settings are shown below.

Parameter	Units	HIHI	HI	Normal	LO	LOLO	Dead Band	Threshold changeable by user	Default Alarm Enable
Temperature	°C	70	60	-	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

To display Alarm Settings for any of the RRAS / RRAG's ports, click a port number, for example **"Port 1"**, on the left column of the **"Modules"** page.



Alarm Settings	Factory Default Setting (bold)
Input Status Alarm	**Enable Major** Enable Minor Disable
AGC Status Alarm	**Enable Major** Enable Minor Disable

Parameter	Units	HIHI	HI	Normal	LO	LOLO	Dead Band
Input Power	dBm	3	2,5	-	-18,5	-19,5	0,2

Click on the value of an enabled alarm you want to change, and then enter the new value. If the box next to the value is checked then the value can be changed.
You can also toggle individual alarms by checking or unchecking the associated boxes.
Click on the **“Submit”** button to confirm changes.

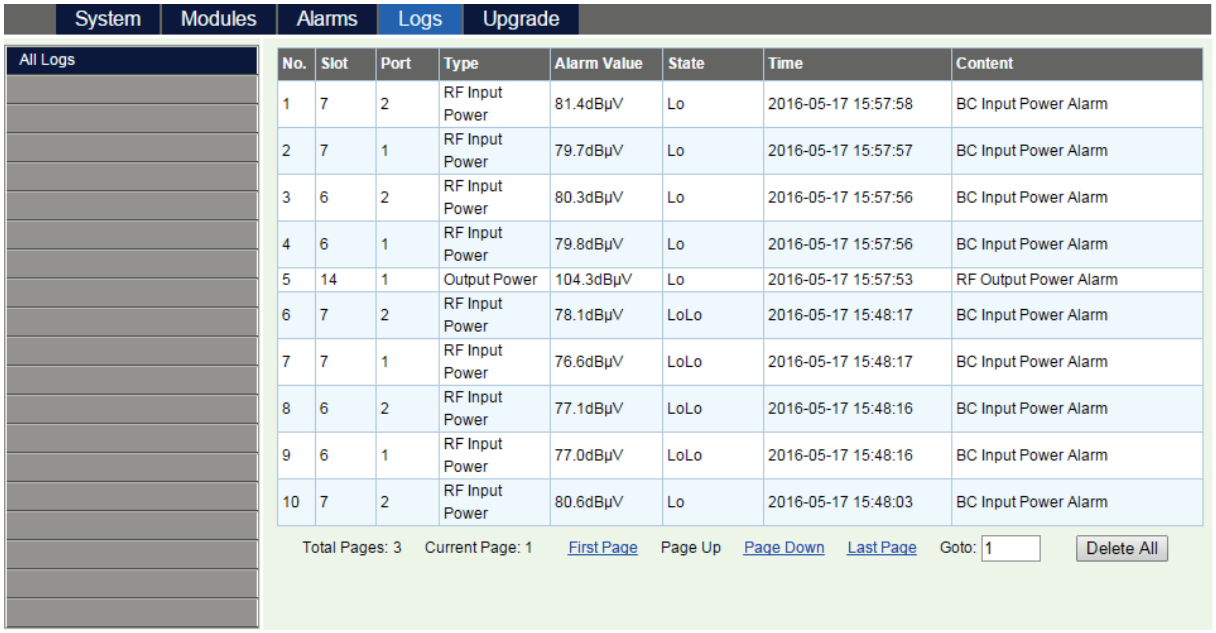
7.8.3 LED Status Indicators

STAT	MODE	RX1	RX2	RX3	RX4	Condition
○	○	○	○	○	○	**All off:** **Power off** – check power supply to AIMA chassis, ensure module is properly inserted into chassis
●	●	●	●	●	●	**All flashing green** (1 times per second): Module initializing
N/A	●	N/A	N/A	N/A	N/A	**Constant green:** No alarm
●	N/A	●	●	●	●	**Constant amber:** Warning Low or Warning High alarm
N/A	●	N/A	N/A	N/A	N/A	**Flashing green** (1 time per second) Module operating in MGC mode
●	N/A	N/A	N/A	N/A	N/A	**Constant red:** Critical Low or Critical High alarm
●	N/A	N/A	N/A	N/A	N/A	**Constant amber:** Warning Low or Warning High alarm

STAT	MODE	RX1	RX2	RX3	RX4	Condition
●	N/A	●	N/A	N/A	N/A	**Constant Red:** RX1 Critical Low or Critical High alarm
●	N/A	●	N/A	N/A	N/A	**Constant Amber:** RX1 Warning Low or Warning High alarm
●	N/A	N/A	●	N/A	N/A	**Constant Red:** RX2 Critical Low or Critical High alarm
●	N/A	N/A	●	N/A	N/A	**Constant Amber:** RX2 Warning Low or Warning High alarm
●	N/A	N/A	N/A	●	N/A	**Constant Red:** RX3 Critical Low or Critical High alarm
●	N/A	N/A	N/A	●	N/A	**Constant Amber:** RX3 Warning Low or Warning High alarm
●	N/A	N/A	N/A	N/A	●	**Constant Red:** RX4 Critical Low or Critical High alarm
●	N/A	N/A	N/A	N/A	●	**Constant Amber:** RX4 Warning Low or Warning High alarm
N/A	N/A	○	○	○	○	**Flashing Any Colour:** Communication with remote node in progress

1.1 Log Management

Click on the **"Logs"** tab on the top menu bar to display an event history of all recorded alarms for all the installed modules.



No.	Slot	Port	Type	Alarm Value	State	Time	Content
1	7	2	RF Input Power	81.4dBµV	Lo	2016-05-17 15:57:58	BC Input Power Alarm
2	7	1	RF Input Power	79.7dBµV	Lo	2016-05-17 15:57:57	BC Input Power Alarm
3	6	2	RF Input Power	80.3dBµV	Lo	2016-05-17 15:57:56	BC Input Power Alarm
4	6	1	RF Input Power	79.8dBµV	Lo	2016-05-17 15:57:56	BC Input Power Alarm
5	14	1	Output Power	104.3dBµV	Lo	2016-05-17 15:57:53	RF Output Power Alarm
6	7	2	RF Input Power	78.1dBµV	LoLo	2016-05-17 15:48:17	BC Input Power Alarm
7	7	1	RF Input Power	76.6dBµV	LoLo	2016-05-17 15:48:17	BC Input Power Alarm
8	6	2	RF Input Power	77.1dBµV	LoLo	2016-05-17 15:48:16	BC Input Power Alarm
9	6	1	RF Input Power	77.0dBµV	LoLo	2016-05-17 15:48:16	BC Input Power Alarm
10	7	2	RF Input Power	80.6dBµV	Lo	2016-05-17 15:48:03	BC Input Power Alarm

Total Pages: 3 Current Page: 1 First Page Page Up Page Down Last Page Goto: 1 Delete All

If there is more than one page of events to display, you can display other pages using the links at the bottom of the displayed list.

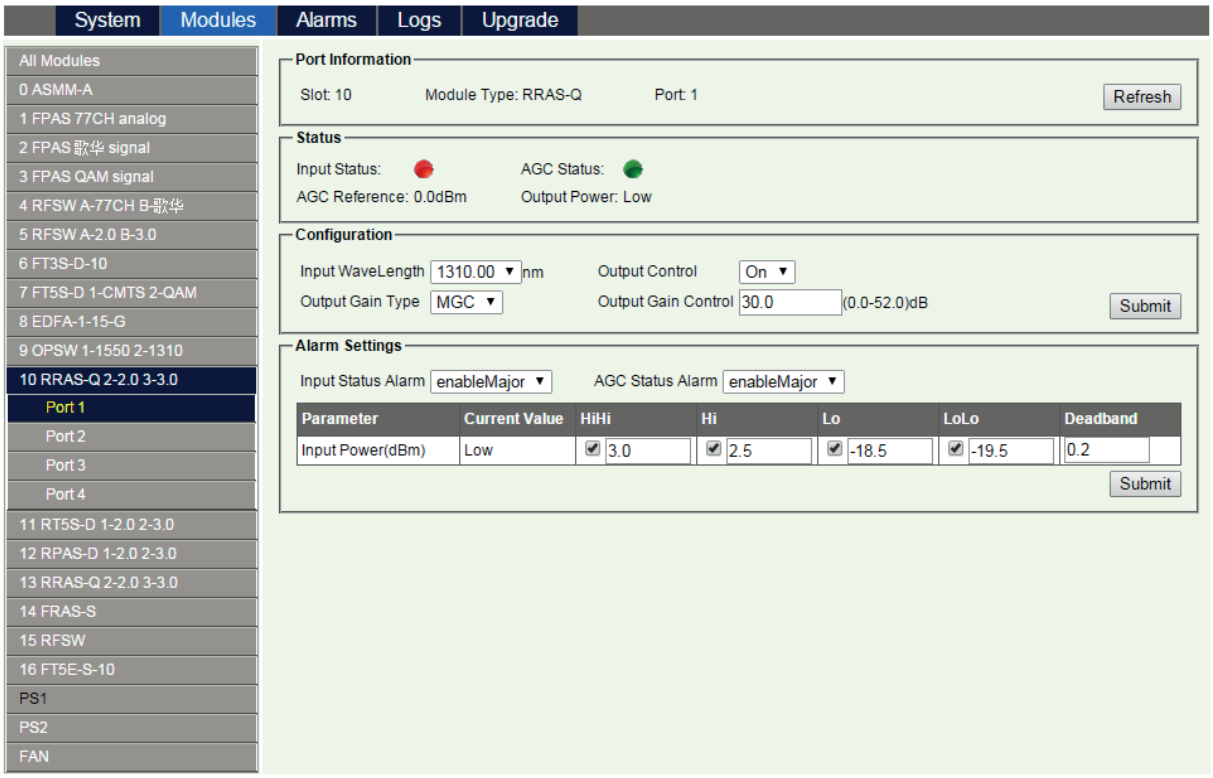
To clear all existing events from the log, click the **"Delete All"** button. You must confirm or cancel this action by clicking on the **"OK"** or **"Cancel"** button in the pop-up dialogue box.

7.10 Port Configuration

Ensure that you are familiar with the LED status indicators, alarm functions and port configuration functions before making any changes to the port configuration settings.

7.10.1 Using the Port Configuration Page

To display the configuration settings for any of the RRAS / RRAG's ports, click on a port number, for example **"Port 1"**, in the left column of the **"Modules"** page.



Port Information (read only)

This page displays the Slot Number, Module Type, and Port Number.

Click on the **"Refresh"** button to update the above information.

Status

Parameters	Description
Input Status	Indicates if it is within the normal input range
AGC Status	Indicates if the output power is within the normal range (AGC only)
Output Power	RF output power
AGC Reference	AGC reference power

Configuration

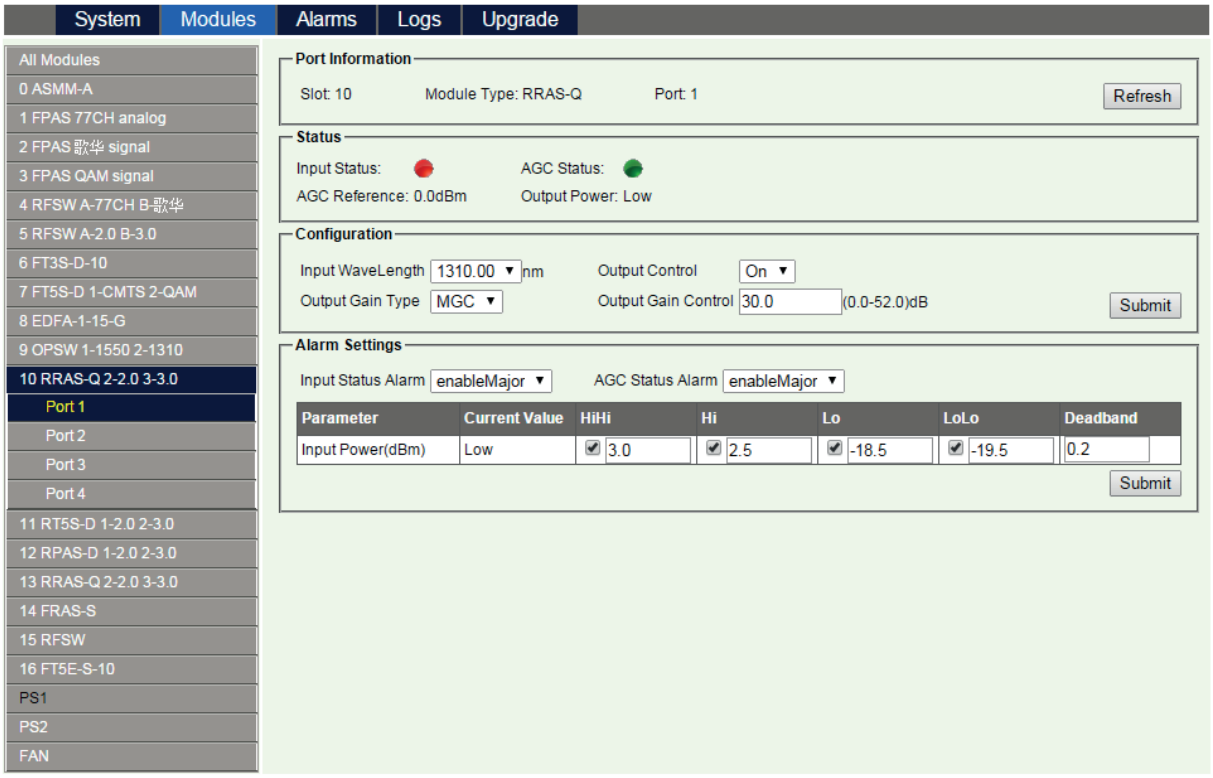
Parameters	Factory Default Setting (bold)
Input Wavelength	**1310 – 1610 nm**
Output Control	**On** Off
Output Gain Type	**MGC** AGC
Output Gain Control	**42.0** (0 ~ 52 dB)

7.10.2 Optical Input Port Signal

Check the current value of the optical input power that is displayed on the page. The acceptable range is between **-18 ~ +2 dBm** for standard RRAS models, and between **-28 ~ -12 dBm** for the RRAG.

CAUTION!

Ensure that the difference between the previously measured optical input power level and the displayed RRAS / RRAG Port input level is ± 1 dBm. If not, you may need to clean the fibre connector and optical input port.



Click on the **"Submit"** button to confirm any changes.

7.10.3 RF Configuration

CAUTION!

Configure the RF output signal for each port only when the corresponding optical input power level is known to be within acceptable limits.

Configure the RF output signal level on each port in accordance with local requirements:

1. Change the “Output Gain Type” to “MGC” mode.
2. Adjust the “Output Gain Control” level until the RF output is at the required level.
3. If the RRAS / RRAG receiver path uses a continuously emitting laser as the transmitting carrier, you can change the “Output Gain Type” to “AGC” mode.
4. Finally, set the required AGC mode.
   In “AGC” mode, the port adjusts gain by using the optical input power as a reference.
   The factory default value of output gain is 42 dB and the adjustment range of the optical input level is ± 5 dB.

Note:

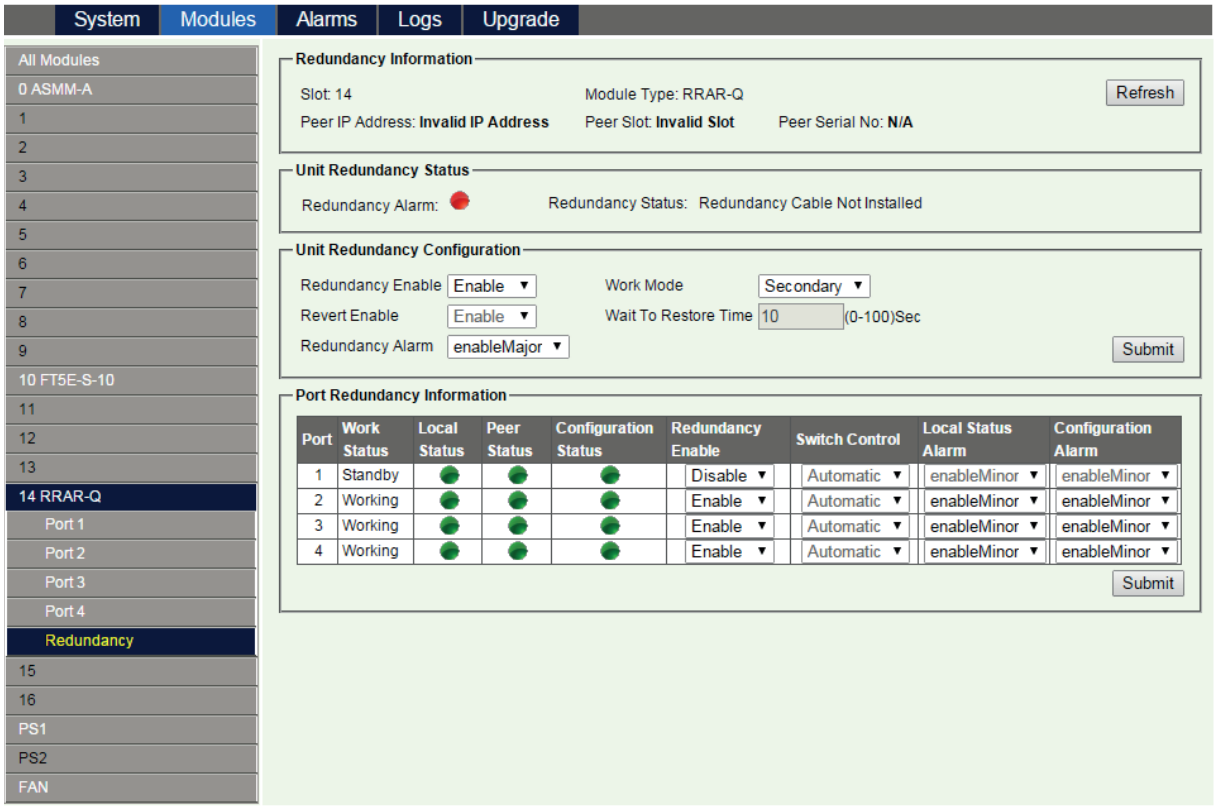
AGC mode will be maintained with variance in the optical level.

CAUTION!

Both types of AGC modes use the current Output RF Pad Level setting in order to stabilize the output. If the RF pad level is set either too high or too low, this will affect the AGC control range.

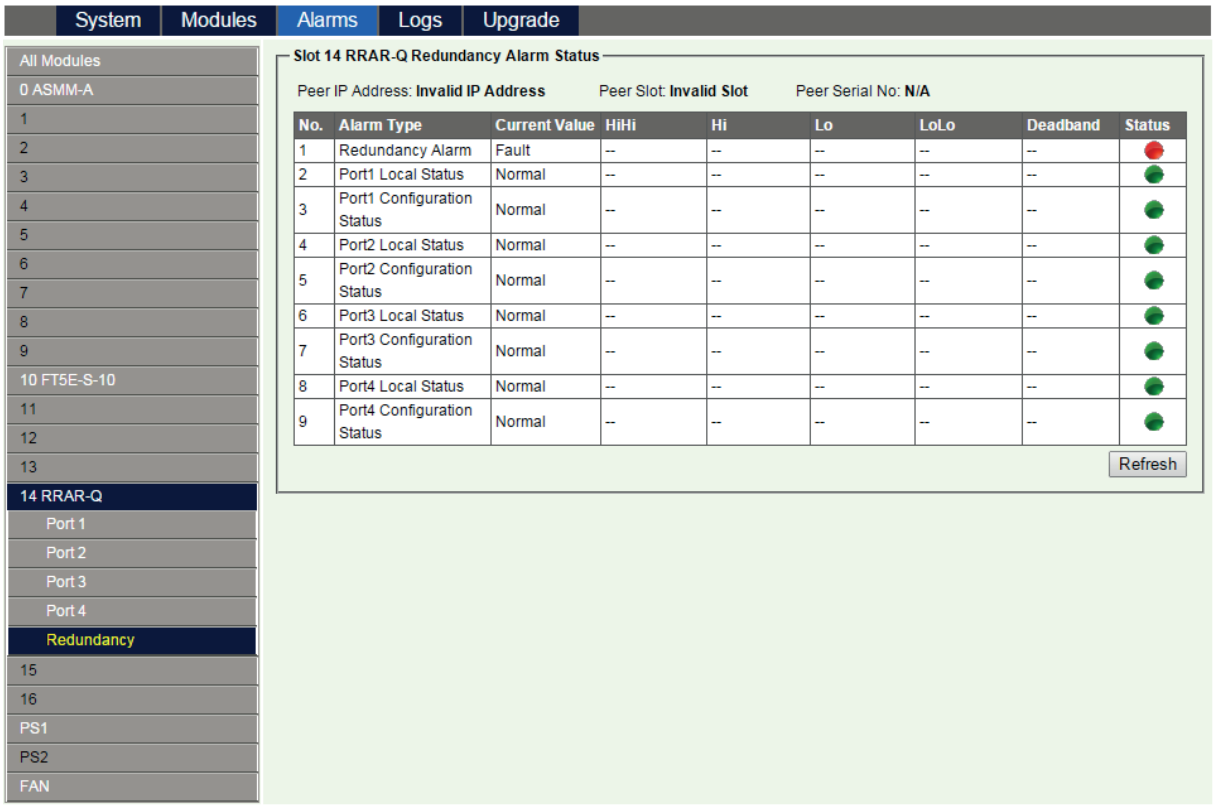
7.11 Redundancy Configuration and Alarms (for RRAR only)

Click on **"Modules"→"RRAR-Q"**(the module name), the port numbers and **"Redundancy"** button will appear. The port configuration pages and alarm pages are completely same to RRAS.



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 to enable or disable the function of redundancy of this module;
"Work Mode" is to set this module to work in primary or secondary mode;
"Revert Enable" is to set whether the primary path will be reconnected when its signal gets normal.
"Wait to Restore Time" is the revert delay of the primary path when it gets normal.
"Redundancy Alarm" is to set the alarm level as major, minor or disable.
In the box of **"Port Redundancy Information"**, you can enable or disable each port's redundancy, set their local status alarm level and configuration alarm level individually.
Please click on **"Submit"** to save your configurations whenever you make new settings on them.

Click on **"Alarms"→"RRAR-Q"**(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.


System
Modules
Alarms
Logs
Upgrade
All Modules
0 ASMM-A
1
2
3
4
5
6
7
8
9
10 FT5E-S-10
11
12
13
14 RRAR-Q
Port 1
Port 2
Port 3
Port 4
Redundancy
15
16
PS1
PS2
FAN
Slot 14 RRAR-Q Redundancy Alarm Status
Peer IP Address: Invalid IP Address
Peer Slot: Invalid Slot
Peer Serial No: N/A
No. Alarm Type Current Value HiHi Hi Lo LoLo Deadband Status
1 Redundancy Alarm Fault -- -- -- -- --
2 Port1 Local Status Normal -- -- -- -- --
3 Port1 Configuration Status Normal -- -- -- -- --
4 Port2 Local Status Normal -- -- -- -- --
5 Port2 Configuration Status Normal -- -- -- -- --
6 Port3 Local Status Normal -- -- -- -- --
7 Port3 Configuration Status Normal -- -- -- -- --
8 Port4 Local Status Normal -- -- -- -- --
9 Port4 Configuration Status Normal -- -- -- -- --
Refresh

8 Module Application

8.1 RRAS NPR Curve

The picture below shows the NPR curve of RRAS when the optical input is -6dBm, the dynamic range is >25dB at NPR>30dB.

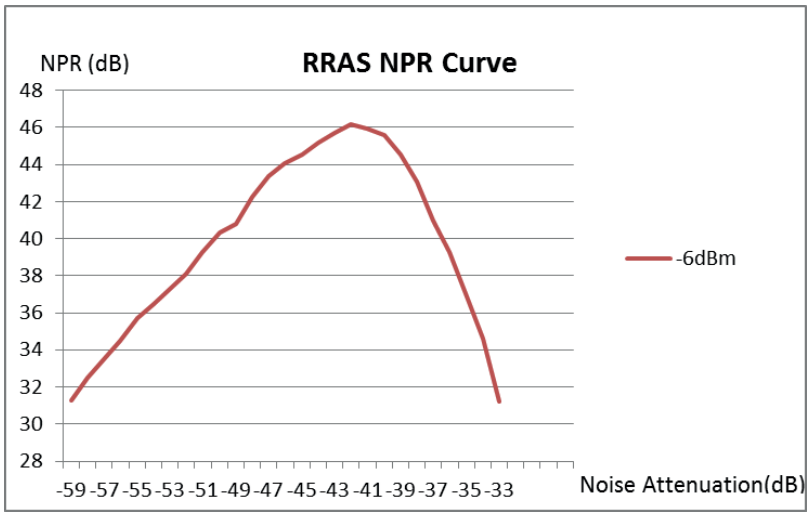


Figure 8-1 RRAS NPR curve

8.2 RRAG NPR Curve

The picture below shows the NPR curve of RRAG when the optical input is -21dBm, the dynamic range is >15dB at NPR>30dB.

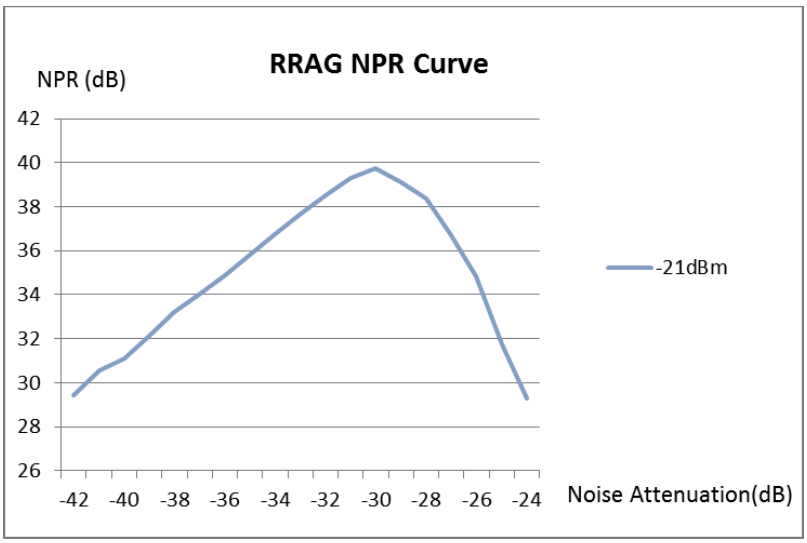


Figure 8-2 RRAG NPR curve

9 Common Faults

9.1 Status LED Fault Indications

LED Status	Common faults	Trouble Shooting
Optical Input LED RX1 ~ RX4 Shows Amber	Input Port Optical Gain slightly low and slightly high	Clean the optical port and tail fibre. Check the optical input power; make sure it is within the normal range. If the alarm persists, contact Technetix technical support.
Optical Input LED Shows Red	Input Port Optical Gain too Low	Check the optical input power; make sure it is within the normal range.
STAT LED Shows Red	Optical Input Power Abnormal	Bias current abnormal. Contact Technetix technical support.
	Room Temperature Too High	Lower the room temperature. If the alarm persists, contact Technetix technical support.

9.2 Common Faults – Resultant LED Status

Common Faults	LED Status	Possible Solutions
Input Port Optical Gain too Low	Optical Input LED RX1 ~ RX4 is Red	Clean the optical port and fibre. Check the optical input power; make sure it is within the normal range. If the alarm persists, contact Technetix technical support.
Input Port Optical Gain too High	Optical Input LED RX1 ~ RX4 is Red	Check the optical input power; make sure it is within the normal range.
Optical Input Power Abnormal	STAT LED is Red	Bias current abnormal. Contact Technetix technical support.
Power Supply Fault	STAT LED is Red	Bias current abnormal. Contact Technetix technical support.
Room Temperature too High	STAT LED is Red	Lower the room temperature. If the alarm persists, contact Technetix technical support.

9.3 Other Faults

Fault	Possible Cause	Possible Solutions
No power supply to module	No power supply to AIMA chassis Blown fuse in AIMA PSU Faulty AIMA PSU Damaged multi-pin connector on module Damaged multi-pin connector on chassis	Reconnect/switch on power supply to chassis Fit new AIMA PSU fuse Replace AIMA PSU Repair/replace module (contact Technetix support) Repair chassis backplane (contact Technetix support) Try inserting module into a different chassis slot
Module is not recognized when inserted into chassis	Incorrectly fitted module Damaged multi-pin connector on module Damaged multi-pin connector on chassis	Re-insert module correctly Repair/replace module (contact Technetix support) Repair chassis backplane (contact Technetix support) Try inserting module into a different chassis slot
No RF power at output port, or RF power lower than required	Dirty or damaged optical input connector Optical input power level is incorrect Incorrectly adjusted Output RF Pad Level Faulty RRAS / RRAG / RRAR module	Clean or replace the relevant optical input connector Check optical input power is within specifications Switch to MGC and adjust Output RF Pad Level Repair/replace module (contact Technetix support)

10 Declaration of Conformity

According to ISO/IEC Guide 22 and EN45014

Manufacturer's Name: Technetix

Manufacturer's Address: Technetix Ltd, Innovation House, Technetix Business Park, Albourne, West Sussex, BN6 9EB

Product Name: RRAS / RRAG / RRAR Analogue Return Receiver Module Series

Conforms to the following standards:

FCC:	FCC Part 15 Subpart B: 2012
CE:	EN 50083-2: 2012; EN 5504: 2010; EN 61000-3-2: 2006+A1: 2009+A2: 2009; EN 55022:2010; EN 61000-3-3: 2008
RCM:	AS/NZS CISPR22: 2009+A1: 2010 (Pending)

Federal Communications Commission