AIMA-FPAS

RF FORWARD PATH AMPLIFIER-STANDARD

Product user manual

technetix

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Technetix Group Limited
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1.1 Chapter overview

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1.2 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

1.3 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.

1.4 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.
- 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 About the Product

The RF Forward Path Amplifier - Standard (FPAS) is designed to plug into the latest generation of Advanced Intelligent Multi-services Access platforms - AIMA3000.

The FPAS accepts forward-path RF signals from 45 MHz to 1218 MHz through the RF input port. The module provides an adjustable gain of 20 dB with a single output port.

Electronic gain and slope controls allow the module to be customised for many situations.
The forward-path version provides Automatic Gain Control (AGC). The FPAS 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 can be done when using the NMSE web-based management system.

3.2 Product Key Features

- Plug-and-play AIMA3000 platform module
- Forward-path version (45 MHz to 1000 MHz) supports PAL, CENELEC, and NTSC up to 127 channels
- Supports both analog and digital transmissions
- High linearity, superior low noise profile and minimal distortion
- Automatic gain control (AGC) or manual gain control (MGC)
- Electronic gain and slope control
- Configurable alarm thresholds at a customer's request
- Alarm monitoring through the NMSE and the ASMM's Web Interface
- Broadband GaAs amplifier technology
- Remote firmware upgrade and auto upload/download of configuration files through the 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.

3.3 Specifications

RF performance

RF bandwidth	45 - 1218 MHz
RF flatness	± 0.75 dB
Noise Figure (NF)	≤ 9 dB
RF Input level	10 dBmV per channel
RF Output level	40 dBmV per channel (rating)
Maximum	30 dB
Minimum gain	10 dB
Gain Adjustment range	0 dB to 10 dB (input gain control) 0 dB to 10 dB (output gain control)
Slope adjustment range	0 dB to 9 dB
AGC range (max)	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 connectors	Single: 2 x GSK-type female Dual: 4 x GSK-type female
RF test points	2 x mini-SMB
Alarms and status	Front-panel LEDS, SNMP traps
Path isolation	> 65 dB

Link Performance [1]	
CNR	> 60 dB
CSO	> 75 dB
CTB	> 75 dB

Notes:

[1] Loaded with 77ch NTSC, RF input=10 dBmV (70 dBuV), Gain=30 dB

General

Power supply	Powered via AIMA3000 backplane
Power consumption	Single: < 10.6 W Dual: < 24 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	Single: 0.88 kg Dual: 0.98 kg
Supported network management options	NMSE or through ASMM's Web interface

3.3.1 Block Diagram

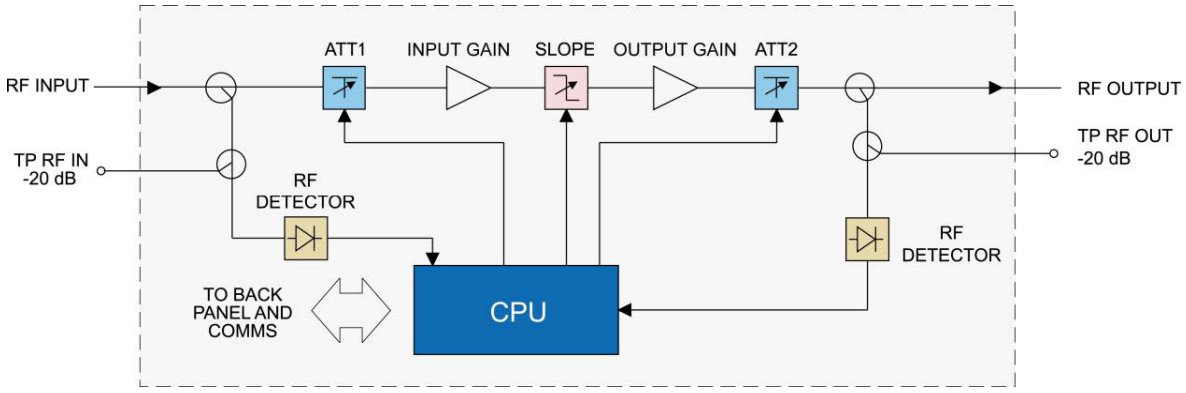


Figure 3-1 Block diagram FPAS-S

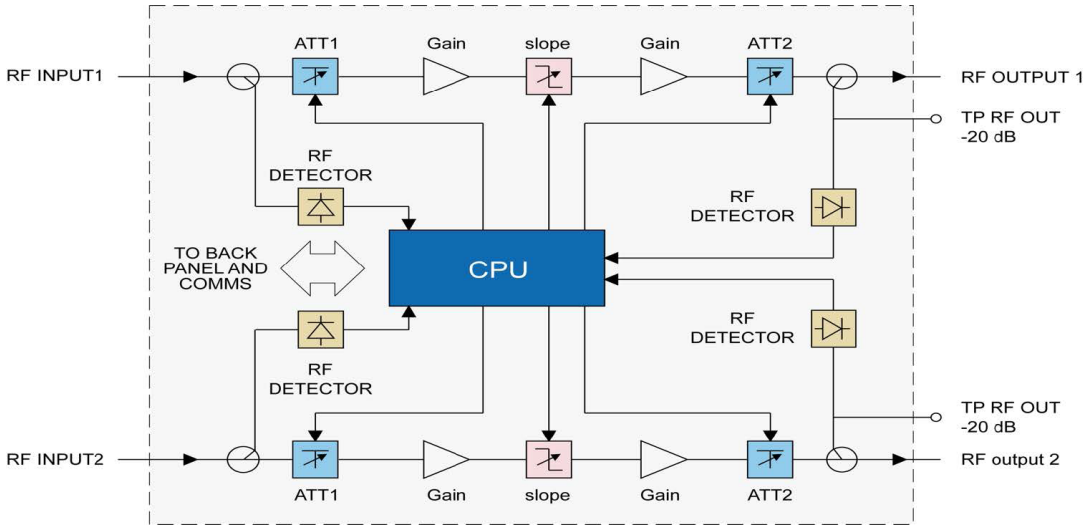


Figure 3-2 block diagram FPAS-D

Table 3-1 FPAS-S block diagram glossary

Parameters	Glossary RF
INPUT	RF input
ATT	Attenuator
TP RF IN -20 dB	RF -20 dB input test point
SLOPE	Slope control
RF OUTPUT	RF output
TP RF OUT -20 dB	RF -20 dB output test point
Input gain	Input gain

Parameters	Glossary RF
Output gain	Output gain
TO BACKPLANE AND COMMS	Data bus
CPU	Central processing unit

Table 3-2 FPAS-D block diagram glossary

Parameters	Glossary
RF INPUT1	RF1 input
RF INPUT2	RF2 input
ATT	Attenuator
TP RF IN -20 dB	RF -20 dB input test point
SLOPE	Slope control
RF1 OUTPUT	RF1 output
RF2 OUTPUT1	RF2 output
TP RF OUT -20 dB	RF -20 dB output test point
Input Gain	Input gain
Output Gain	Output gain
TO BACK PLANE AND COMMS	Data bus
CPU	Central processing unit

3.4 Order details

A-FPAS-[Y]-[Z] Forward-Path Amplifier - Standard

Options:

Y Ports

S Single

D Dual

Z Bandwidth

1G 45 - 1000 MHz (Standard)

12 45 - 1218 MHz

4 Module characteristics

4.1 Module appearance and port layout

4.1.1 Overview

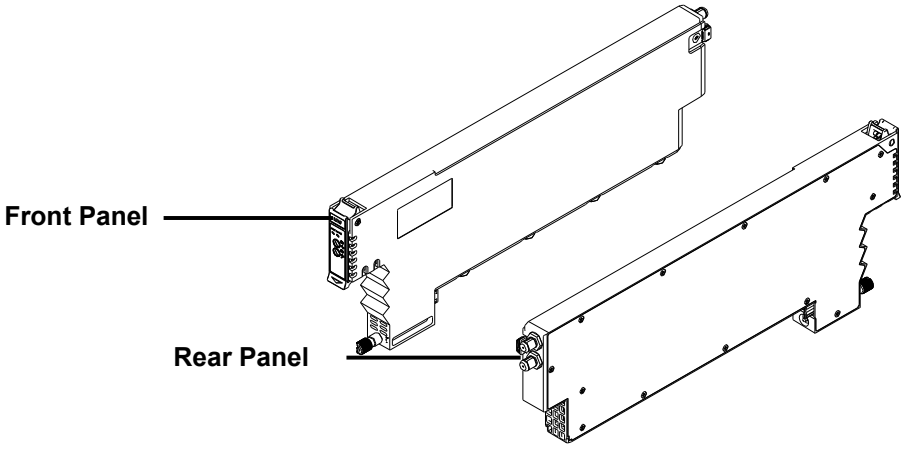


Figure 4-1 module appearance

4.1.2 FPAS-S front panel view

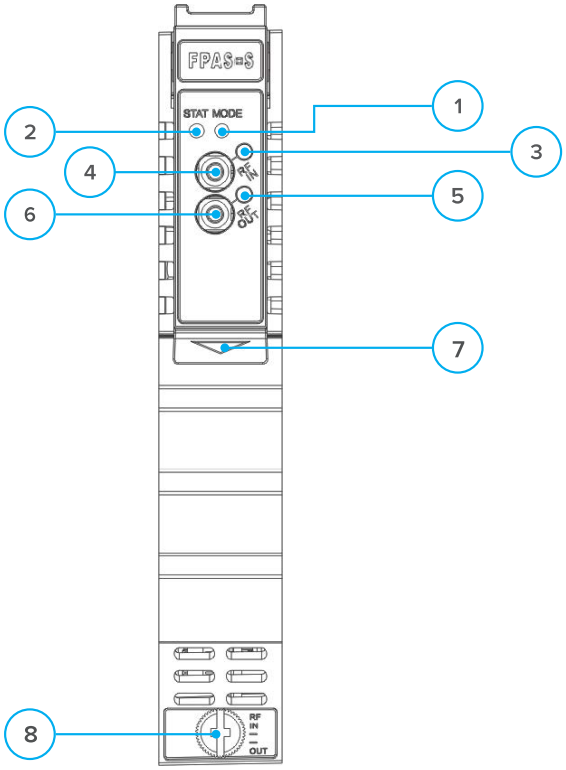


Figure 4-2 FPAS-S front panel layout

Table 4-1 FPAS-S front panel functions

Item Number	Item	Description
1	MODE LED	Module gain control mode indicator MGC: Green light Blinking AGC: Green
2	STATUS LED	Module alarm indicator Normal: Green Minor alarm: Amber Major alarm: Red
3	RF IN LED	RF input Normal: Green Minor alarm: Amber Major alarm: Red
4	RF IN TP	RF input test point
5	RF OUT LED	RF output indicator Normal: Green Minor alarm: Amber Major alarm: Red
6	RF OUT TP	RF output test point
7	Orange tab-retaining clip	Used to plug and anchor the module The tab-retaining clip will pop-up after pressing the release and plug module.
8	Mounting Screw	Module fastening screw

WARNING!

“OPT OUT” emits a non-visible laser radiation when working.

4.1.3 FPAS-S rear panel view

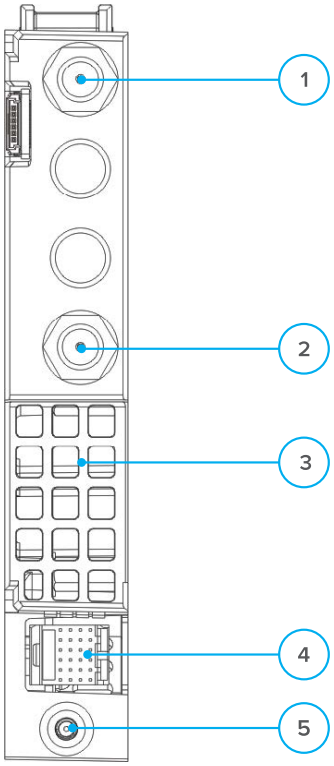


Figure 4-3 FPAS-S rear panel layout

Table 4-2 FPAS-S rear panel functions

Item Number	Item	Description
1	RF IN	RF input
2	RF OUT	RF output
3	Air vent	Air vent allowing air to flow out of the module
4	Multi-pin connector	Power and communication port
5	Placement pin	Used to position the module in the chassis

4.1.4 FPAS-D Front panel view

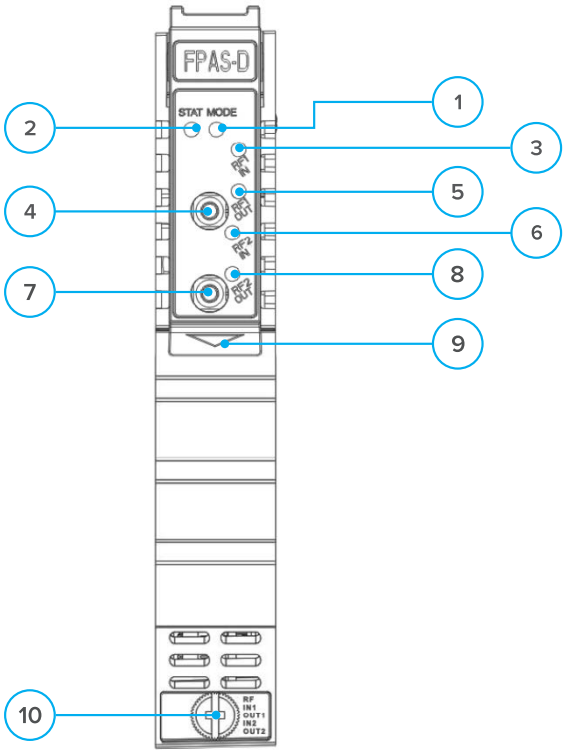


Figure 4-4 FPAS-D front panel layout

Table 4-3 FPAS-D front panel functions

Item Number	Item	Description
1	MODE LED	Module gain control mode indicator MGC: Green light blinking AGC: Green
2	STATUS LED	Module alarm indicator Normal: Green Minor alarm: Amber Major alarm: Red
3	RF1 IN LED	RF1 input Normal: Green Minor alarm: Amber Major alarm: Red
4	RF1 OUT LED	RF1 output indicator Normal: Green Minor alarm: Amber Major alarm: Red
5	RF IN TP	RF1 input test point
6	RF2 IN LED	RF2 input Normal: Green Minor alarm: Amber Major alarm: Red
7	RF2 OUT LED	RF2 output indicator Normal: Green Minor alarm: Amber Major alarm: Red
8	RF OUT TP	RF1 output test point
9	Orange retaining clip tab	Used to plug and anchor the module The retaining clip tab will pop-up after pressing the release and plug module.
10	Mounting screw	Module fastening screw

4.1.5 FPAS-D Rear panel view

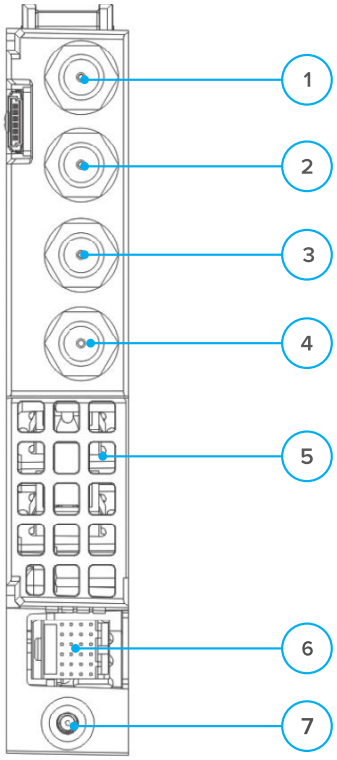


Figure 4-5 FPAS-D rear panel layout

Table 4-4 FPAS-D rear panel functions

Item Number	Item	Description
1	RF1 IN	RF1 input
2	RF1 OUT	RF1 output
3	RF2 IN	RF2 input
4	RF2 OUT	RF2 output
5	Air vent	Air vent allowing air to flow out of the module
6	Multi-pin connector	Power and communication port
7	Placement pin	Used to position the module in the chassis

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
FPAS module	The module to install into the AIMA3000 chassis

5.2 Unpacking

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

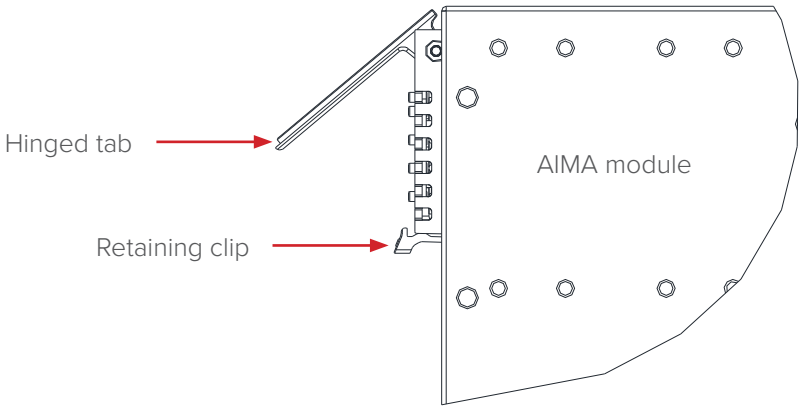
Check the package manifest, record the product module type, serial number, purchase date, and any other relevant information to facilitate later management and maintenance.

Table 5-2 Packing manifest

No.	Description	Qty
1	FPAS module	1
2	Individual test sheet (certificate of performance)	1

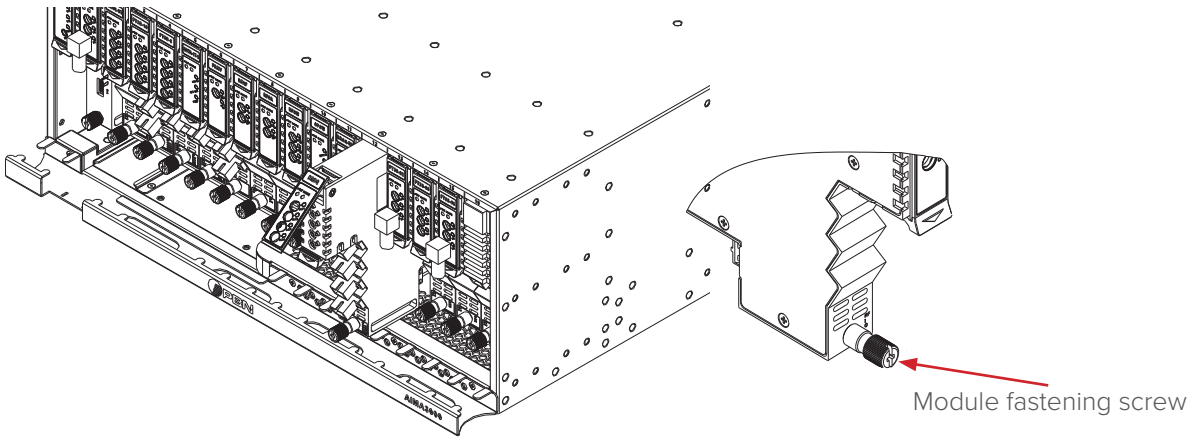
5.3 Module installation

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 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 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 AIMA module, fasten the spring-loaded mounting screw. Only use fingers to fasten the mounting screw. **DO NOT** use a screwdriver.

5.4 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 the module has started. The BC/NC status indicators show a green light.

5.5 Test the RF input signal

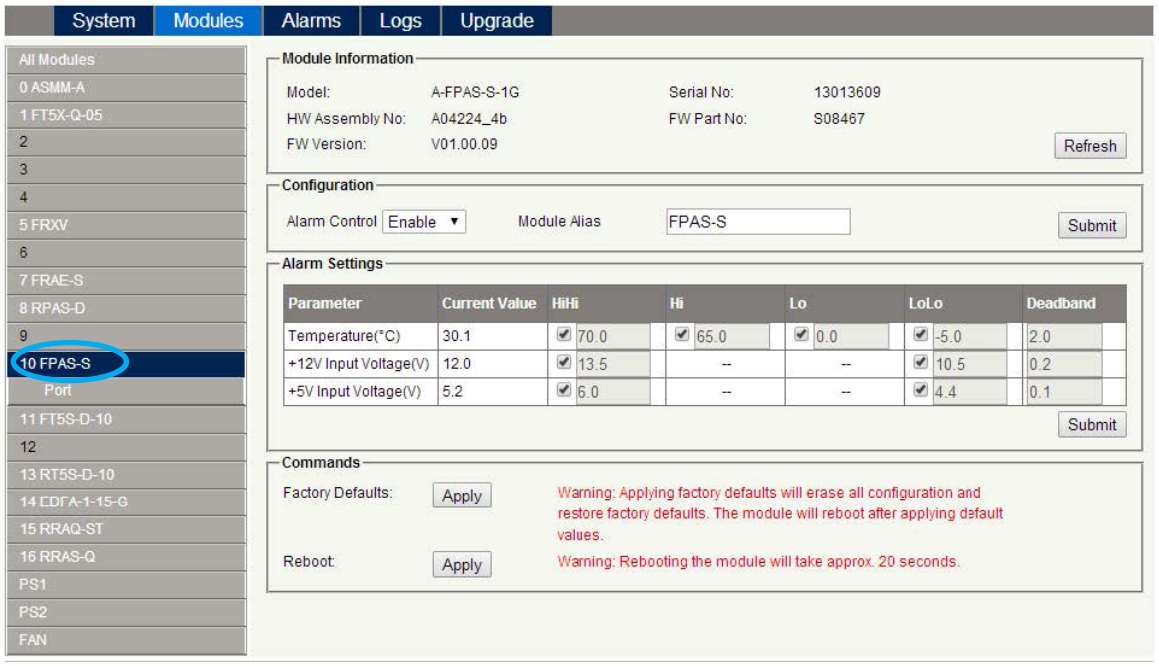
When setting up the transmitter for final deployment, the RF input levels must not exceed 20 dB.

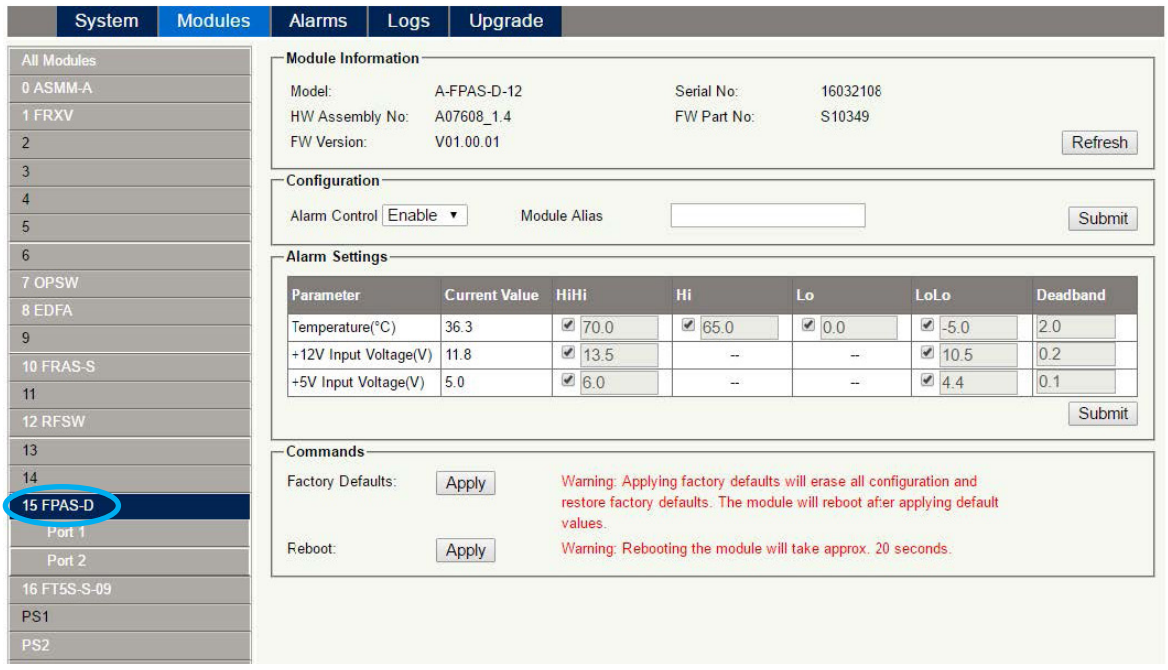
6 Module configuration & alarm setup

The module configuration settings can be configured using the web interface and the 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.

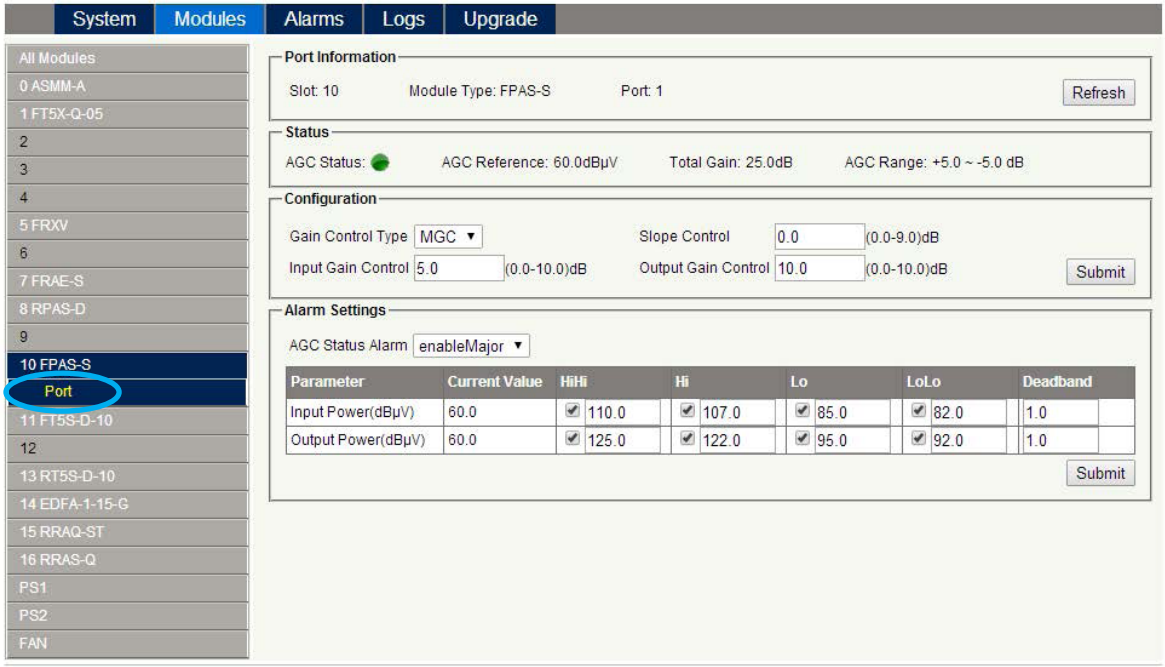
6.1 Port configuration screen

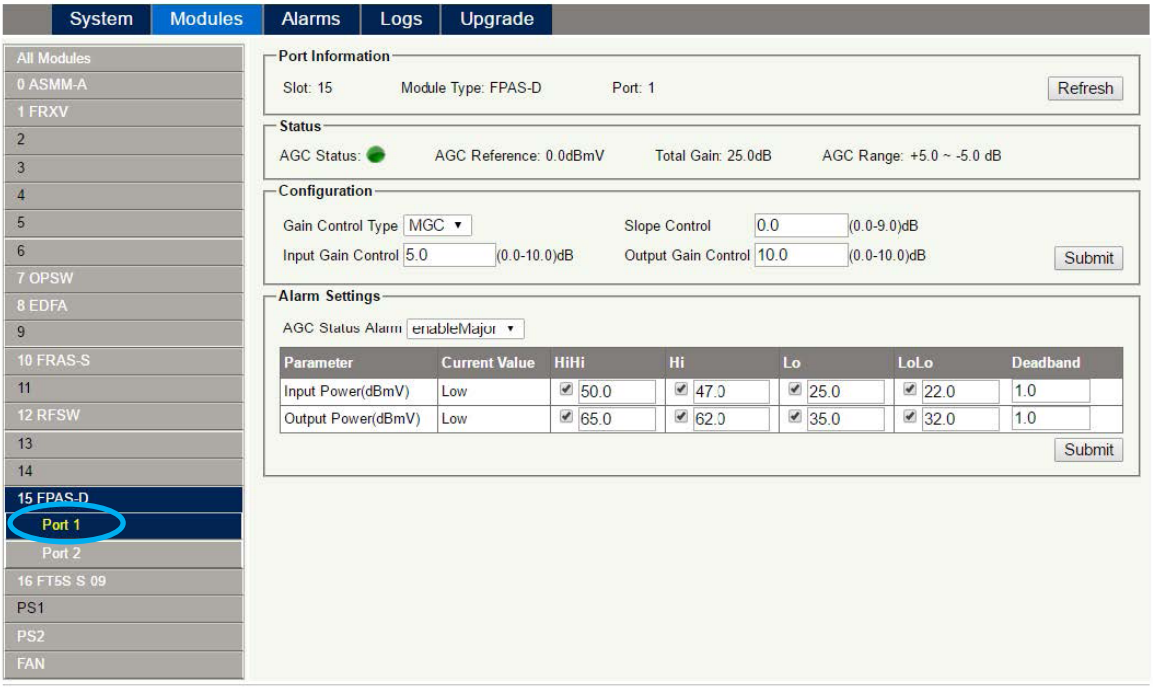
After logging in to the AIMA ASMM controller, select the **'Modules'** tab and then the **'FPAS'** to configure one of the FPAS modules. After selecting the **'FPAS'**, the **'Port'** option will appear.





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')

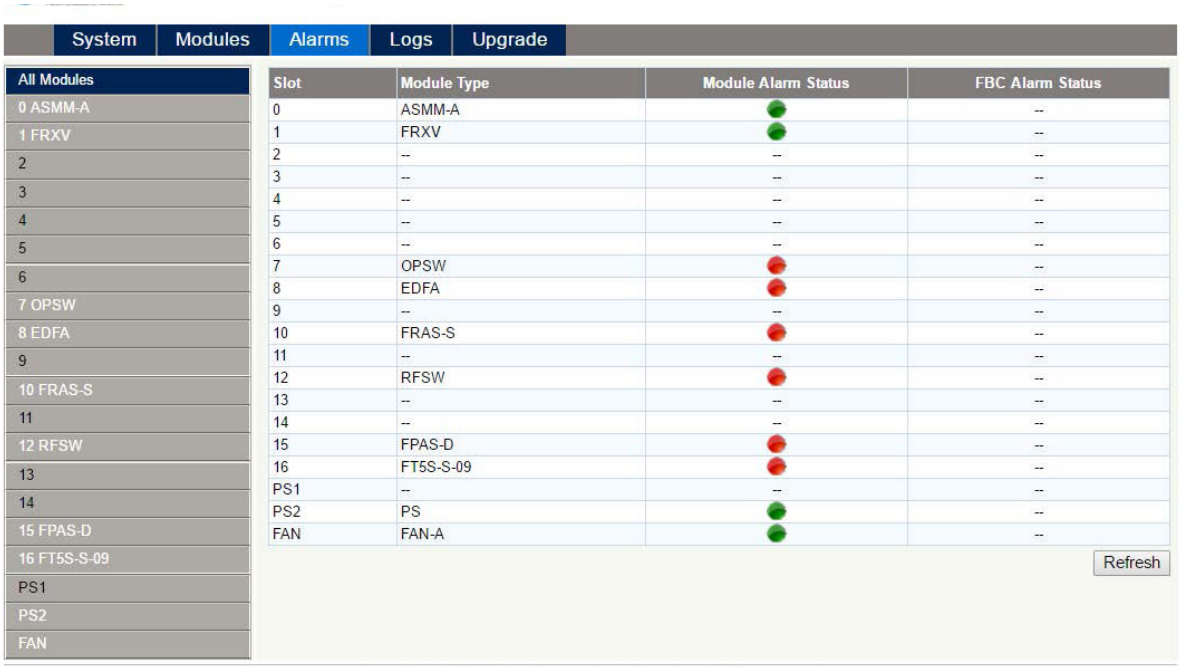
6.2 Alarms monitoring

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

6.2.1 Alarm status pages

Click the **'Alarms'** tab on the top menu bar to display an overview of the alarm status of all the installed modules. The module row has an alarm status indicator used to show:

Normal operation: Green
Major alarm: Red

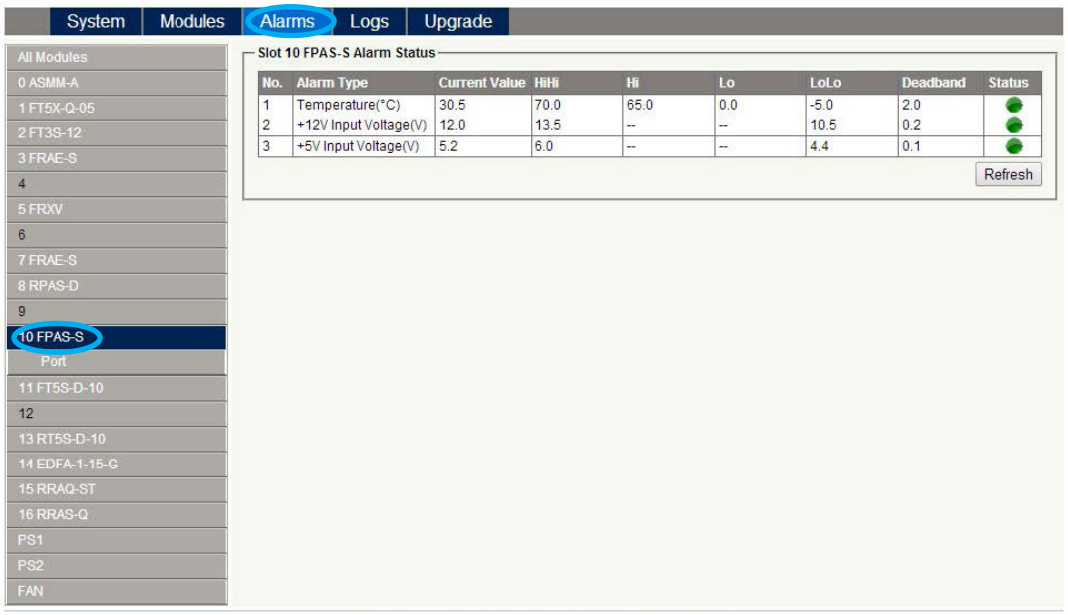


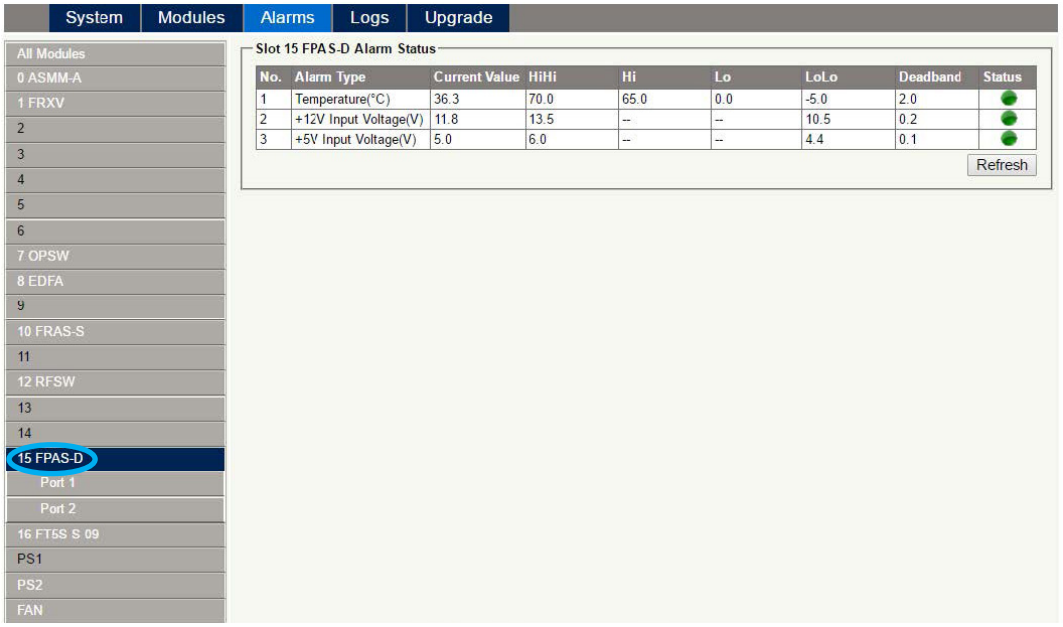
6.2.2 Module operating voltage and temperature alarm

Click on the corresponding module, as shown in the following figure, to view the module alarm information. By clicking on **'FPAS'**, under **'Modules'** tab, the operator can view the module temperature and power supply voltage alarms. The operator can utilise the status indicators to judge whether the module is working properly.

The status has three conditions:

Normal: Green
Major alarm: Red





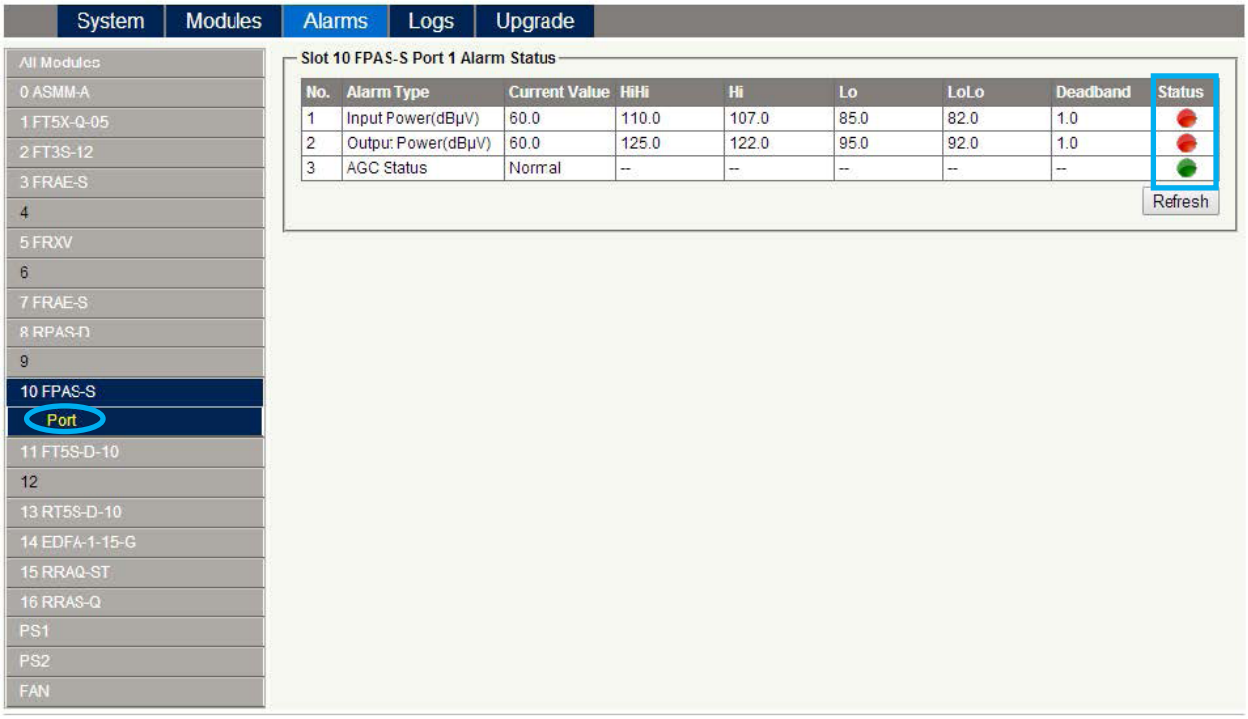
Use the status indicators to determine if the module is working properly. If the device is replaced or reset, click on **'Refresh'** to update the alarm information.

6.2.3 Module Port Alarms

Click on the **'Port'** label under the selected module on the left column. On the module **'Port'** page, the operator can view the **'Input Power'**, **'Output Power'**, and the **'AGC Status'** alarms:

The status has three conditions:

Normal: Green
Major alarm: Red



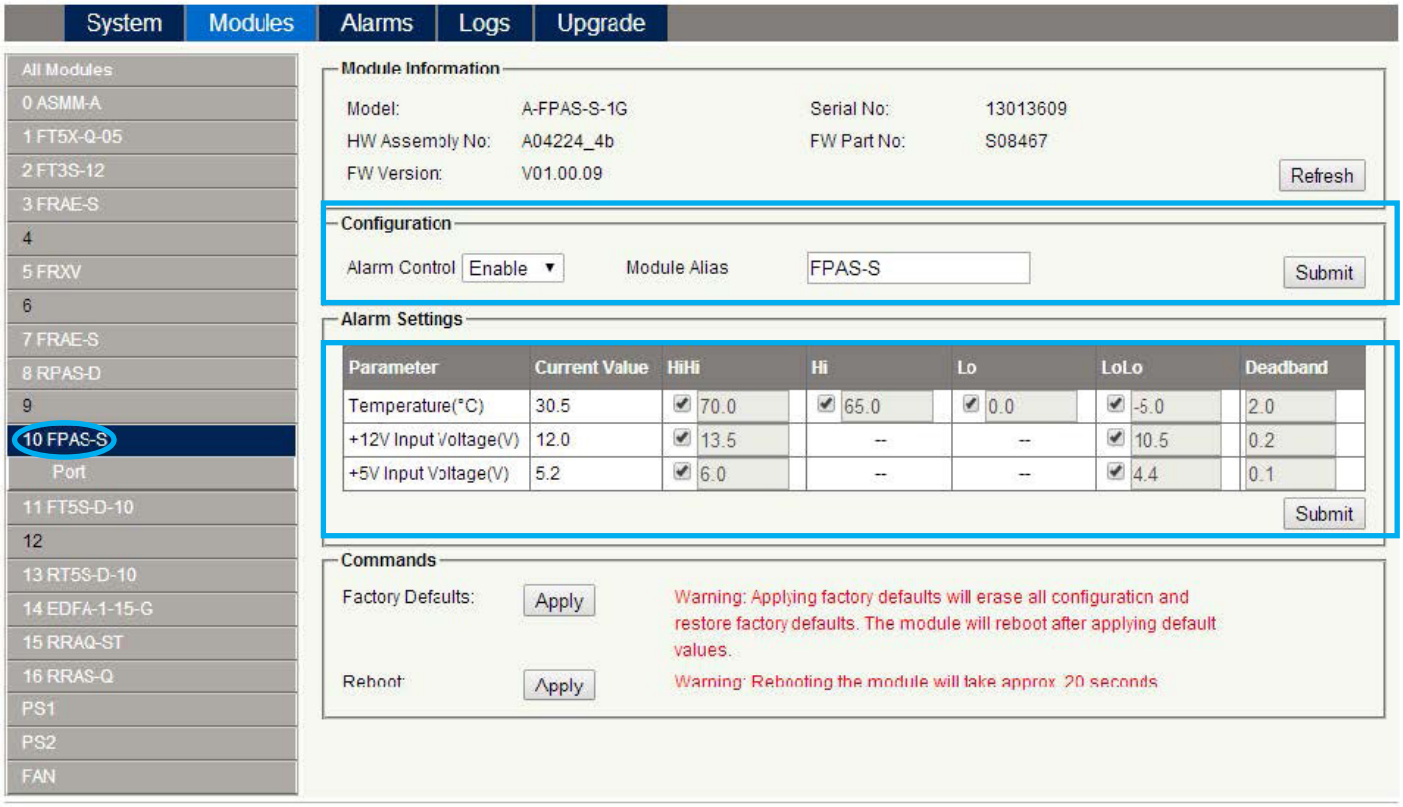
6.2.4 Alarm Monitoring Configuration

Monitoring Function ON/OFF

In the Configuration section, on the **'Modules'** page, click **'Alarm Control'** to toggle the monitoring function.

Temperature, +12V, +5V Voltage Alarm Levels Management

By default, temperature, +12 V and +5 V alarms are all set to ON. The check box ☑ as shown in Figure 6-6 toggles detection. When the check box is checked (detection ON), the text in the text box will be solid black. When a check box is NOT checked, (detection OFF), the text in the text box will be light grey and cannot be changed.



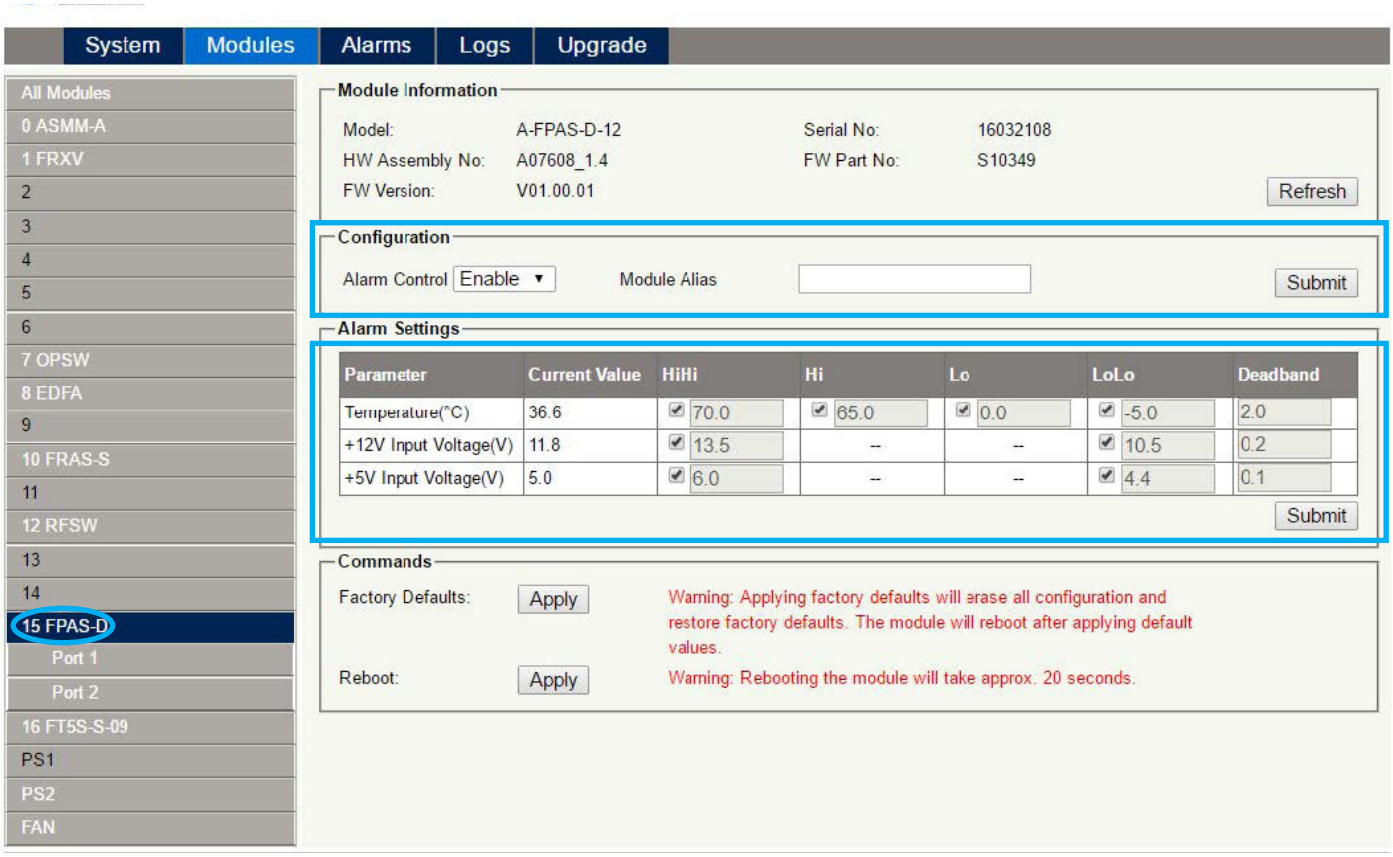
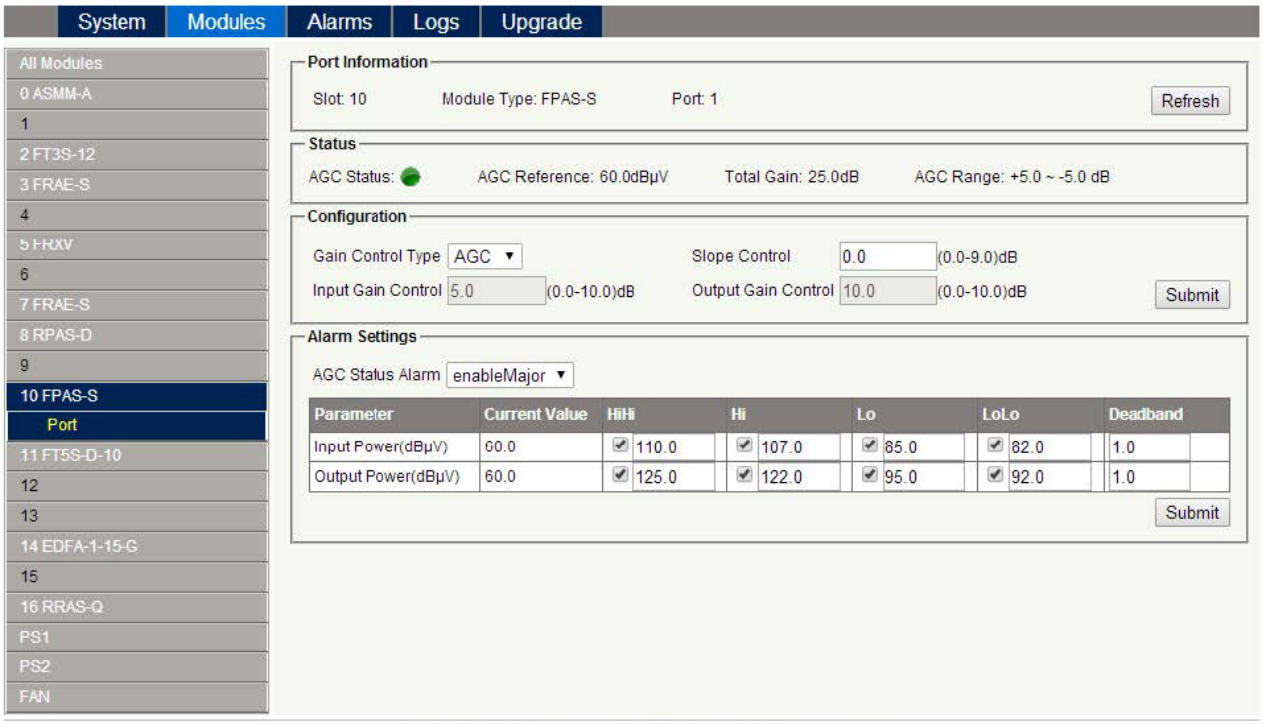


Table 6-1

Parameter	HIHI	HI	LO	LOLO	Deadband	Threshold changeable	Default Alarm Enable
Temperature (oC)	70.0	65.0	0.0	-5.0	2.0	NO	YES
+12V Input Voltage (V)	13.5	-	-	10.5	0.2	NO	YES
+5V Input Voltage (V)	6.0	-	-	4.4	0.1	NO	YES

6.2.5 Input/Output Status Monitoring

To setup Input/Output status monitoring, select the **'Port'** label from the left menu under the desired module, and then the monitoring parameters will be listed the in the **'Alarm Settings'** section, click on ☑ to toggle the alarms. Customers can change the monitoring parameters.



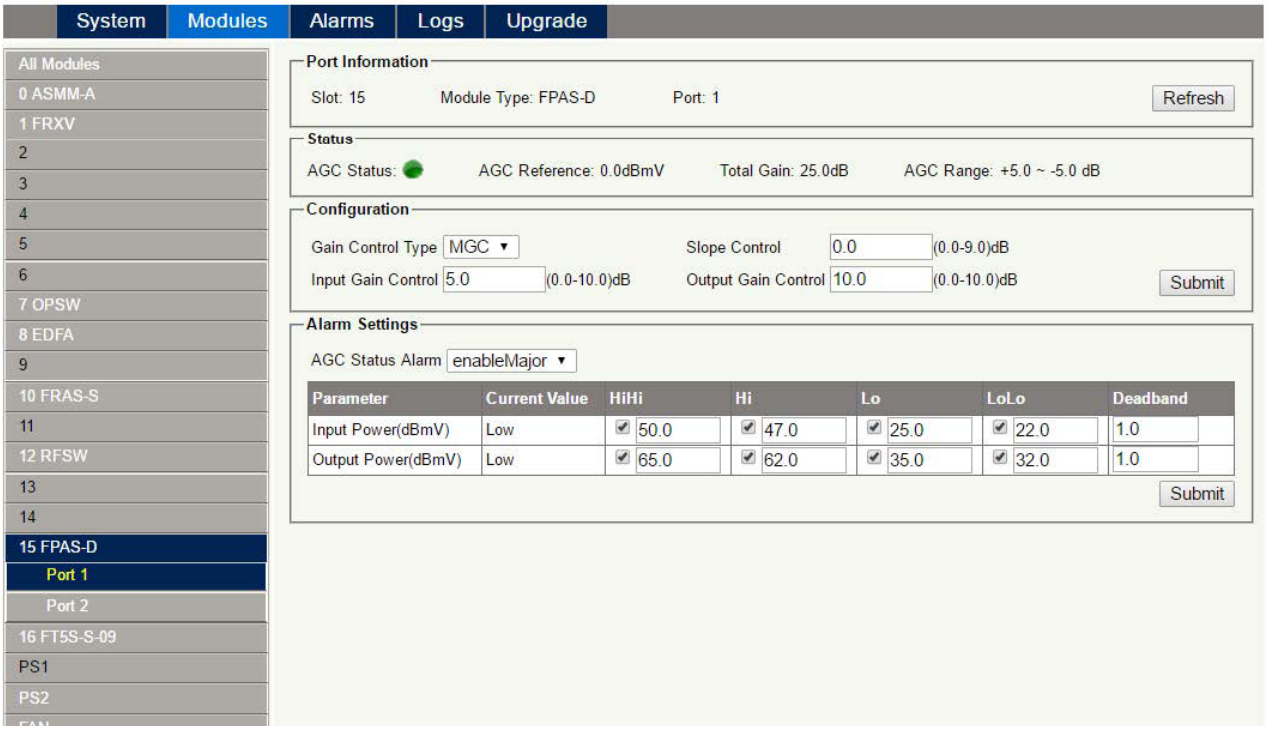


Table 6-2 Port page alarms threshold parameters instruction

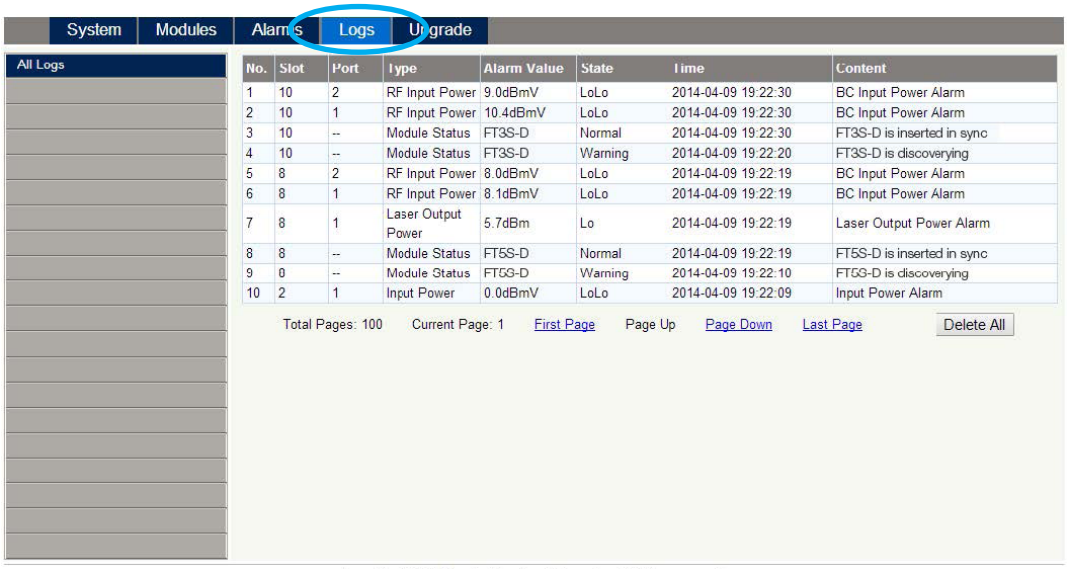
Parameter	HIHI	HI	LO	LOLO	Deadband	Threshold changeable	Default Alarm Enable	Range
Input Power (dBuV)	110	107	85	82	1.0	YES	YES	
74-124 Output Power (dBuV)	125	122	95	92	1.0	YES	YES	94-133

Table 6-3 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	During Module Power ON	All	Green (2 times/sec)
No Alarm	Normal operation	Normal	All	Green
Upgrading AM Firmware	AM Upgrading	Module upgrade	MODE	
AM-Critical-ALM	Critical Alarm		STAT	Red
AM-Minor-ALM	Warning Alarm		STAT	Amber
AGC/MGC	AGC/MGC Mode Control	AGC/MGC Mode Control	MODE	MGC Blinking (1 time/ sec), AGC Green always

6.3 Logs management

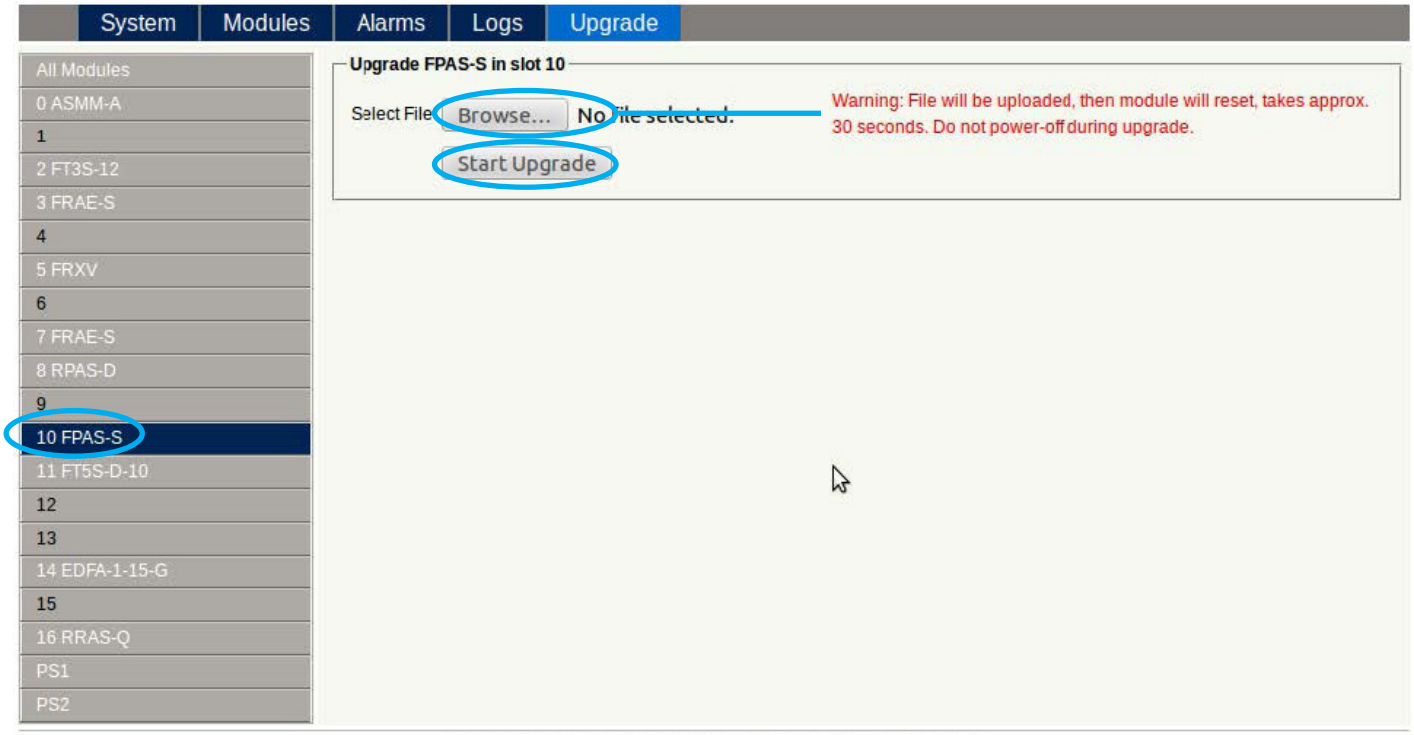
The operator can view all the alarms of the modules in the chassis on the logs management page. Click **'Logs'** to enter the logs management page.



6.4 Device upgrade

The module supports the firmware upgrade function.

To upgrade the firmware first upload the firmware file, and then click **'Start Upgrade'** to begin with the upgrade process. At the same time, you will be automatically redirected to the network management page. The upgrade operation is then complete.



* 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 FPAS supports automated firmware updates and automatic backup & restore features via TFTP when managed via the NMSE management software. Please refer to the NMSE product user manual for more information.

WARNING!

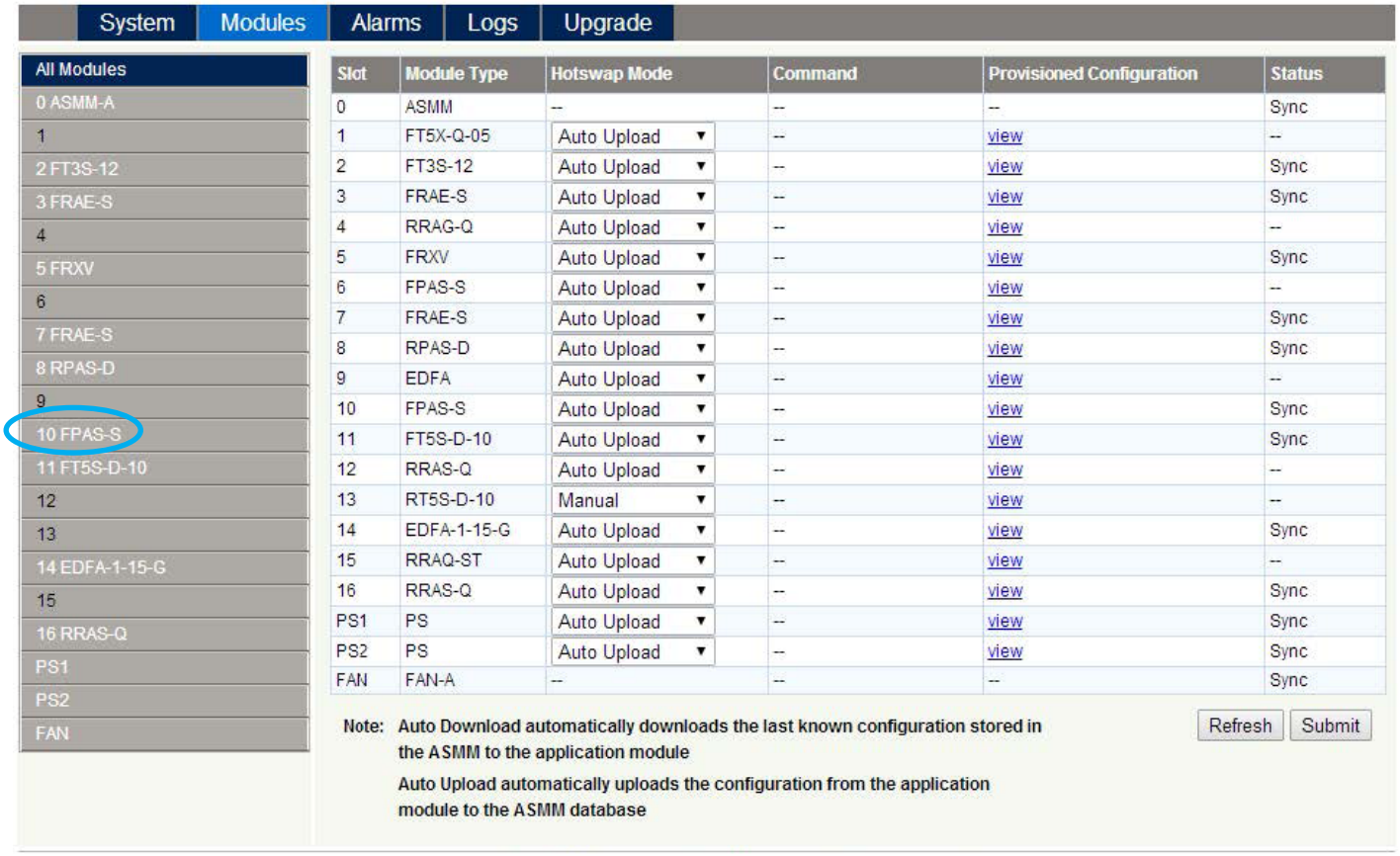
Module will be upgraded after the firmware is uploaded. The upgrading and reboot process will take about 30 seconds.

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.

6.5 Restoring factory defaults

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

Detailed operations:
Click the **'Modules'** tab on the top menu and click the module to be configured on the left menu. Click the **'Apply'** button in the **'Factory Defaults'** section. When finished, the device configuration will be reset. For more detailed factory reset information, please refer to the factory restore and upgrade configuration parameters table as in **Table 6-4.**



Note:
All the powers displayed on the webpage are total power.

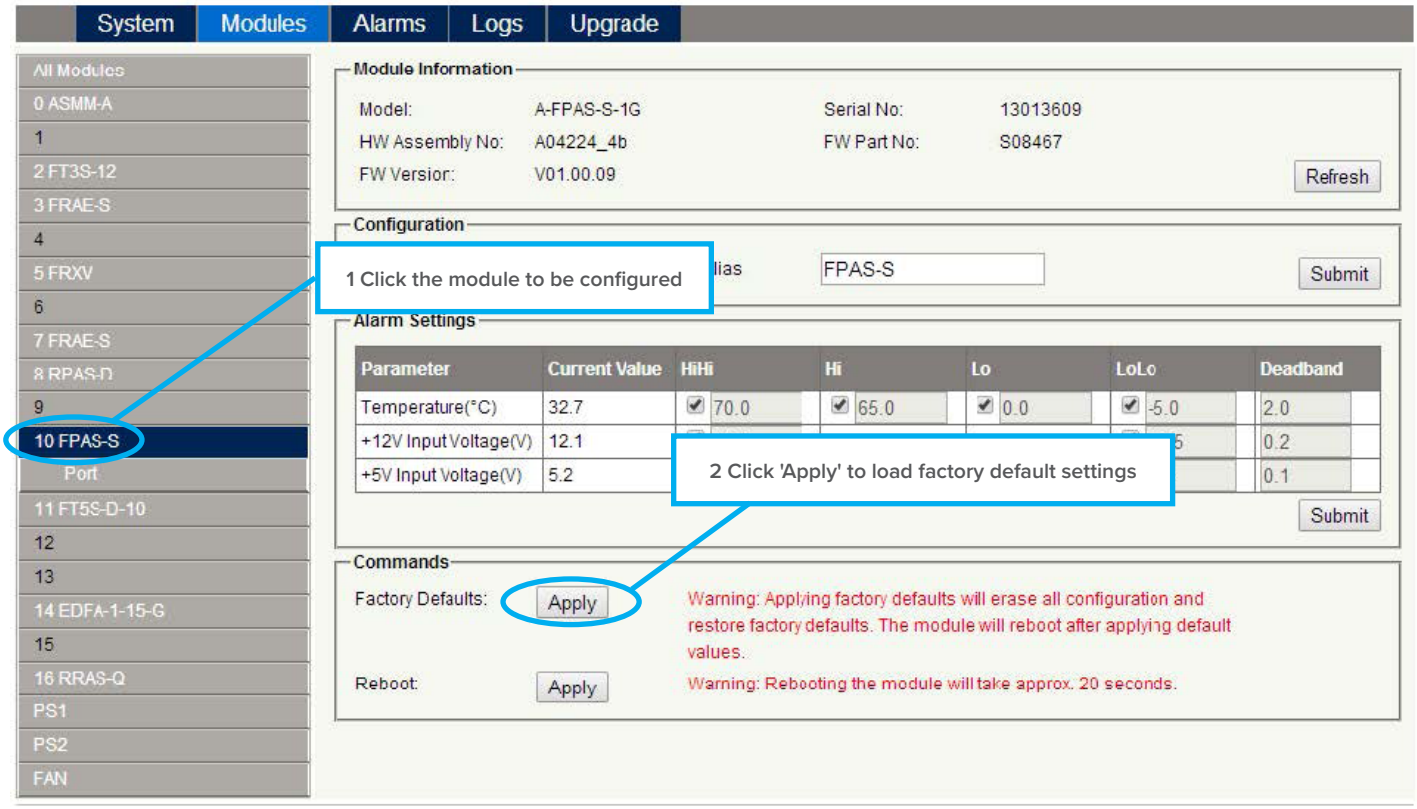


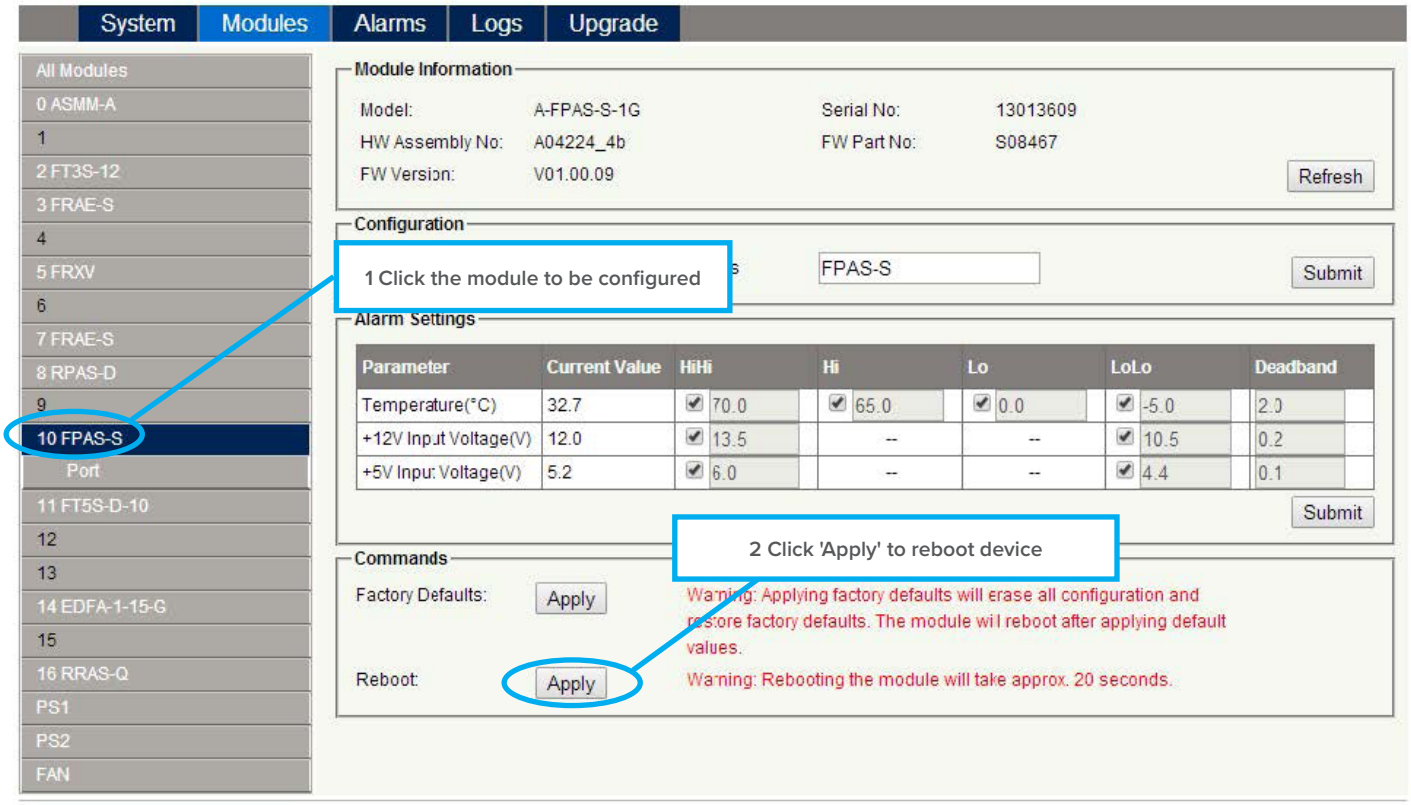
Table 6-4 Factory default and upgrade configuration parameters table

Parameters	Configuration	Factory default value
Alarm Control	Enable/Disable	Enable
Gain Control Type	AGC/MGC	MGC
Slope Control (dB)	(0.0-9.0)	0
Input Gain Control (dB)	(0.0-10.0)	5
Output Gain Control (dB)	(0.0-10.0)	10
AGC Status Alarm	enableMajor/enableMinor/disable	enableMajor

6.6 Reboot

The module can be made to reboot remotely.

Detailed operations:
Click the **'Modules'** tab on the top menu, then click the corresponding FPAS module from the left menu, and click the **'Apply'** button in **'Reboot'** section. Next, click on **'Submit'** to confirm, and then the module will automatically restart. The configuration of the module will not be lost after rebooting.



7 Troubleshooting

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 Indicator status	Common Faults	Trouble Shooting
RF IN is amber	RF input power is lower or higher	Adjust input signal
RF IN is red	RF input power is too high or too low, or no input	Adjust input signal
RF OUT is amber	RF output power is lower or higher	Adjust input signal or adjust MGC to an appropriate value
RF OUT is red	RF output power is too high or too low	Adjust input signal or adjust MGC to an appropriate value
STAT is amber	Operating environment temperature is lower or higher	Check the fans, or lower the room temperature. If the temperature is normal, please contact Technetix's technical support.
	+12V/+5V Input voltage is lower or higher.	Please contact Technetix's technical support.
	RF input/output power is lower or higher.	Adjust input signal or adjust MGC to an appropriate value
	AGC status alarm, and it was set to "enableMinor".	Adjust input signal or turn to MGC mode.
STAT is red	Operating environment temperature is too high or too low.	Check the fans, or lower the room temperature If the temperature is normal, please contact Technetix's technical support
	+12V/+5V input voltage too high or too low	Please contact Technetix's technical support
	RF input/output power too high or too low	Adjust input signal or adjust MGC to an appropriate value
	AGC status alarm, and it was set to "enableMajor"	Adjust input signal or turn to MGC mode.

Appendix A: Default alarm limit settings

Parameters	Critical high	Warning high	Normal	Warning low	Critical low	Deadband	Factory default	Detection range
Temperature (°C)	70.0	65.0	28.0	0.0	-5.0	2.0	ON	-20 - 125
+5V input Voltage (V)	6		5.0		4.4	0.1	ON	0 - 6.5
+12V input Voltage (V)	13.5		12.0		10.5	0.2	ON	0 - 16

Appendix B: Factory default settings

Parameters	Conditions	Factory default value
Alarm detection control	ON/OFF	ON
Output control	ON/OFF	ON
Output gain type	MGC/AGC	MGC
Input gain control (dB)	0 - 10	5
Output gain control (dB)	0 - 10	10
Remote node control	ON/OFF	OFF

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