



AIMA3000.FT5S

1510 nm Single Optical Forward Transmitter Module

Product User Manual



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1 About This Manual

1.1 Chapter Overview

About This Manual: Preface

1. Precautions
2. Overview: Application module overview, including the module features, technical specifications and ordering information.
3. Module Characteristics: The appearance of the equipment, port and introduction of other components
4. Installation: Installation procedure
5. Module Configuration & Alarms: Web management configuration instructions.
6. Troubleshooting
7. Product Warranty
8. Declaration of Conformity.

Appendix A: Default Alarm Parameters

Appendix B: Factory Default Settings

1.2 Related Documentation

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

- AIMA.3000 - Product User Manual
- 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

1.3 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 FT5S, 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 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 3A 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 Product Description

The 1550 nm Forward Transmitter Module - Standard series (FT5S) is designed to plug into Technetix latest generation Advanced Intelligent Multi-services Access platform - the AIMA3000.

Technetix AIMA3000 FT5S is available in single, dual, and quad laser configurations. It features advanced forward transmitters engineered for multi-service operators (MSOs) to increase network capacity to satisfy an ever-growing subscriber demand for more bandwidth. The module's operating wavelength conforms to ITU's standards and works with Technetix Erbium Doped Fibre Amplifier Module (EDFA). It allows for fullspectrum broadcast and narrowcast channels, providing the utmost flexibility for MSOs during the transition to all digital.

The FT5S series employs an advanced RF circuit design and laser with high-quality and low-chirp characteristics. The module offers a consistent optical modulation index (OMI) and ensures high-index optical power output. In addition, it is a cutting-edge optoelectronic design for the delivery of high-quality transmissions, in both analogue and digital formats over passive fibre optical networks.

All FT5S models 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 Technetix NMSE web-based management system.

3.2 Product Key Features

- Plug-and-play with the AIMA3000 platform
- High quality 1550 nm, isolated low-chirp analogue DFB laser
- RF amplifier gain blocks with advanced GaAs technology for better performance
- Conforms to the ITU DWDM standards
- Frequency response from 45 MHz to 1000 MHz fit for both broadcast and narrowcast applications
- Alarm monitoring via ASMM web interface and Technetix NMSE
- Automatic gain control (AGC) for a consistent optical modulation index (OMI)
- Automatic thermo-cooler control (ATC) for a consistent laser temperature
- Automatic power control (APC) for a consistent optical output power
- Available in single, dual, or quad transmitter configurations
- Up to 64 transmitters per chassis
- Remote firmware upgrade and auto upload/download of configuration files through ASMM web interface or using Technetix NMSE
- Fully FCC, CE, and RCM compliant

3.3 Specifications

Optical Performance

| | |
|--------------------|--|
| Optical wavelength | 1510 nm \pm 5 nm or ITU wavelength |
| Optical outputs | 1, 2 or 4 |
| Output power | 8 dBm, 9 dBm, or 10 dBm |
| Optical connector | SC/APC ⁽¹⁾ , LC/APC, FC/APC |
| Laser RIN | < -155 dB/Hz |

RF Performance

| | |
|--|---|
| RF bandwidth | 45 ~ 1000 MHz |
| RF flatness | \pm 0.75 dB |
| RF input return loss | > 16 dB |
| RF input level, NC nominal | 25 ~ 35 dBmV (85 ~ 95 dB μ V) per channel |
| RF input level, BC nominal | 15 ~ 25 dBmV (75 ~ 85 dB μ V) per channel |
| AGC range | \pm 3 dB |
| Isolation of NC and BC | > 50 dB |
| RF impedance | 75 Ω |
| RF test point relative to RF output port | -20 \pm 1 dB |
| Isolation between transmitters | > 65 dB |
| RF input connectors | Single port: 2 \times GSK-type female (1 for NC, 1 for BC); Dual port: 4 \times GSK-type female (2 for NC, 2 for BC); Quad port: 4 \times GSK-type female |
| RF test points | Single port: 3 \times Mini-SMB ⁽²⁾ ; Dual port: 4 \times Mini-SMB ⁽³⁾ ; Quad port: 4 \times Mini-SMB ⁽⁴⁾ |
| Alarms and laser status | Front-panel LEDs, SNMP Traps |

Link Performance ⁽⁵⁾

| | |
|---|---------|
| CNR ^(4 MHz Narrow bandwidth) | > 53 dB |
| CSO | > 58 dB |
| CTB | > 67 dB |
| MER | > 38 dB |
| BER | < 1E-9 |

General

| | |
|-----------------------|--|
| Power supply | Powered via AIMA3000 backplane |
| Power consumption | Single port: < 8 W; Dual port: < 15 W; Quad port: < 24 W |
| Operating temperature | -5 ~ 55 $^{\circ}$ C |
| Operating humidity | 90 % (Non-condensing) |

| | |
|---|--|
| Storage temperature | -25 ~ 70 °C |
| Storage humidity | 90 % (Non-condensing) |
| Dimensions (W × D × H) | 24.6 x 410 x 152.5 mm |
| Weight | 0.88 kg |
| Supported network management options | Technetix NMSE or through ASMM's Web Interface |

Notes:

- (1) Standard option. Contact a Technetix Sales Representative for availability of other options
- (2) Three mini-SMBs on front panel: one each for broadcast and Narrowcast inputs and one for laser RF level
- (3) Four mini-SMBs on front panel: BC and NC inputs test ports (user switchable) and two to measure RF input before the laser transmitter.
- (4) Four mini-SMB connectors on front panel to measure RF input before the laser transmitter
- (5) CNR, CSO, CTB and MER are loaded with 30 NTSC+124 QAM256 or 30 PAL D/K+85 QAM256. BER is loaded with 30 NTSC+124 QAM256, 30 PAL D/K+85 QAM256 or 153 QAM256. All are measured with Technetix referenced optical receiver with 5 km single-mode optical fibre 0 dBm.

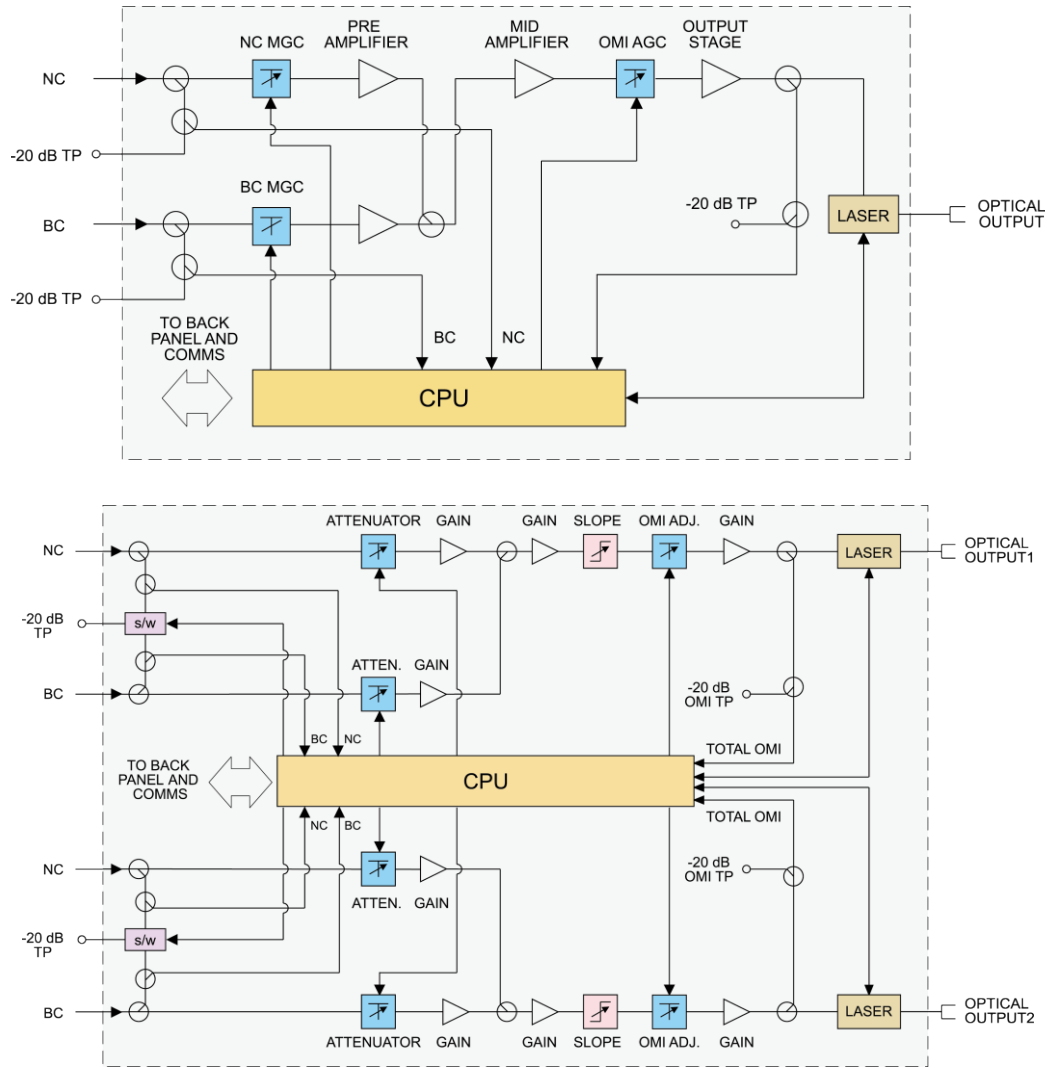


Figure 1 Block diagram FT5S

Table 3-3 FT5S Block Diagram Glossary

| Parameters | Glossary |
|-------------------------|-------------------------|
| NC | Narrowcast input |
| ATTEN | Attenuator |
| -20 dB TP | -20 dB test point |
| BC | Broadcast Input |
| OMI ADJ | |
| TO BACK PLANE AND COMMS | Data bus |
| -20 dB OMI TP | -20 dB OMI test point |
| CPU | Central processing unit |
| Parameters | Glossary |

3.4 Order Details

AIMA-FT5S-[V]-[W]-[X1X2]-[Y]-[Z] Forward transmitter 1510 nm module

Options:

| | | |
|-------------------------------|--------------------------------|------------------------------|
| V | Number of Optical Ports | |
| | S | Single port |
| | D | Dual ports |
| | Q | Quad ports |
| W | Optical Output Power | |
| | 08 | 8 dBm (6.3 mW) optical power |
| | 09 | 9 dBm (8 mW) optical power |
| | 10 | 10 dBm (10 mW) optical power |
| X1X2 ⁽¹⁾⁽²⁾ | First Channel | Last Channel |
| | 21 | 192.1 THz (1560.61 nm) |
| | 23 | 192.3 THz (1558.98 nm) |
| | 25 | 192.5 THz (1557.36 nm) |
| | 27 | 192.7 THz (1555.75 nm) |
| | 29 | 192.9 THz (1554.13 nm) |
| | 31 | 193.1 THz (1552.52 nm) |
| | 33 | 193.3 THz (1550.92 nm) |
| | 35 | 193.5 THz (1549.32 nm) |
| | ... | ... |
| | 51 | 195.1 THz (1536.61 nm) |
| Y | Optical Connector Type | |
| | S | SC/APC ⁽³⁾ |
| | F | FC/APC |
| | L | LC/APC |
| | E | E2000/APC |
| Z | Bandwidth | |
| | 1G | 45 ~ 1000 MHz |

Note:

- (1) Default spacing is 200 GHz. For other wavelength configurations not listed, please contact Technetix.
- (2) X2 used only in dual transmitter versions. Dual version, X1 is first channel and X2 is the second channel. Quad version, X1 is first channel and X2 is fourth channel (the second is 200 GHz higher than the first, the third channel is 200 GHz higher from the second).Contact Technetix Representatives for detailed optical information.

Example:

| | | |
|--------|------|--|
| Single | X1 | 25 |
| Dual | X1X2 | 2527, 2525 |
| Quad | X1X2 | 2531 (25, 27, 29, 31) 2525 (25, 25, 25, 25) |

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

4 Module Characteristics

4.1 Module Appearance and Port Layout

4.1.1 Overview

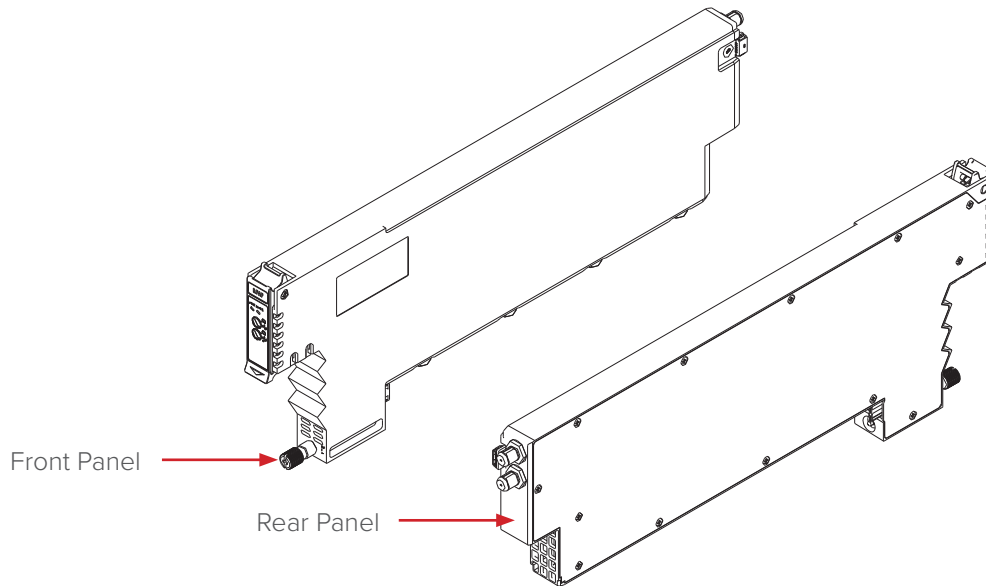


Figure 4-1 Module Appearance

4.1.2 FT5S-S Front Panel Layout

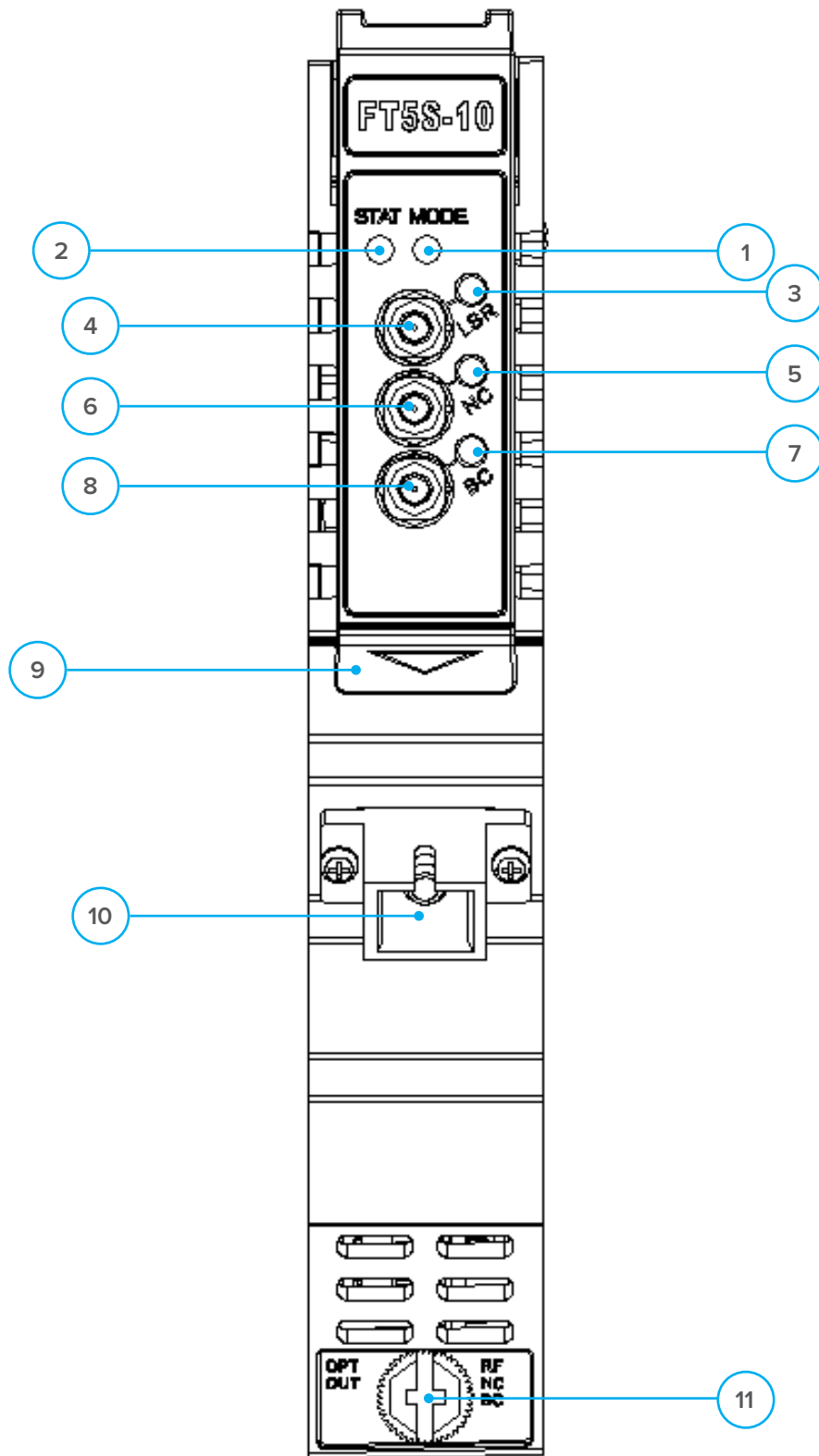


Figure 4-2 FT5S Front Panel Layout

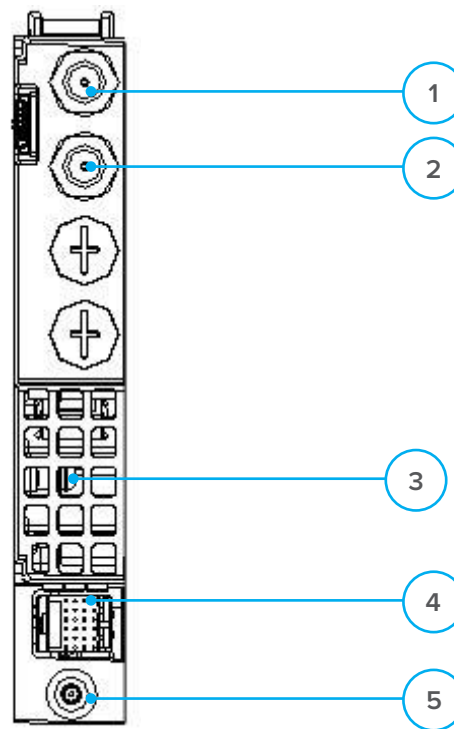
Table 4-1 FT5S-S Front Panel Functions

| Serial 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: Orange Major Alarm: Red |
| 3 | LSR | Laser status indicator ON: Green OFF: Green Light Blinking Major Alarm: Red |
| 4 | LSR-OUT | Laser former level input test point |
| 5 | NC LED | Narrowcast input working status indicator Normal: green Minor Alarm: orange Major Alarm: red |
| 6 | NC-IN | Narrowcast input test point |
| 7 | BC LED | Broadcast input working status indicator Normal: green Minor Alarm: orange Major Alarm: red |
| 8 | BC-IN | Broadcast input test point |
| 9 | 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. |
| 10 | OPT OUT | Optical output |
| 11 | Mounting Screw | Module fastening screw |

CAUTION!

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

4.1.3 FT5S-S Rear Panel Layout



4.1.3 FT5S-S Rear Panel Layout

Table 4-2 FT5S-S Rear Panel Functions

| Serial Number | Item | Description |
|---------------|---------------|--|
| 1 | NC IN | Narrowcast RF input |
| 2 | BC IN | Broadcast RF input |
| 3 | Air vent | Module air vent allowing air to flow out of the module |
| 4 | Bus connector | Power and communication port |
| 5 | Placement pin | Used to position the module in the chassis |

4.1.4 FT5S-D Front Panel Layout

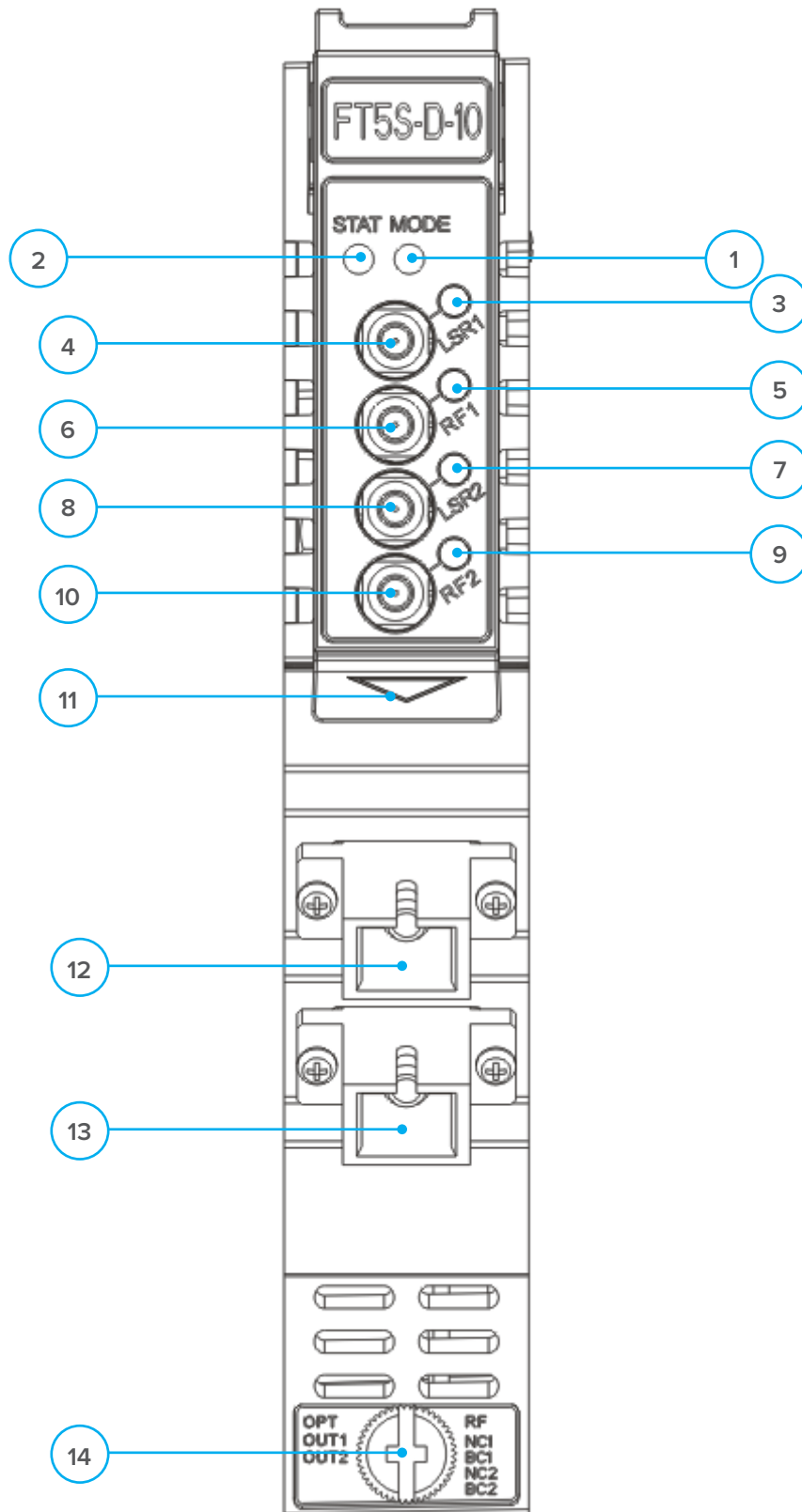


Figure 4-4 Front Panel Layout

Table 4-3 FT3S-D Front Panel Functions

| Serial 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: Orange Major Alarm: Red |
| 3 | LSR1 LED | Laser status indicator ON: Green OFF: Green Light Blinking Major Alarm: Red |
| 4 | LSR1-OUT | Laser Former level input test point |
| 5 | RF1 LED | Narrowcast or Broadcast input working status indicator Normal: green Minor Alarm: orange Major Alarm: red |
| 6 | RF1-IN | Narrowcast or Broadcast input test point |
| 7 | LSR2 LED | Laser status indicator ON: green OFF: Green Light Blinking Major Alarm: red |
| 8 | LSR2-OUT | Laser Former level input test point |
| 9 | RF2 LED | Narrowcast or Broadcast input working status indicator Normal: green Minor Alarm: orange Major Alarm: red |
| 10 | RF2-IN | Narrowcast or Broadcast input test point |
| 11 | 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. |
| 12 | OPT OUT 1 | Optical output |
| 13 | OPT OUT 2 | Optical output |
| 14 | Mounting Screw | Module fastening screw |

4.1.5 FT3S-D Rear Panel Layout

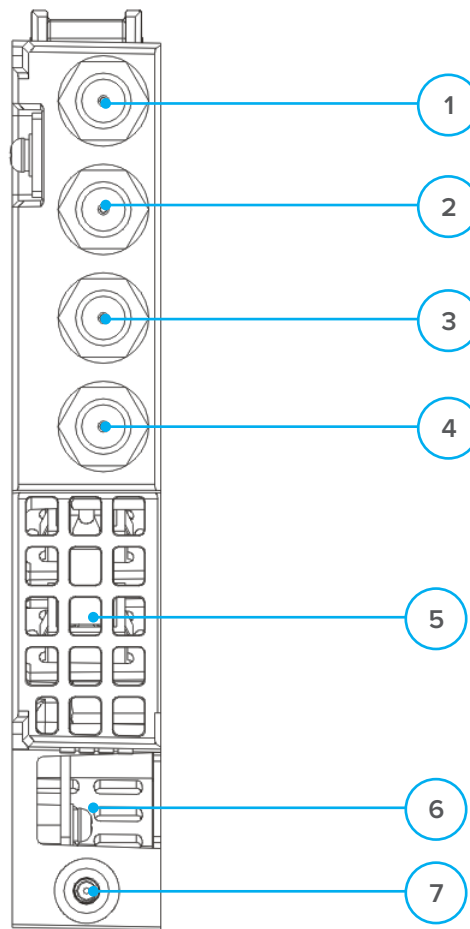


Table 4-4 FT3S-D Rear Panel Functions

| Serial Number | Item | Description |
|---------------|---------------|---|
| 1 | NC1 IN | Narrowcast RF input |
| 2 | BC1 IN | Broadcast RF input |
| 3 | NC2 IN | Narrowcast RF input |
| 4 | BC2 IN | Broadcast RF input |
| 5 | Air vent | Air vent allowing air to flow out of the module |
| 6 | Bus 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 fastening the FT5S module in the AIMA3000 chassis |
| FT5S Module | The module to install into the AIMA3000 chassis |

5.2 Unpacking

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

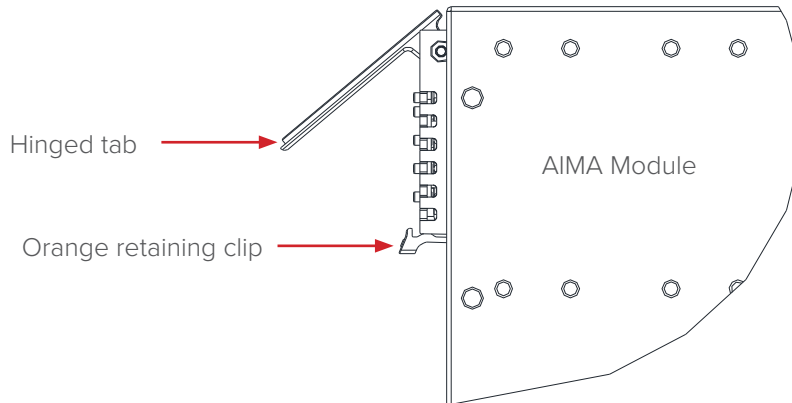
Check the packaging, record the product module type, serial number, purchase date, and any other relevant information to facilitate later management and maintenance.

Table 5-2 Packaging

| No. | Description | Qty |
|-----|--|-----|
| 1 | FT5S module | 1 |
| 2 | Product User Manual (CD) | 1 |
| 3 | Individual test sheet (Certificate of Performance) | 1 |

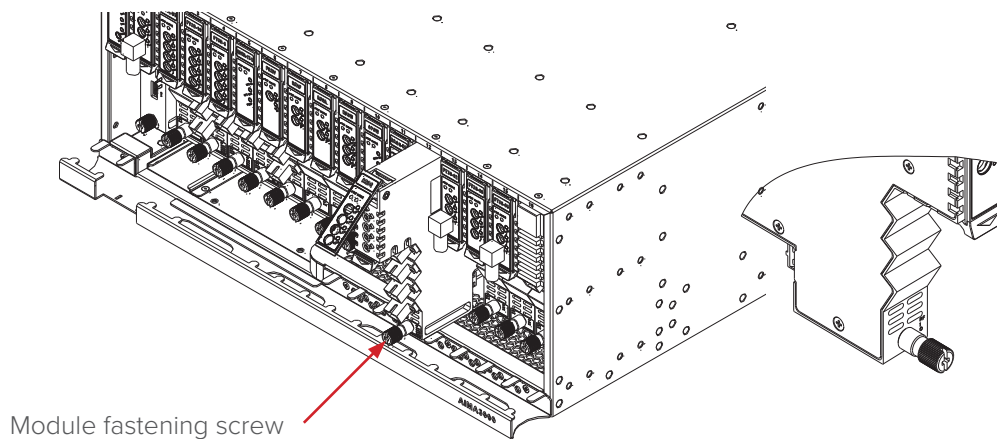
5.3 Module Installation

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 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.

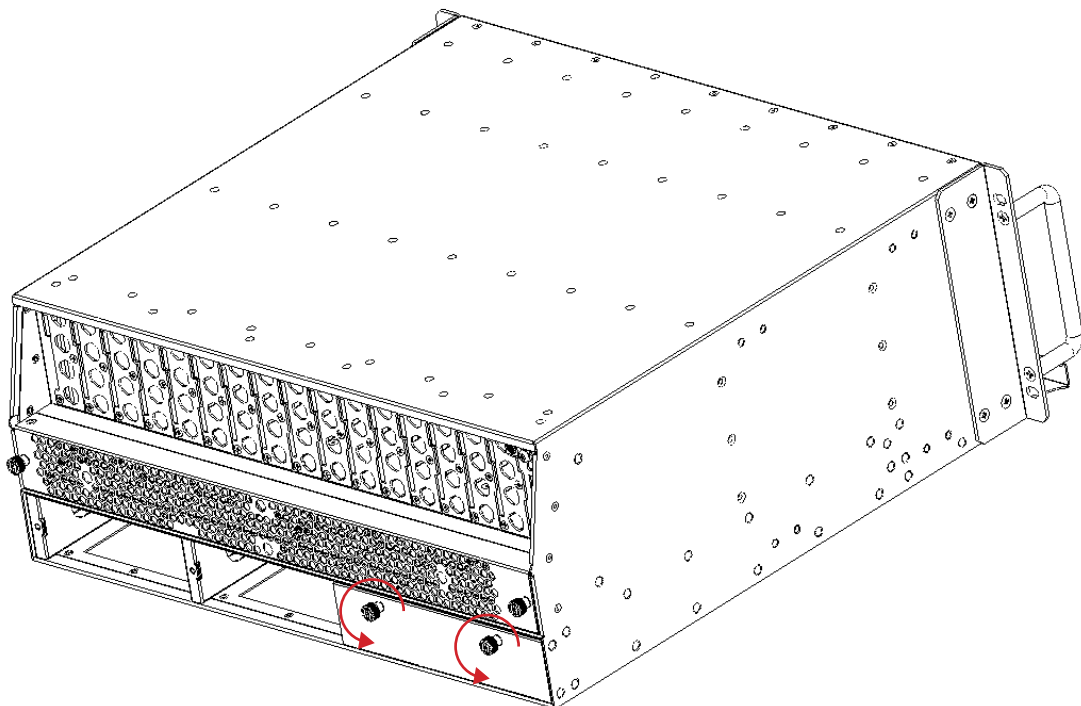
5.4 Connecting Optical Cables

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.

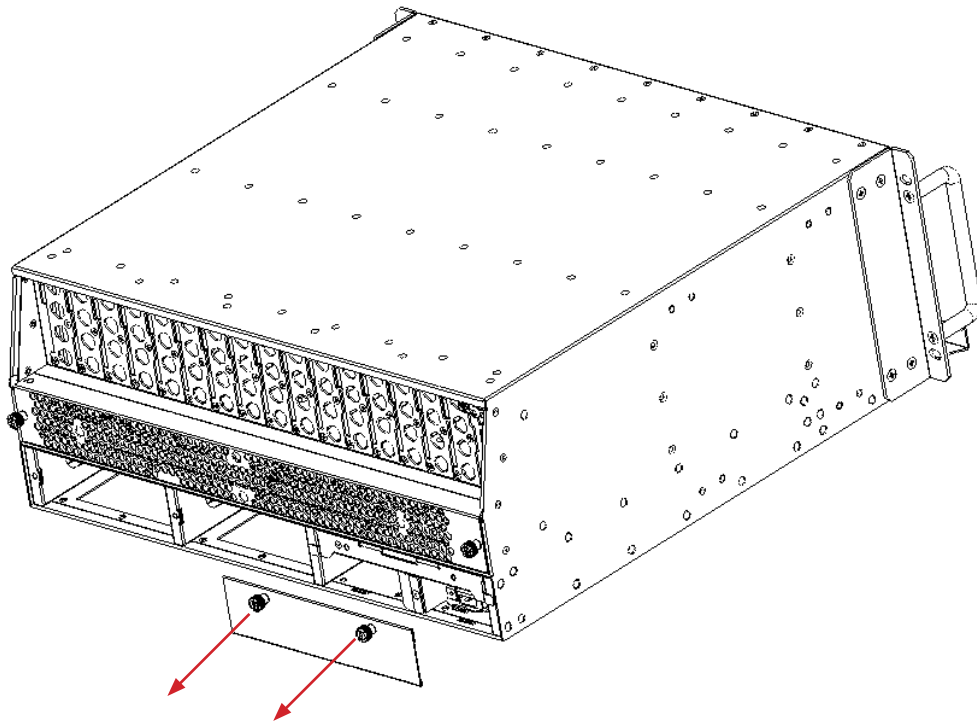
5.4.1 Using the Sliding Fibre Guide

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

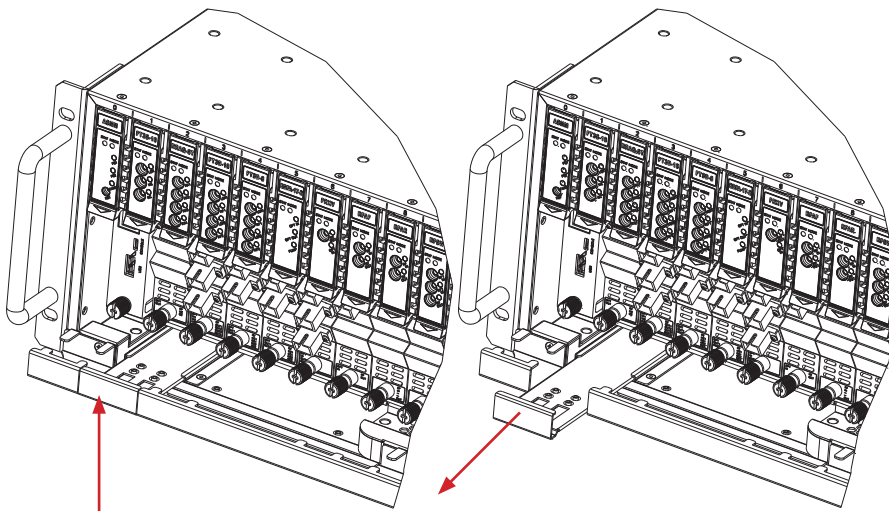
1. Unscrew the two thumbscrews on the rear panel.



2. Then, pull the panel forward.

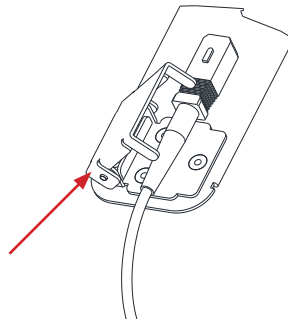


3. Then lift up the handle and slide the fibre guide out of the front of the chassis.



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.



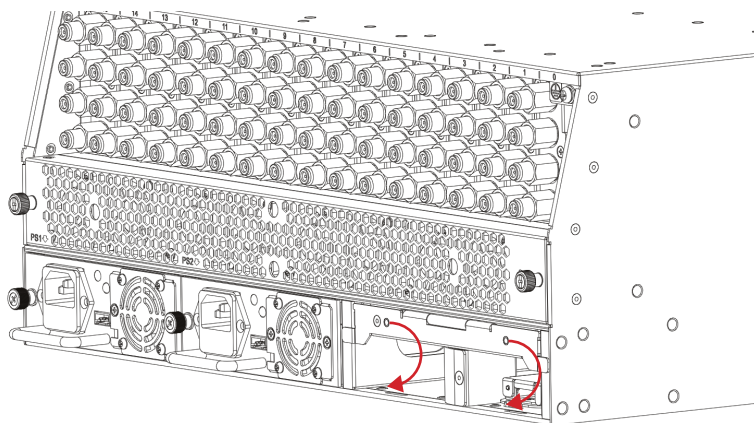
Fibre clip (at rear, for up to two connectors)

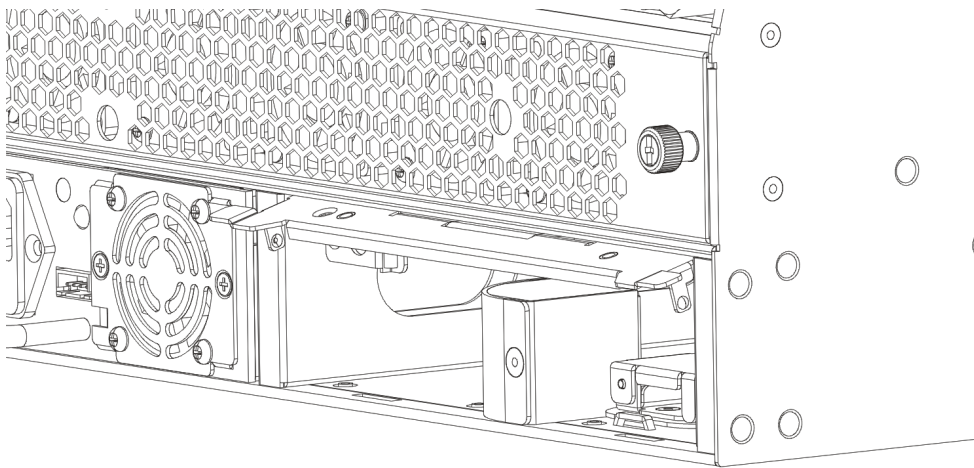
Handle (at front)

5.4.2 Using the Fibre Tray

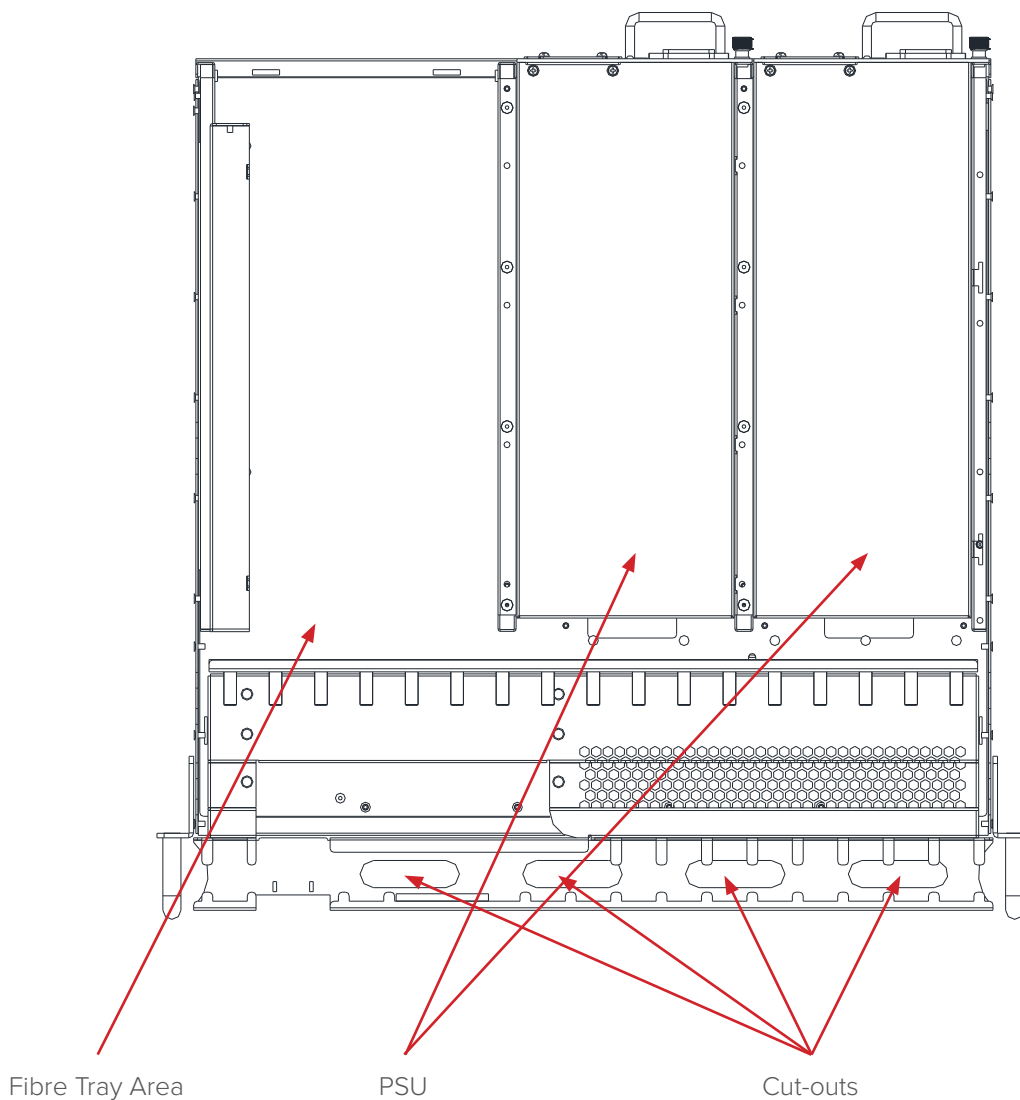
All optical fibres must be organised in a tidy manner in the chassis's fibre tray, which provides enough space for up to 64 optical fibres. This allows for easy positioning and future replacement of optical fibres. Along the front of the chassis, there are cut-outs for keeping the optical fibres in position.

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.



5.4.3 Cleaning the Fibre Connector Ends and Front-panel Optical Ports

To obtain a good quality optical input signal, optical fibre input ports and fibre connector ends must be carefully cleaned.

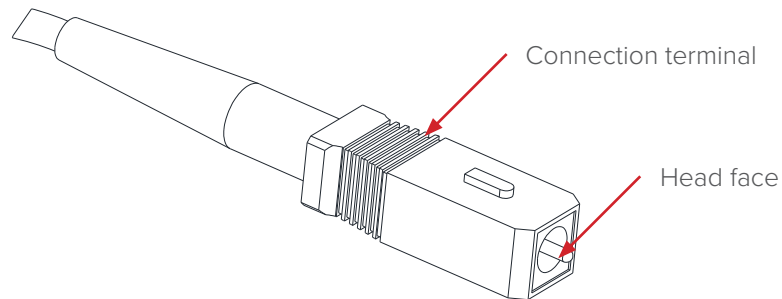


Figure 5-4

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 area of the 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 swab.

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.

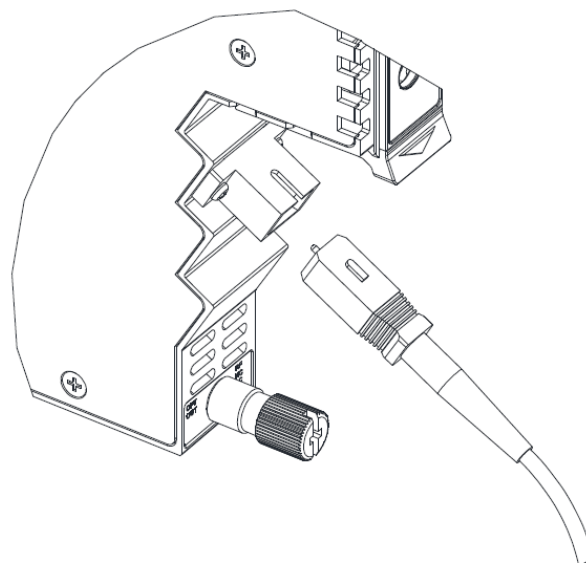


Figure 5-5

5.5 Check Module LEDs

Single port module

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 and output 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 "LSR", "BC" and "NC" LED indicators will also remain constant green when the signals are normal.

If the BC RF input signal is out of the expected range, the "STAT" and "BC" LED indicator will show constant orange or red. If the NC RF input signal is out of the expected range, the "STAT" and "NC" LED indicator will show blinking orange or red*. If the optical output signal is out of the expected range, the "STAT" and "LSR" LED indicator will show constant orange or red. FT5S' default alarm setting on "NC input power" is disabled. The NC LED indicator will remain constant green when it's disabled. Before checking the status of the NC LED indicator, please log into AIMA3000 configuration page to enable the major alarm and minor alarm (check the checkbox on HiHi/Hi/Lo/LoLo and fill in the thresholds).

Dual port module

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 and output 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 "LSR" LED indicators will also remain constant green when the signals are normal.

The RF indicators will act in 2 different ways when the signal is normal:

a. When BC/NC monitoring is set to BC on, the RF indicators will remain constant green when the signals are normal.

b. When BC/NC monitoring is set to NC on, the RF indicators will remain blinking green when the signals are normal.

If the BC RF input signal is out of the expected range ("Monitor BC or NC" set to BC On), the "STAT" and "RF" LED indicator will show constant orange or red. If the NC RF input signal is out of the expected range ("Monitor BC or NC" set to NC On), the "STAT" and "RF" LED indicator will show blinking orange or red. If the optical output signal is out of the expected range, the "STAT" and "LSR" LED indicator will show constant orange or red.

5.6 Test the RF Input Signal

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

5.7 Test the Optical Output Signal

After the input signal confirmation, the optical power of the optical output port should be tested. Use the optical power meter to test the output levels; the output values should be in accordance with the technical specifications. Before testing, the testing tools must be calibrated. For optical signals verify the interfaces are clean and not damaged.

CAUTION!

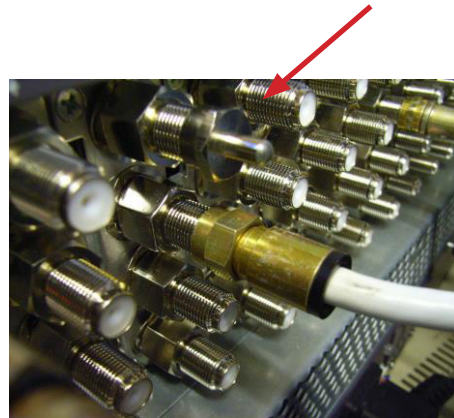
The device output optical power measurement procedure and regular maintenance must be performed by highly trained personnel. In any case, they must be aware of and comply with the following warnings associated with FT5S optical transmitter module:

WARNING

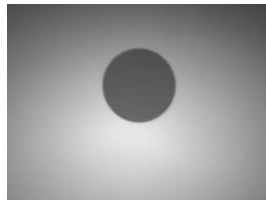
Module emits an invisible laser when working. Avoid direct contact with laser connector. Do not look directly at the fibre connector.

5.8 FT5S initial setup

1. After calculating the correct RF per channel drive level for the channel plan to be used for BC only or BC and NC. See following formula in section 6.1.1. Confirm RF channel level only on the BC RF input lead or BC and NC RF input leads and connect both to the chassis (pictured below). Note: if narrowcast is not in use install an "F" 75 Ω terminator to the NC RF input connection.



2. Before installing FT5S, check output optical ferrule tip with a fibre scope to ensure that the connector is clean as shown in following screen shot of clean optical connector. The cap on the optical output connector does not prevent contamination from getting on to the optical connector, it prevents laser from being emitted when laser is on and no optical patch cord is installed.



6 Module Configuration & Alarm setup

The module configuration setting uses Web pages and Technetix NMSE management software. This manual only provides the Web page configuration method. For login details and network setup please refer to the AIMA-ASMM user manual.

6.1 Port Configuration screen

After the login on the AIMA ASMM controller, select the "modules" tab and then the "FT5S" to configure the FT5S transmitter. After selecting "FT5S", the "Port" option will appear.

The screenshot displays the 'Modules' configuration interface. On the left is a sidebar with a list of modules, where '7 FT5S-D 1-CMSTS 2-QAM' is selected. The main content area is divided into several sections:

- Module Information:** Shows details such as Model (A-FT5S-D-10-2527-S-1G), Serial No. (14024144), HW Assembly No. (A05144_0a), FW Part No. (S08866), and FW Version (V01.00.05). A 'Refresh' button is present.
- Configuration:** Includes 'Alarm Control' set to 'Enable', 'Tx Unit Control' set to 'On', and a 'Module Alias' field containing 'FT5S-D 1-CMSTS 2-QAM'. A 'Submit' button is at the bottom right.
- Alarm Settings:** A table with columns for Parameter, Current Value, HiHi, Hi, Lo, LoLo, and Deadband.

| Parameter | Current Value | HiHi | Hi | Lo | LoLo | Deadband |
|-----------------------|---------------|--|--|---|--|----------|
| Temperature(*C) | 26.6 | <input checked="" type="checkbox"/> 70.0 | <input checked="" type="checkbox"/> 65.0 | <input checked="" type="checkbox"/> 0.0 | <input checked="" type="checkbox"/> -5.0 | 2.0 |
| +12V Input Voltage(V) | 12.1 | <input checked="" type="checkbox"/> 13.5 | -- | -- | <input checked="" type="checkbox"/> 10.5 | 0.2 |
| +5V Input Voltage(V) | 5.0 | <input checked="" type="checkbox"/> 6.0 | -- | -- | <input checked="" type="checkbox"/> 4.4 | 0.1 |
| -5V Input Voltage(V) | -5.0 | <input checked="" type="checkbox"/> -4.4 | -- | -- | <input checked="" type="checkbox"/> -6.0 | 0.1 |

 A 'Submit' button is located at the bottom right of this section.
- Commands:** Contains 'Factory Defaults' and 'Reboot' buttons, each with an 'Apply' button. Red warning text is displayed next to each:
 - Factory Defaults: Warning: Applying factory defaults will erase all configuration and restore factory defaults. The module will reboot after applying default values.
 - Reboot: Warning: Rebooting the module will take approx. 20 seconds.

After selecting "Port" the RF configuration screen will appear.

| 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-CMSTS 2-QAM | | | | |
| Port 1 | | | | |
| Port 2 | | | | |
| 8 EDFA-1-15-G | | | | |
| 9 OPSW 1-1550 2-1310 | | | | |
| 10 RRAS-Q 2-2.0 3-3.0 | | | | |
| 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 | | | | |

Port Information

Slot: 7 Module Type: FT5S-D Port: 1 Refresh

Status

Laser Type: Cooled DFB Laser Wave Length: 1557.36nm Laser Output Status: On
 Laser TEC Current: 90mA AGC Point: 0.0dB
 Broadcast Input Power: 88.0dBμV Narrowcast Input Power: Low RF Composite Input Power: 107.2dBμV

Configuration

Laser Output Control: Modulation Mode:
 Input AGC Mode: OMI Offset: (-3.0-3.0)dB
 Broadcast MGC: (-10.0-5.0)dB Narrowcast MGC: (-10.0-5.0)dB
 Monitor BC or NC: Submit

Alarm Settings

Laser Output Status Alarm:

| Parameter | Current Value | HiHi | Hi | Lo | LoLo | Deadband |
|-------------------------|---------------|---|---|--|--|----------|
| BC Input Power(dBμV) | 87.8 | <input checked="" type="checkbox"/> 113.8 | <input checked="" type="checkbox"/> 108.8 | <input checked="" type="checkbox"/> 83.8 | <input checked="" type="checkbox"/> 78.8 | 1.0 |
| NC Input Power(dBμV) | Low | <input type="checkbox"/> 113.8 | <input type="checkbox"/> 108.8 | <input type="checkbox"/> 83.8 | <input type="checkbox"/> 78.8 | 1.0 |
| Laser Temperature(°C) | 33.5 | <input type="checkbox"/> 60.0 | <input type="checkbox"/> 40.0 | <input type="checkbox"/> 15.0 | <input type="checkbox"/> -15.0 | 5.0 |
| Laser Bias Current(mA) | 79 | <input type="checkbox"/> 120 | <input type="checkbox"/> 110 | <input type="checkbox"/> 20 | <input type="checkbox"/> 15 | 2 |
| Laser Output Power(dBm) | 10.2 | <input checked="" type="checkbox"/> 14.0 | <input checked="" type="checkbox"/> 11.0 | <input checked="" type="checkbox"/> 5.0 | <input checked="" type="checkbox"/> 2.0 | 0.5 |

In the RF configuration screen RF levels, Automatic level control and alarm management options become available. For proper RF settings some sample calculations will be performed to explain how to set up the transmitter for different RF channel loads. After evaluating and calculating several channel load options, the actual RF setup of the transmitter will be explained.

6.1.1 Determine RF power to RF input port.

In order to set up the port configuration for the FT5S transmitter, first the proper RF level to be applied to the transmitter needs to be determined. The factory default RF load is listed below

- Number of analogue RF channels = 80
- RF level for 80 ch = 15dBmV
- This ensures 4% OMI per channel

The channel load as listed above is the reference RF load for the FT5S transmitter. Any deviation from this RF load, new RF levels will be calculated based on 80 analogue channels at a RF input level at the transmitter of 15dBmV.

To recalculate the RF input level following formula can be used.

$$\text{PEAK analogue RF input} = 34 - 10\text{LOG}(\text{Na})$$

(Na) = number of channels to be applied to the transmitter

Example 1

Sample 1 is a check to verify the RF calculation formula. The standard channel load will be used to determine the correct RF input at the transmitter for 80 channels.

Channel load is 80 analogue channels

Peak analogue input = $34 - 10\text{LOG}(80)$

Peak analogue input = $34 - 19$

Peak analogue input = **15dBmV**

The calculated RF level is 15dBmV as specified in the data sheet. 2 more sample RF loads will be highlighted, a set up for 42 analogue RF channels (Cenelec) and a RF load consisting of a mix of analogue and QAM RF channels.

The given examples will allow to re-calculate any RF load to be connected to the FT5S transmitter

Example 2

Channel load = 42 analogue channels

Peak analogue input = 34 - 10LOG (42)

Peak analogue input = 34 - 16.2

Peak analogue input = **17.8dBmV**

To calculate the OMI for analogue channels, following formula can be used;

$$\text{OMI per analogue channel} = ((\text{OMI}^{80} \times (\sqrt{\text{NA}^{80}/2})) \times (\sqrt{2/\text{NA}^{\text{new}}}))$$

OMI^{80} = omi for 80 channels (4%)

NA^{80} = Channel load 80 channels (factory std)

NA^{new} = Actual channel load at transmitter

In this example when applying a channel load (42 channels) at the transmitter at 17.8dBmV the OMI per channel is:

$$\text{OMI per analogue channel} = (\text{OMI}^{80} \times (\sqrt{\text{NA}^{80}/2})) \times (\sqrt{2/\text{NA}^{\text{new}}})$$

$$\text{OMI per analogue channel} = (0.04 \times (\sqrt{80/2})) \times (\sqrt{2/42})$$

$$\text{OMI per analogue channel} = 0.04 \times 6.32 \times 0.218$$

$$\text{OMI per analogue channel} = 0.0552 = \mathbf{5.52\%}$$

Example 3

This example will include a mix of analogue and QAM RF channels.

Sample channel load:

Analogue channels = 50

QAM64 channels = 13 at -10dB back off

QAM256 channels = 15 at -6dB back off

First step is to determine total RF power of the suggested channel load. This will require the QAM RF channels to be calculated to analogue equivalent RF power. As the QAM RF channels operate -6dB and -10dB below the analogue RF channels, the RF power of the QAM channels is significant less RF power compared to analogue channels.

Rule of thumb,

- 10 x QAM operating at -10dB from analogue channels equals same RF power of 1 x Analogue RF channel

Formula for calculating QAM RF to equivalent analogue RF power.

$$\text{QAM RF equivalent power} = (Nd) \times 10^{-(\text{back off} / 10)}$$

(Nd) = Number of QAM RF channels

Back off = RF delta between Analogue RF and QAM RF

Typically QAM64 operates at 10dB below analogue RF, QAM256 operates 6dB below analogue RF.

Calculating total RF power

13 x QAM64 at -10dB

$$\text{QAM RF equivalent power} = (Nd) \times 10^{-(\text{back off} / 10)}$$

$$\text{QAM RF equivalent power} = (13) \times 10^{-(10 / 10)}$$

$$\text{QAM RF equivalent power} = (13) \times 0.1$$

$$\text{QAM RF equivalent power} = 1.3 \times \text{analogue channel}$$

15 x QAM256 at -6dB

$$\text{QAM RF equivalent power} = (Nd) \times 10^{-(\text{back off} / 10)}$$

$$\text{QAM RF equivalent power} = (15) \times 10^{-(6 / 10)}$$

$$\text{QAM RF equivalent power} = (15) \times 0.25$$

$$\text{QAM RF equivalent power} = 3.8 \times \text{analogue channel}$$

Total RF power

$$50 \text{ channels analogue} = 50 \text{ analogue equivalent}$$

$$13 \times \text{QAM @ -10dB} = 1.3 \text{ analogue equivalent}$$

$$15 \times \text{QAM256 @ -6dB} = 3.8 \text{ analogue equivalent}$$

Totals 55.1 analogue equivalent channels

RF level to be applied to the transmitter

Channel load = 55.1 analogue channels

$$\text{PEAK analogue RF input} = 34 - 10\text{LOG}(\text{Na})$$

(Na) = number of channels to be applied to the transmitter

$$\text{Peak analogue input} = 34 - 10\text{LOG}(55.1)$$

$$\text{Peak analogue input} = 34 - 17.4$$

$$\text{Peak analogue input} = 16.6\text{dBmV}$$

To calculate OMI for 55.1 analogue channels

In this example when applying a channel (55.1 channels) load at the transmitter at 17.8dBmV the OMI per channel is:

$$\text{OMI per analogue channel} = ((\text{OMI}^{80} \times (\sqrt{\text{Na}^{80}/2})) \times (\sqrt{2/\text{Na}^{\text{new}}}))$$

OMI^{80} = OMI for 80 channels (4%)

NA^{80} = Channel load 80 channel (factory std)

NA^{new} = Actual channel load at transmitter = 55.1 channels

$$\text{OMI per analogue channel} = (\text{OMI}^{80} \times (\sqrt{\text{Na}^{80}/2})) \times (\sqrt{2/\text{Na}^{\text{new}}})$$

$$\text{OMI per analogue channel} = (0.04 \times (\sqrt{80/2})) \times (\sqrt{2/55.1})$$

$$\text{OMI per analogue channel} = 0.04 \times 6.32 \times 0.1905$$

$$\text{OMI per analogue channel} = 0.0481 = 4.81\%$$

6.2 Applying RF settings to FT5S transmitter MGC mode

Load the “port” setting web page of the FT5S module (see chapter 6.1 for details)

6.2.1 Sample RF load 80 channels analogue RF load

Connect RF to the BC input of the FT5S transmitter. If the BC port is not used it is advised to terminate the NC port with a 75 Ohm terminator.

Option 1

Connect RF load to the transmitter at a level of 15dBmV (80 channels analogue) See sample calculation for calculated RF input level (chapter 6.1.1. Sample 1)

1. Set “Input AGC Mode” to OFF and click submit to apply the setting
2. Set field “Broadcast MGC” to 0 and click submit to apply the setting

Option 2

Connect RF load to transmitter at a level (for example) 10dBmV.

1. Set "Input AGC Mode" to OFF and click submit to apply the setting
2. Set field "Broadcast MGC" to $15\text{dBmV} - 10\text{dBmV} = 5$ and click submit to apply the setting

6.2.2 Sample RF load 42 channels analogue RF load

Connect RF to the BC input of the FT5S transmitter. If the BC port is not used it is advised to terminate the NC port with a 75 Ohm terminator.

Option 1

Connect RF load to the transmitter at a level of 17.8 dBmV (42channels analogue) See sample calculation for calculated RF input level (chapter 6.1.1. Sample 2)

3. Set "Input AGC Mode" to OFF and click submit to apply the setting
4. Set field "Broadcast MGC" to 0 and click submit to apply the setting

Option 2

Connect RF load to transmitter at a level (for example) 20dBmV.

3. Set “Input AGC Mode” to OFF and click submit to apply the setting
4. Set field “Broadcast MGC” to $17.8\text{dBmV} - 20\text{dBmV} = -2.2$ and click submit to apply the setting

6.2.3 Sample RF load 50 analogue + 13xQAM64 and 15xQAm256

Connect RF to the BC input of the FT5S transmitter. If the BC port is not used it is advised to terminate the NC port with a 75 Ohm terminator.

Option 1

Connect RF to the BC input of the FT5S transmitter. If the BC port is not used it is advised to terminate the NC port with a 75 Ohm terminator.

5. Set "Input AGC Mode" to OFF and click submit to apply the setting
6. Set field "Broadcast MGC" to 0 and click submit to apply the setting

Option 2

Connect RF load to transmitter at a level (for example) 15dBmV.

5. Set "Input AGC Mode" to OFF and click submit to apply the setting
6. Set field "Broadcast MGC" to $16.6\text{dBmV} - 15\text{dBmV} = 1.6$ and click submit to apply the setting

6.3 Applying RF settings to FT5S transmitter AGC mode

Load the “port” setting web page of the FT5S module (see chapter 6.1 for details)

6.3.1 Sample RF load 80 channels analogue RF load

Connect RF to the BC input of the FT5S transmitter. If the BC port is not used it is advised to terminate the NC port with a 75 Ohm terminator.

Connect RF load to the transmitter at a level of $15\text{dBmV} \pm 3\text{dB}$ (80 channels analogue) See sample calculation for calculated RF input level (chapter 6.1.1. Sample 1)

1. Set “Input AGC Mode” to ON and click submit to apply the setting

6.3.2 Sample RF load 42 channels analogue RF load

Connect RF to the BC input of the FT5S transmitter. If the BC port is not used it is advised to terminate the NC port with a 75 Ohm terminator.

Connect RF load to the transmitter at a level of $17.8\text{ dBmV} \pm 3\text{dB}$ (42channels analogue) See sample calculation for calculated RF input level (chapter 6.1.1. Sample 2)

1. Set “Input AGC Mode” to ON and click submit to apply the setting

6.3.3 Sample RF load 50 analogue + 13xQAM64 and 15xQAM256

Connect RF to the BC input of the FT5S transmitter. If the BC port is not used it is advised to terminate the NC port with a 75 Ohm terminator.

Connect RF load to the transmitter at a level of $16.6\text{ dBmV} \pm 3\text{dB}$ (50 x analogue + 13 x QAM64 and 15 x QAM256) See sample calculation for calculated RF input level (chapter 6.1.1. Sample 3)

1. Set "Input AGC Mode" to ON and click submit to apply the setting

6.4 Setup using separate BC and NC RF input in MGC mode

Since no QAM RF signals are used in sample calculation 1 or 2, this setup will use sample calculation 3. For the exact RF calculation please refer to Chapter 6.1.1 sample calculation 3.

Sample calculation 3 details:

| | |
|-----------------------|-----------------------------------|
| <u>Total RF power</u> | |
| 50 channels analogue | = 50 analogue equivalent |
| 13 x QAM @ -10dB | = 1.3 analogue equivalent |
| 15 x QAM256 @ -6dB | = 3.8 analogue equivalent |
| ----- + | |
| Totals | 55.1 analogue equivalent channels |

6.4.1 RF transmitter setup using both BC and NC RF input

Option 1

Connect broadcast analogue RF load to the BC port of the transmitter at a level of 16.6 dBmV (50 x analogue). See sample calculation for calculated RF input level (chapter 6.1.1. Sample 3)

Broadcast port setup

1. Set "Input AGC Mode" to OFF and click submit to apply the setting
2. Set field "Broadcast MGC" to 0 and click submit to apply the setting
3. Apply the channel load of the 50 channels analogue RF load with a level of 16.6dBmV to the transmitter.
4. Click apply to store setting at the transmitter

Narrowcast port setup

1. Apply the QAM RF load to the NC input of the transmitter.
2. Apply the RF level of the QAM RF load to the NC port at 16.6dBmV
3. With equal RF input at the transmitter at the BC and NC port, the transmitter will automatically introduce a back off of 0dB. Set the Narrowcast MGC to -6dB to create the 6dB RF back off between BC RF load and NC RF load.
4. Hit apply button to store transmitter settings.

Option 2

Broadcast port setup

1. Set "Input AGC Mode" to OFF and click submit to apply the setting
2. Apply the channel load of the 50 channels analogue RF load with a level of 15dBmVdBmV to the transmitter
3. Set the Broadcast MGC setting to 16.6dBmV - 15dBmV = **1.6dB**. Click apply to store setting at the transmitter

Narrow cast port setup

1. Apply the QAM RF load to the NC input of the transmitter at 15dBmV
2. Set NC MGC back off to -6dB by subtracting 6dB from the BC MGC setting (1.6dB) $1.6 - 6 = -4.4\text{dB}$
3. Set Narrowcast MGC to **-4.4dB**
4. Hit apply button to store setting into the transmitter.

6.5 Setup using separate BC and NC RF input in AGC mode

Since no QAM RF signals are used in sample calculation 1 or 2, this setup will use sample calculation 3. For the exact RF calculation please refer to Chapter 6.1.1 sample calculation 3.

Sample calculation 3 details:

Total RF power

| | | |
|--|---------------------------|---|
| 50 channels analogue | = 50 analogue equivalent | |
| 13 x QAM @ -10dB | = 1.3 analogue equivalent | |
| 15 x QAM256 @ -6dB | = 3.8 analogue equivalent | |
| | | + |
| Totals 55.1 analogue equivalent channels | | |

6.5.1 RF transmitter setup using both BC and NC RF input

Option 1

Connect broadcast RF load to the BC port of the transmitter at a level of 16.6 dBmV \pm 3dB (50 x analogue) See sample calculation for calculated RF input level (chapter 6.1.1. Sample 3)

Broadcast port setup

1. Set "Input AGC Mode" to OFF and click submit to apply the setting
2. Set field "Broadcast MGC" to 0 and click submit to apply the setting
3. Apply the channel load of the 50 channels analogue RF load with a level of 16.6dBmV to the transmitter.
4. Click apply to store setting at the transmitter

Narrow cast port setup

1. Connect the QAM RF load to the NC input of the transmitter.
2. Apply The RF level of the QAM RF load to the NC port at 16.6dBmV
3. With equal RF input at the transmitter at the BC and NC port, the transmitter will automatically introduce a back off of 0dB. Set the Narrowcast MGC to -6dB to create the 6dB RF back off between BC RF lead and NC RF load.
4. Hit apply button to store transmitter settings.

Enabling AGC mode

1. Set "Input AGC mode" from Off to ON
2. Hit apply to store the settings to the transmitter.

Note:

When applying the analogue RF at 16.6dBmV, at this RF level, the AGC circuit will operate exactly in the middle of the AGC dynamic range. This means that RF variations of 16.6dBmV +3dB or -3dB will be compensated.

6.6 Alarms Monitoring

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

6.6.1 Alarm Status Pages

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

The status has three conditions:

- Normal: Green Light
- Minor Alarm: Orange Light
- Major Alarm: Red Light

| System | Modules | Alarms | Logs | Upgrade |
|--------------------|--------------------|--------|-------------|---------|
| All Modules | | | | |
| 0 | ASMM-A | 0 | ASMM-A | ● |
| 1 | FPAS 77CH analog | 1 | FPAS-S | ● |
| 2 | FPAS 歌华 signal | 2 | FPAS-S | ● |
| 3 | FPAS QAM signal | 3 | FPAS-S | ● |
| 4 | RFSW A-77CH B 歌华 | 4 | RFSW | ● |
| 5 | RFSW A-2.0 B-3.0 | 5 | RFSW | ● |
| 6 | FT3S-D-10 | 6 | FT3S-D-10 | ● |
| 7 | FT5S-D-10 | 7 | FT5S-D-10 | ● |
| 8 | EDFA-1-15-G | 8 | EDFA-1-15-G | ● |
| 9 | OPSW | 9 | OPSW | ● |
| 10 | RRAS-Q 2-2.0 3-3.0 | 10 | RRAS-Q | ● |
| 11 | RT5S-D 1-2.0 2-3.0 | 11 | RT5S-D-10 | ● |
| 12 | RPAS-D 1-2.0 2-3.0 | 12 | RPAS-D | ● |
| 13 | RRAS-Q 2-2.0 3-3.0 | 13 | RRAS-Q | ● |
| 14 | FRAS-S | 14 | FRAS-S | ● |
| 15 | RFSW | 15 | RFSW | ● |
| 16 | FT5E-S-10 | 16 | FT5E-S-10 | ● |
| PS1 | | | -- | -- |
| PS2 | | | PS | ● |
| FAN | | | FAN-A | ● |

Figure 6-6

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 FT5S, 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 Light
- Minor Alarm: Orange Light
- Major Alarm: Red Light

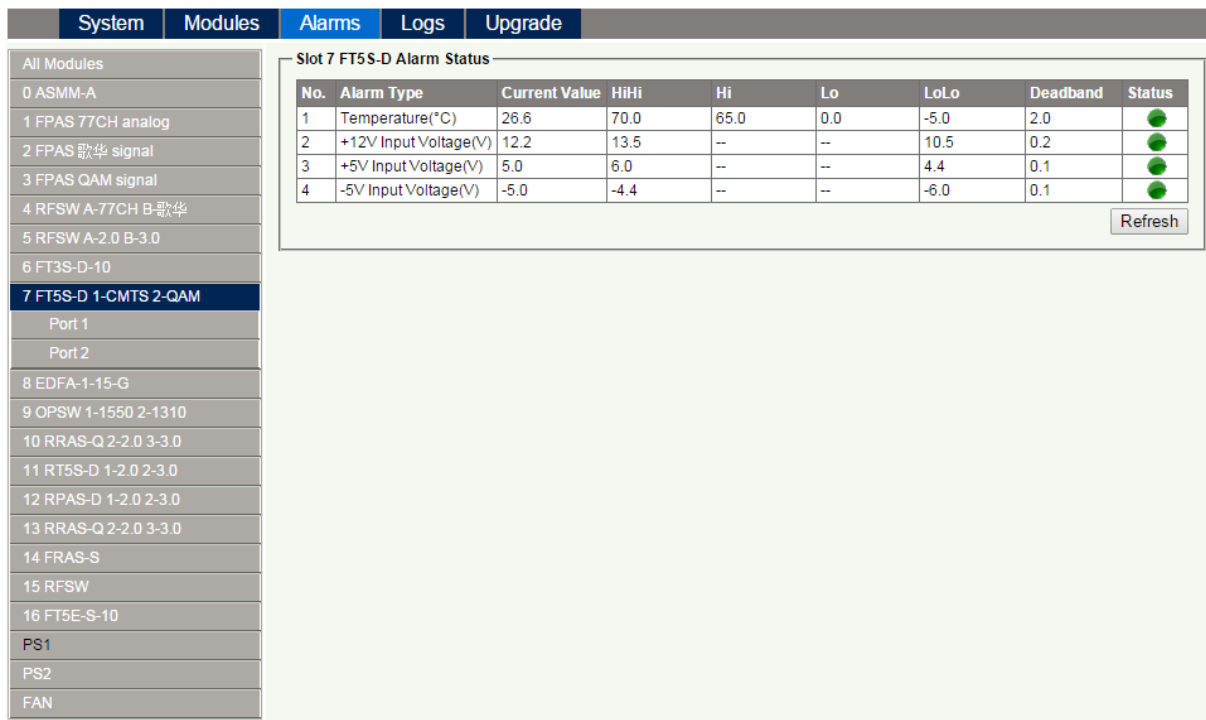


Figure 6-7

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

Module Port Alarms

Click on Module **Port**, as shown in **Figure 6-8**, here the operator can view the Input Total Power, Laser preceding stage Power and Laser bias voltage alarms status, etc.:

Status has three conditions:

- Normal: Green Light
- Minor Alarm: Orange Light
- Major Alarm: Red Light

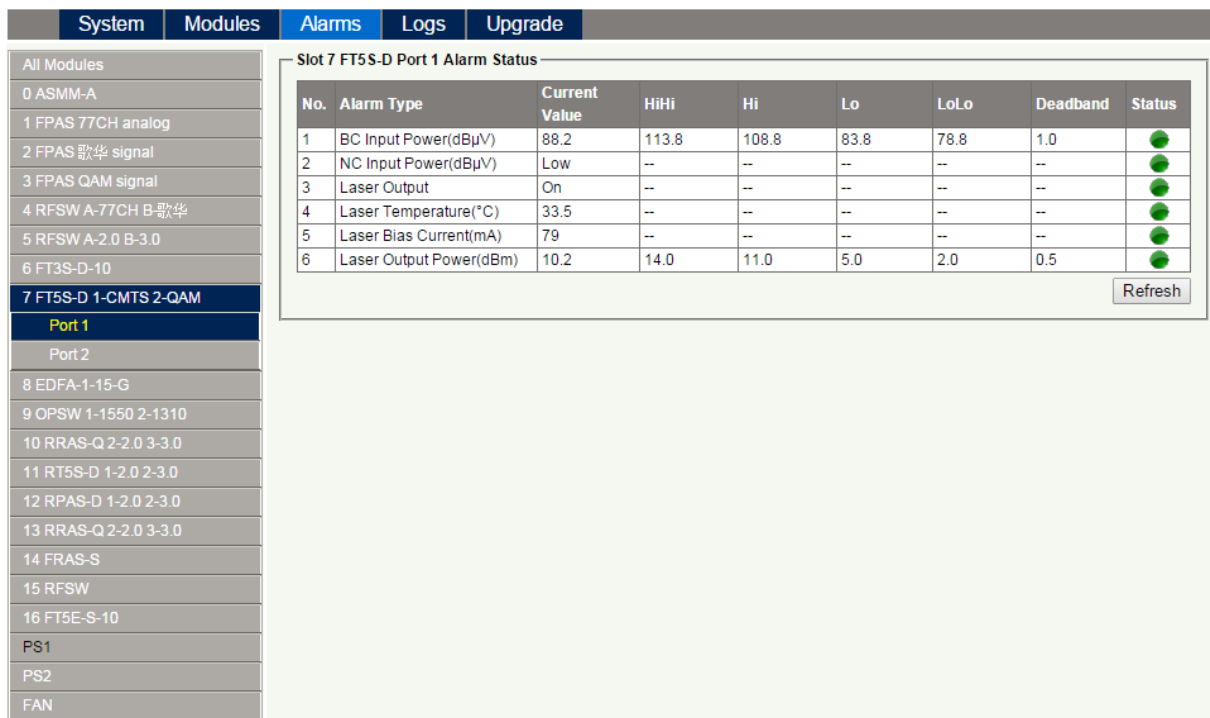


Figure 6-8

6.6.2 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, temperature, +12 V, +5 V, - 5V voltage alarms are all set to ON. The check box as shown in **Figure 6-9** controls the detection is set to ON or OFF. When the check box is checked (detection ON), the text in the text box will be solid black. When the check box is NOT checked, (detection OFF), the text in the text box will be light grey and cannot be changed. The parameters instruction is shown in **Figure 6-9, Table 6-4** below.

The screenshot shows the 'Alarms' configuration page for the selected module. It is divided into four main sections:

- Module Information:** Displays Model (A-FT5S-D-10-2527-S-1G), Serial No. (14024144), HW Assembly No. (A05144_0a), FW Part No. (S08866), and FW Version (V01.00.05). A 'Refresh' button is present.
- Configuration:** Includes 'Alarm Control' set to 'Enable', 'Tx Unit Control' set to 'On', and 'Module Alias' set to 'FT5S-D 1-CMSTS 2-QAM'. A 'Submit' button is at the bottom right.
- Alarm Settings:** A table with columns: Parameter, Current Value, HiHi, Hi, Lo, LoLo, and Deadband.

| Parameter | Current Value | HiHi | Hi | Lo | LoLo | Deadband |
|-----------------------|---------------|--|--|---|--|----------|
| Temperature(°C) | 26.6 | <input checked="" type="checkbox"/> 70.0 | <input checked="" type="checkbox"/> 65.0 | <input checked="" type="checkbox"/> 0.0 | <input checked="" type="checkbox"/> -5.0 | 2.0 |
| +12V Input Voltage(V) | 12.2 | <input checked="" type="checkbox"/> 13.5 | -- | -- | <input checked="" type="checkbox"/> 10.5 | 0.2 |
| +5V Input Voltage(V) | 5.0 | <input checked="" type="checkbox"/> 6.0 | -- | -- | <input checked="" type="checkbox"/> 4.4 | 0.1 |
| -5V Input Voltage(V) | -5.0 | <input checked="" type="checkbox"/> -4.4 | -- | -- | <input checked="" type="checkbox"/> -6.0 | 0.1 |

 A 'Submit' button is at the bottom right of this section.
- Commands:** Includes 'Factory Defaults' and 'Reboot' buttons, both with 'Apply' sub-buttons. Red warning text is displayed next to each:
 - Factory Defaults: Warning: Applying factory defaults will erase all configuration and restore factory defaults. The module will reboot after applying default values.
 - Reboot: Warning: Rebooting the module will take approx. 20 seconds.

Figure 6-9

Table 6-4 Modules Page Alarms Threshold Parameters Instruction

| Parameters | Critical High | Warning High | Normal | Warning Low | Critical Low | Dead Band | Factory Default | Detection Range |
|------------------------|---------------|--------------|--------|-------------|--------------|-----------|-----------------|-----------------|
| Temperature (°C) | 70.0 | 65.0 | 28.0 | 0.0 | -5.0 | 2.0 | ON | -40 ~ 120 |
| +12V Input Voltage (V) | 13.5 | | 12.0 | | 10.5 | 0.2 | ON | 0 ~ 15.5 |
| +5V Input Voltage (V) | 6.0 | | 5.0 | | 4.4 | 0.1 | ON | 0 ~ 6.6 |
| -5V Input Voltage (V) | -4.4 | | -5.0 | | -6.0 | 0.1 | ON | -6.6 ~ 0 |

Input/Output Status Monitoring

To setup Input/Output Status Monitoring, select the specific **Port** from the left menu, and the monitoring parameters are listed under Alarm Settings, click on to turn the items ON/OFF. The monitoring parameters can be changed by the customer. The page is shown in **Figure 6-10** below.

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

Port 1

Port 2

8 EDFA-1-15-G

9 OPSW 1-1550 2-1310

10 RRAS-Q 2-2.0 3-3.0

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

Port Information

Slot: 7 Module Type: FT5S-D Port: 1

Status

Laser Type: Cooled DFB Laser Wave Length: 1557.36nm Laser Output Status: On

Laser TEC Current: 83mA AGC Point: 0.0dB

Broadcast Input Power: 88.0dBμV Narrowcast Input Power: Low RF Composite Input Power: 107.2dBμV

Configuration

Laser Output Control: Modulation Mode:

Input AGC Mode: OMI Offset: (-3.0-3.0)dB

Broadcast MGC: (-10.0-5.0)dB Narrowcast MGC: (-10.0-5.0)dB

Monitor BC or NC:

Alarm Settings

Laser Output Status Alarm:

| Parameter | Current Value | HiHi | Hi | Lo | LoLo | Deadband |
|-------------------------|---------------|---|---|--|--|----------|
| BC Input Power(dBμV) | 88.0 | <input checked="" type="checkbox"/> 113.8 | <input checked="" type="checkbox"/> 108.8 | <input checked="" type="checkbox"/> 83.8 | <input checked="" type="checkbox"/> 78.8 | 1.0 |
| NC Input Power(dBμV) | Low | <input type="checkbox"/> 113.8 | <input type="checkbox"/> 108.8 | <input type="checkbox"/> 83.8 | <input type="checkbox"/> 78.8 | 1.0 |
| Laser Temperature(°C) | 33.5 | <input type="checkbox"/> 60.0 | <input type="checkbox"/> 40.0 | <input type="checkbox"/> 15.0 | <input type="checkbox"/> -15.0 | 5.0 |
| Laser Bias Current(mA) | 79 | <input type="checkbox"/> 120 | <input type="checkbox"/> 110 | <input type="checkbox"/> 20 | <input type="checkbox"/> 15 | 2 |
| Laser Output Power(dBm) | 10.2 | <input checked="" type="checkbox"/> 14.0 | <input checked="" type="checkbox"/> 11.0 | <input checked="" type="checkbox"/> 5.0 | <input checked="" type="checkbox"/> 2.0 | 0.5 |

Figure 6-10

Module Alarm Indicator Definitions

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 | During Module Power ON | All | Green (2times/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 | Orange |
| BC Critical High (BC-Major-ALM) | BC Level High | | STAT BC | Red |
| BC Warning High (BC-Minor-ALM) | BC Level Low | | STAT BC | Orange |
| NC Critical High (NC-Critical-ALM) | NC Level High (NC set Enable) | | STAT NC | Red |
| NC Warning High (NC-Minor-ALM) | NC Level Low (NC set Enable) | | STAT NC | Orange |
| AGC/MGC | AGC/MGC Mode Control | AGC/MGC Mode Control | MODE | MGC Blinking (1 times/sec), AGC Green always |
| Laser-Critical-ALM | Laser preceding stage Gain High | Laser Current High | STAT LSR | Red |
| Laser-Warning-ALM | Laser preceding stage Gain Low | Laser Current Low | STAT LSR | Orange |
| Laser-Shutdown | Laser-Shutdown | Laser-Shutdown | LSR | Red |

6.7 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. Refer to **Figure 6-11** below:

| System | Modules | Alarms | Logs | Upgrade | | | |
|--|---------|--------|----------------|-------------|---------|---------------------|----------------------------|
| All Logs | | | | | | | |
| No. | Slot | Port | Type | Alarm Value | State | Time | Content |
| 1 | 7 | 2 | RF Input Power | 89.9dBμV | Normal | 2016-05-17 14:17:14 | BC Input Power Alarm |
| 2 | 7 | 1 | RF Input Power | 87.6dBμV | Normal | 2016-05-17 14:17:14 | BC Input Power Alarm |
| 3 | 6 | 2 | RF Input Power | 88.2dBμV | Normal | 2016-05-17 14:17:13 | BC Input Power Alarm |
| 4 | 6 | 1 | RF Input Power | 88.1dBμV | Normal | 2016-05-17 14:17:13 | BC Input Power Alarm |
| 5 | 14 | 1 | Output Power | 112.8dBμV | Normal | 2016-05-17 14:17:07 | RF Output Power Alarm |
| 6 | 14 | 1 | Output Power | 99.0dBμV | LoLo | 2016-05-16 14:26:19 | RF Output Power Alarm |
| 7 | 14 | -- | Module Status | FRAS-S | Normal | 2016-05-16 14:26:19 | FRAS-S is inserted in sync |
| 8 | 14 | -- | Module Status | FRAS-S | Warning | 2016-05-16 14:26:15 | FRAS-S is discovering |
| Total Pages: 1 Current Page: 1 First Page Page Up Page Down Last Page Goto: <input type="text" value="1"/> <input type="button" value="Delete All"/> | | | | | | | |

Figure 6-11

6.8 Device Upgrade

The Module supports firmware upgrade function.

Via the following **Figure 6-12** screen, upload the local upgrade 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.

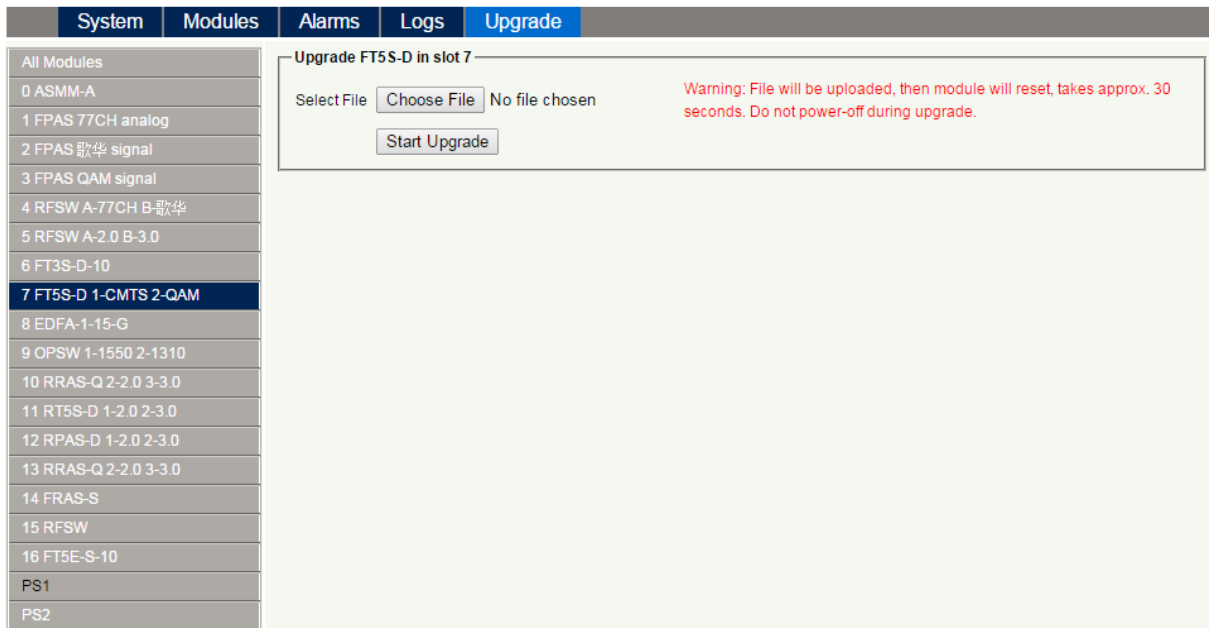


Figure 6-12

*The upgrade file needs to be located in the PC that is connecting to ASMM

*The Web GUI above only supports the manual operation from a local PC.

*The FT5S supports automated firmware updates and automatic backup & restore features via TFTP when managed via Technetix NMSE management software. Please refer to the NMSE Product User Manual for more information.

6.9 Restoring Factory Defaults

Loading factory default can restore the device to the factory default setting.

Detailed operations:

Click Modules tab and click the module to be configured as the page shown in **Figure 6-1**. Click **Apply** button in Factory Default 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 6-1**.

| System | Modules | Alarms | Logs | Upgrade |
|-----------------------|---------|-------------|-----------------|-------------------------|
| All Modules | | | | |
| 0 ASMM-A | Slot 0 | ASMM-A | Hotswap Mode -- | Command -- |
| 1 FPAS 77CH analog | Slot 1 | FPAS-S | Manual ▼ | -- view |
| 2 FPAS 歌华 signal | Slot 2 | FPAS-S | Manual ▼ | -- view |
| 3 FPAS QAM signal | Slot 3 | FPAS-S | Manual ▼ | -- view |
| 4 RFSW A-77CH B 歌华 | Slot 4 | RFSW | Manual ▼ | -- view |
| 5 RFSW A-2.0 B-3.0 | Slot 5 | RFSW | Manual ▼ | -- view |
| 6 FT3S-D-10 | Slot 6 | FT3S-D-10 | Manual ▼ | -- view |
| 7 FT5S-D-10 | Slot 7 | FT5S-D-10 | Manual ▼ | -- view |
| 8 EDFA-1-15-G | Slot 8 | EDFA-1-15-G | Manual ▼ | -- view |
| 9 OPSW 1-1550 2-1310 | Slot 9 | OPSW | Manual ▼ | -- view |
| 10 RRAS-Q 2-2.0 3-3.0 | Slot 10 | RRAS-Q | Manual ▼ | -- view |
| 11 RT5S-D 1-2.0 2-3.0 | Slot 11 | RT5S-D-10 | Manual ▼ | -- view |
| 12 RPAS-D 1-2.0 2-3.0 | Slot 12 | RPAS-D | Manual ▼ | -- view |
| 13 RRAS-Q 2-2.0 3-3.0 | Slot 13 | RRAS-Q | Manual ▼ | -- view |
| 14 FRAS-S | Slot 14 | FRAS-S | Manual ▼ | -- view |
| 15 RFSW | Slot 15 | RFSW | Manual ▼ | -- view |
| 16 FT5E-S-10 | Slot 16 | FT5E-S-10 | Manual ▼ | -- view |
| PS1 | PS1 | PS | Manual ▼ | -- view |
| PS2 | PS2 | PS | Manual ▼ | -- view |
| FAN | FAN | FAN-A | -- | -- view |

Note: Auto Download automatically downloads the last known configuration stored in the ASMM to the application module

Auto Upload automatically uploads the configuration from the application module to the ASMM database

Note:

All the powers displayed on the webpage are total power.

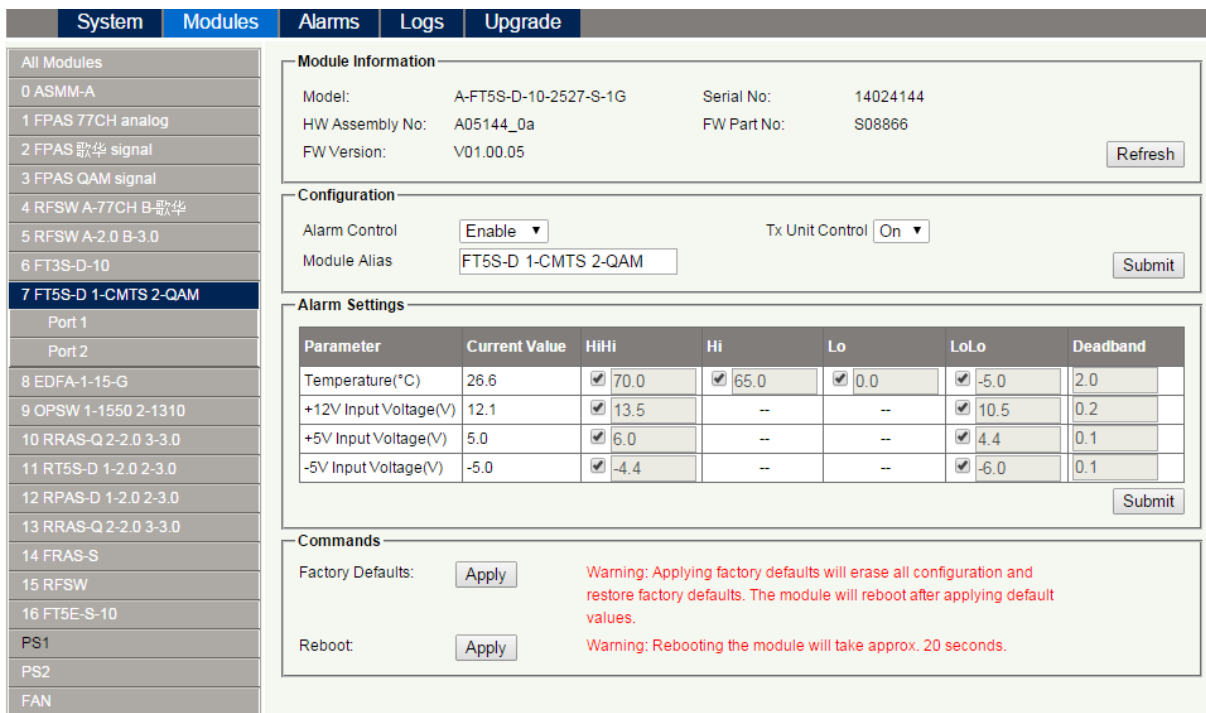


Figure 6-1

Table 6-1 Factory default and upgrade configuration parameters table

| Parameters | Configuration | Factory default value | After software upgrade |
|----------------------|---------------|-----------------------|------------------------|
| Alarm Control | ON/OFF | ON | ON |
| TxUnitControl | ON/OFF | ON | OFF |
| AGC Mode | ON/OFF | OFF | OFF |
| Broadcast MGC (dB) | -10 ~ +5 | 0 | Retention |
| Narrowcast MGC (dB) | -15 ~ 0 | 0 | Retention |
| Laser Output Control | ON/OFF | ON | OFF |

6.10 Reboot

The module can be made to reboot remotely, shown in **Figure 6-2** below.

Detailed operations:

Click Modules tab, click the corresponding FT5S module, 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.

| System | Modules | Alarms | Logs | Upgrade | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---------------|--|--|---|--|---------------|------|----|----|------|----------|-----------------|------|--|--|---|--|-----|-----------------------|------|--|----|----|--|-----|----------------------|-----|---|----|----|---|-----|----------------------|------|--|----|----|--|-----|
| <div style="display: flex;"> <div style="width: 20%; border-right: 1px solid #ccc; padding-right: 5px;"> <p>All Modules</p> <p>0 ASMM-A</p> <p>1 FPAS 77CH analog</p> <p>2 FPAS 歌华 signal</p> <p>3 FPAS QAM signal</p> <p>4 RFSW A-77CH B 歌华</p> <p>5 RFSW A-2.0 B-3.0</p> <p>6 FT3S-D-10</p> <p style="background-color: #0056b3; color: white; padding: 2px;">7 FT5S-D 1-CMTS 2-QAM</p> <p>Port 1</p> <p>Port 2</p> <p>8 EDFFA-1-15-G</p> <p>9 OPSW 1-1550 2-1310</p> <p>10 RRAS-Q 2-2.0 3-3.0</p> <p>11 RT5S-D 1-2.0 2-3.0</p> <p>12 RPAS-D 1-2.0 2-3.0</p> <p>13 RRAS-Q 2-2.0 3-3.0</p> <p>14 FRAS-S</p> <p>15 RFSW</p> <p>16 FT5E-S-10</p> <p>PS1</p> <p>PS2</p> <p>FAN</p> </div> <div style="width: 80%; padding-left: 5px;"> <div style="border: 1px solid #ccc; padding: 5px;"> <p>Module Information</p> <p>Model: A-FT5S-D-10-2527-S-1G Serial No: 14024144</p> <p>HW Assembly No: A05144_0a FW Part No: S08866</p> <p>FW Version: V01.00.05 Refresh</p> </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> <p>Configuration</p> <p>Alarm Control: Enable Tx Unit Control: On</p> <p>Module Alias: FT5S-D 1-CMTS 2-QAM Submit</p> </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> <p>Alarm Settings</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Parameter</th> <th>Current Value</th> <th>HiHi</th> <th>Hi</th> <th>Lo</th> <th>LoLo</th> <th>Deadband</th> </tr> </thead> <tbody> <tr> <td>Temperature(°C)</td> <td>26.6</td> <td><input checked="" type="checkbox"/> 70.0</td> <td><input checked="" type="checkbox"/> 65.0</td> <td><input checked="" type="checkbox"/> 0.0</td> <td><input checked="" type="checkbox"/> -5.0</td> <td>2.0</td> </tr> <tr> <td>+12V Input Voltage(V)</td> <td>12.1</td> <td><input checked="" type="checkbox"/> 13.5</td> <td>--</td> <td>--</td> <td><input checked="" type="checkbox"/> 10.5</td> <td>0.2</td> </tr> <tr> <td>+5V Input Voltage(V)</td> <td>5.0</td> <td><input checked="" type="checkbox"/> 6.0</td> <td>--</td> <td>--</td> <td><input checked="" type="checkbox"/> 4.4</td> <td>0.1</td> </tr> <tr> <td>-5V Input Voltage(V)</td> <td>-5.0</td> <td><input checked="" type="checkbox"/> -4.4</td> <td>--</td> <td>--</td> <td><input checked="" type="checkbox"/> -6.0</td> <td>0.1</td> </tr> </tbody> </table> <p style="text-align: right;">Submit</p> </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> <p>Commands</p> <p>Factory Defaults: Apply Warning: Applying factory defaults will erase all configuration and restore factory defaults. The module will reboot after applying default values.</p> <p>Reboot: Apply Warning: Rebooting the module will take approx. 20 seconds.</p> </div> </div> </div> | | | | | Parameter | Current Value | HiHi | Hi | Lo | LoLo | Deadband | Temperature(°C) | 26.6 | <input checked="" type="checkbox"/> 70.0 | <input checked="" type="checkbox"/> 65.0 | <input checked="" type="checkbox"/> 0.0 | <input checked="" type="checkbox"/> -5.0 | 2.0 | +12V Input Voltage(V) | 12.1 | <input checked="" type="checkbox"/> 13.5 | -- | -- | <input checked="" type="checkbox"/> 10.5 | 0.2 | +5V Input Voltage(V) | 5.0 | <input checked="" type="checkbox"/> 6.0 | -- | -- | <input checked="" type="checkbox"/> 4.4 | 0.1 | -5V Input Voltage(V) | -5.0 | <input checked="" type="checkbox"/> -4.4 | -- | -- | <input checked="" type="checkbox"/> -6.0 | 0.1 |
| Parameter | Current Value | HiHi | Hi | Lo | LoLo | Deadband | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temperature(°C) | 26.6 | <input checked="" type="checkbox"/> 70.0 | <input checked="" type="checkbox"/> 65.0 | <input checked="" type="checkbox"/> 0.0 | <input checked="" type="checkbox"/> -5.0 | 2.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| +12V Input Voltage(V) | 12.1 | <input checked="" type="checkbox"/> 13.5 | -- | -- | <input checked="" type="checkbox"/> 10.5 | 0.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| +5V Input Voltage(V) | 5.0 | <input checked="" type="checkbox"/> 6.0 | -- | -- | <input checked="" type="checkbox"/> 4.4 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -5V Input Voltage(V) | -5.0 | <input checked="" type="checkbox"/> -4.4 | -- | -- | <input checked="" type="checkbox"/> -6.0 | 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Figure 6-2

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 | Troubleshooting |
|------------------------|---|--|
| BC status is orange | BC input signal is lower or higher. | Adjust input signal or adjust MGC to an appropriate value. |
| BC status is red | BC input signal is too high or no input. | Adjust input signal |
| STAT red | The output optical power is abnormal or bias current is abnormal. | Please contact Technetix technical support. |
| | Power failure | Please contact Technetix technical support. |
| | Operating environment temperature is too high. | Lower the room temperature. If the temperature is normal, please contact Technetix technical support. |

8 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

**Declares, that the product
Product Name:** FT5S - Optical Forward Transmitter 1510 nm Single Module

Conforms to the following standards:

Safety: EN 80083-1, EN 60950, IEC 950, AS/NZS 3260:1993,
EN-60825-1, IEC 825-1, AS/NZS 2211.1 Laser Safety

EMC: EN 50083-2, EN-55022:1994, IEC/CISPR 22:1993,
AS/NZS CISPR 22:2006

CATV/HFC: EN-50083

Appendix A: Default Alarm Limit Settings

| Parameter | Critical High | Warning High | Normal | Warning Low | Critical Low | Dead Band | Factory Default | Detection Range |
|------------------------|---------------|--------------|--------|-------------|--------------|-----------|-----------------|-----------------|
| Temperature | 70.0 | 65.0 | 28.0 | 0.0 | -5.0 | 2.0 | ON | -20 ~ 125 |
| +5V Input Voltage (V) | 5.7 | | 5.0 | | 4.6 | 0.1 | ON | 0 ~ 6.5 |
| +12V Input Voltage (V) | 13.2 | | 12.0 | | 10.8 | 0.1 | ON | 0 ~ 16 |

Appendix B: Factory Default Settings

| Parameters | Configuration | Factory default value | After software upgrade |
|--------------------------|---------------|-----------------------|------------------------|
| Alarm Detection Control | ON / OFF | ON | ON |
| Output Control | ON/OFF | ON | ON |
| Output Gain Type | MGC/OAGC/PAGC | MGC | MGC |
| Output RF Pad Level (dB) | 0 ~ 20 | 10 | 10 |
| Remote Node Control | ON/OFF | OFF | OFF |

