AIMA3000-FT5E 1550 NM FORWARD TRANSMITTER ENHANCED

Product User Manual

technetix

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Technetix Group Limited

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1 Manual Guide

1.1 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 only to Technetix's qualified service personnel.

Servicing and repairs:

DO NOT attempt to service this unit yourself. Refer all servicing needs to Technetix's 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.

1.2 Related Documentation

Documents listed below can be used in association with this manual:

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

1.3 Technical Support

If you need help in the process of setting up and maintaining an FT5E, 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 Introduction

2.1 Overview

The 1550 nm Forward Transmitter – Enhanced (FT5E) is designed to plug into the Technetix latest Advanced Intelligent Multi-services Access platform – the AIMA3000.

The FT5E supports DOCSIS 3.1 technical standards. It allows for broadcast and narrowcast dual RF inputs, providing individual amplifying and transmission gain configuration for each circuit. The module's operating wavelength conforms to ITU standards and works with the Erbium Doped Fibre Amplifier Modules (EDFA), satisfying a growing demand for multi-application modules. The module supports dual-channel configuration. It can be used in HFC 1550 nm optical transmission systems and effectively improves network performance.

The FT5E employs an advanced RF circuit design and a high-quality/low-chirp laser with stable optical modulation, ensuring high-performance optical output.

2.2 Product Key Features

- Plug-and-Play (PnP)
- High quality 1550 nm low-chirp analog DFB laser
- RF amplifier gain blocks with advanced GaAs technology
- Conforms to ITU wavelength DWDM standards
- Frequency response of 45 MHz to 1218 MHz for both broadcast and narrowcast applications
- 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
- Fully FCC, CE, and RCM compliant[1]

1. See Declaration of Conformity.

2.3 Specifications

Optical Performance

Optical wavelength	ITU channels 21 to 51
Optical outputs	2
Output power	8 dBm, 9 dBm, 10 dBm
Optical connector	SC/APC[1], FC/APC, LC/APC, E2000/APC
Laser RIN	< – 155 dB/Hz

RF Performance

RF bandwidth	45~1218 MHz
RF flatness	±0.75 dB
RF input level (BC)[2]	10 dBmV per channel (117 channel QAM256) 13 dBmV per channel (77 NTSC)
RF input level (NC)[2]	20 dBmV per channel (117 channel QAM256)
AGC range	±3 dB
Isolation between BC and NC inputs	>45 dB
RF impedance	75 Ω
RF input return loss	>16 dB
RF test point	– 20±1 dB
Transmitter isolation	>65 dB
RF input connector	4 GSK female (2 for NC and 2 for BC)
RF test points	Mini-SMB×4[3]
Alarms	Front-panel LEDs, SNMP Traps

Link Performance

	CNR	CSO	CTB	MER	BER
NTSC+QAM[4]	> 50 dB	> 55 dB	> 60 dB	> 39 dB	< 1E-9
QAM(20Km)[5]	-	-	-	> 41 dB	< 1E-9
QAM(40Km)[5]	-	-	-	> 39 dB	< 1E-9

1. Standard option. Contact a Technetix sales representative for availability of other options.
2. dBuV=60+dBmV.
3. Two ports for NC inputsand two for laser RF level.
4. CNR/CSO/CTB are tested with 77 NTSC CW channels (55.25MHz-547.25MHz). MER and BER are tested with 110 QAM256. All parameters are measured using a Technetix reference receiver, 10 km fibre, and 0 dBm input level.
5. MER and BER are tested with 117 QAM256 (ITU-TJ.83 Annex A). All parameters are measured using a Technetix reference receiver, 20/40 km fibre, and 0 dBm input level.

General

Power supply	Powered via AIMA3000 backplane
Power consumption	<19 W
Operating conditions	Temperature: -5~55 °C;
	Relative humidity: ≤90% (non-condensing)
Storage conditions	Temperature: -40~70 °C;
	Relative humidity: ≤90% (non-condensing)
Dimensions (W*D*H)	24.6×410×152.5 mm (W×D×H)
Weight	1 kg

2.4 Order Details

A-FT5E-[V]-[W]-[X]-[Y]-[Z] **AIMA3000 1550 nm Forward Transmitter - Enhanced**

Options:

V	**Optical ports**	
	D	Dual (2)
W	**Optical output power per port**	
	08	8 dBm (6.3 mw)
	09	9 dBm (8 mw)
	10	10 dBm (10 mw)
X	**Wavelength**	
	21	192.1 THz (1560.61 nm)
	22	192.2 THz (1559.79 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 (1549.32 nm)
Y	**Optical connector type**	
	S	SC / APC [2]
	L	LC/APC
	F	FC/APC
	E	E2000/APC
Z	**Bandwidth**	
	12	45-1218 MHz

1. Default spacing is 200 GHz. For other wavelength configurations not listed, please contact Technetix.
2. Standard option. Contact a Technetix sales representative for availability of other options.

3 Technical Description

3.1 Block Diagram

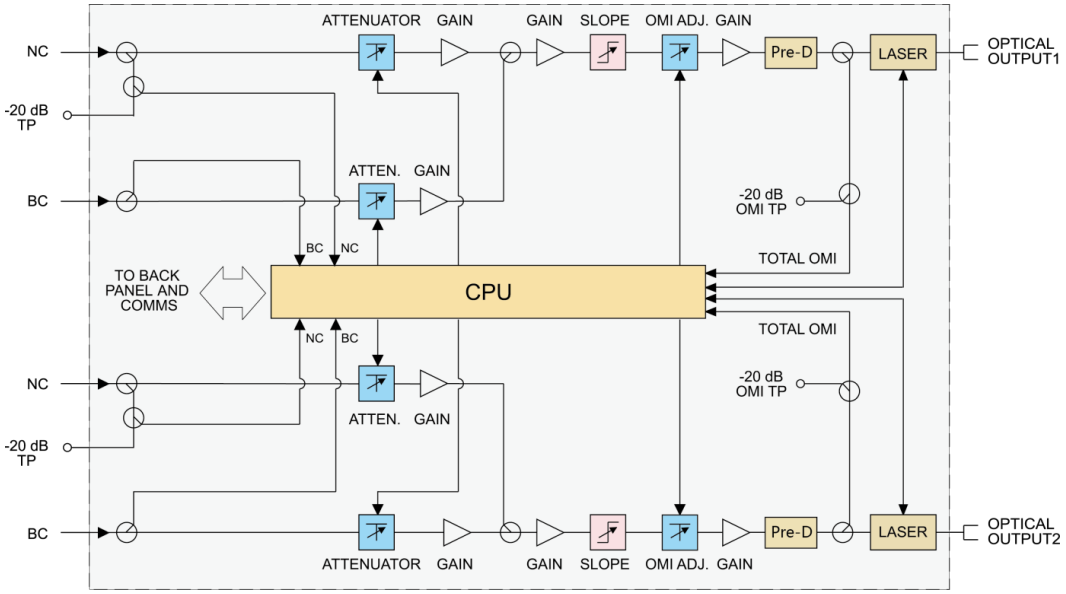

Figure 3-1 FT5E block diagram

Table 3-1 FT5E circuit components

Component	Description
NC	
-20 dB TP	
BC	
Attenuator/Atten	
Gain	
Slope	
-20dB OMI TP	
OMI ADJ.	
Pre-D	
Total OMI	
To back panel and comms	Connection chassis back panel (module power supply and communication interface)
CPU	Microprocessor
Laser	Laser
Optical output 1	Optical output port 1
Optical output 2	Optical output port 2

3.2 FT5E Module Structure

3.2.1 FT5E Module Appearance

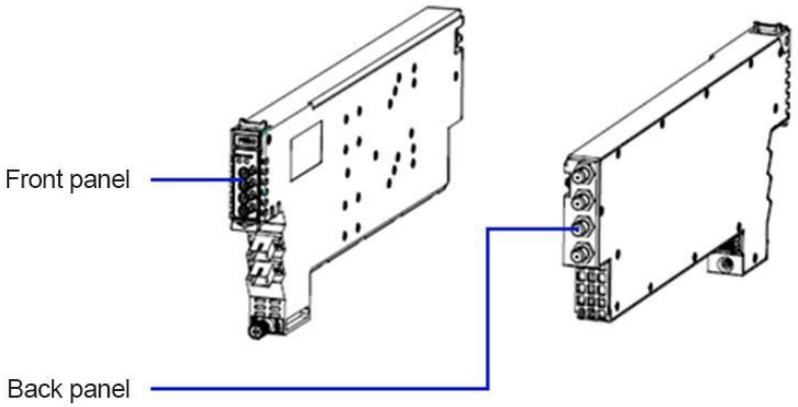

Figure 3-2 FT5E module

3.2.2 FT5E Module Front/Back Panel Layout

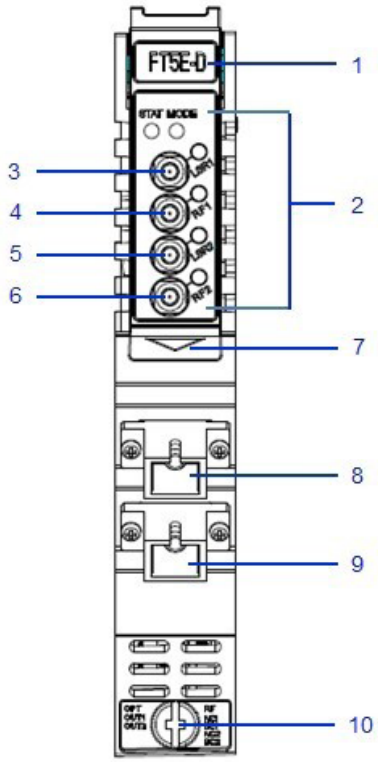

Figure 3-3 FT5E front panel layout

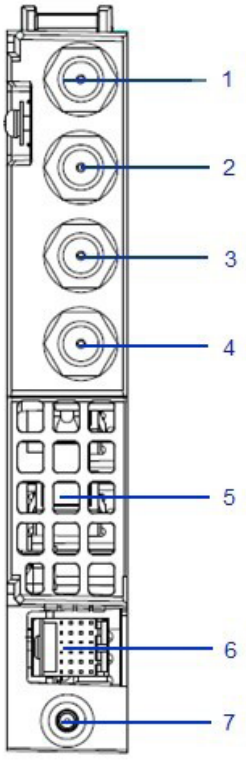

Figure 3-4 FT5E back panel layout

Table 3-2 FT5E front panel components

No.	Component	Description
1	Lever	
2	LED indicator	See Appendix A for more details about LED indicator lights
3	Channel 1 laser RF level test point	−20±1 dB
4	Channel 1 narrowcast intput test point	−20±1 dB
5	Channel 2 laser RF level test point	−20±1 dB
6	Channel 2 narrowcoast input test point	−20±1 dB
7	Button	
8	Optical output port 1	
9	Optical output port 2	
10	Fastening screw	

Table 3-3 FT5E back panel components

No.	Component	Description
1	Narrowcast input port 1	
2	Broadcast input port 1	
3	Narrowcast input port 2	
4	Broadcast input port 2	
5	Air vent	
6	Multi-pin port	Connection chassis back panel (module power)
7	Alignment pin	For easier positioning during module installation

WARNING!

When the FT5E is operating, the optical output port will produce non-visible laser radiation.

4 Installation

4.1 Packing List

On receiving your new FT5E, carefully unpack and examine the contents for damage or loss that may have occurred during shipping. If any items are missing or damaged, refer to the product warranty terms and contact Technetix. The FT5E package should consist of the following:

Table 4-1 FT5E packing list

Item	Qty
FT5E module	1
Factory inspection report	1

4.2 Packaging and Transportation

Keep all boxes and packaging provided for the FT5E for future transport.
Use only the original packaging for transporting the FT5E, as it has been specifically designed to protect this product.

4.3 Installation and Wiring

4.3.1 Installation

Conduct the following inspections after unpacking the FT5E:

- Check the FT5E module's multi-pin connectors for damage and deformation.
- Check whether the FT5E case is damaged and whether screws are loose, have fallen out, or are missing.
- Check whether the Technetix name plate on the module is intact and write down the module's model, serial number, and date of production.

If any issues arise during the inspection, please contact Technetix technical support. Install the FT5E into any application module slot in the chassis.[1]

1. See 'Technetix.AIMA3000 Product User Manual' for information about module installation.

4.3.2 FT5E Wiring

Before wiring, determine the FT5E RF input power based on the number of channels (broadcast or broadcast + narrowcast). Set the parameters for the 'AGC model,' 'BC MGC,' or 'NC MGC' in the AIMA3000 configuration system according to the actual input RF power, and set the parameters for the alarms.

See Chapter 5.1.2 for more information about parameters in the FT5E module port configuration interface.

a. Connect narrowcast and broadcast RF input cables to the narrowcast and broadcast input ports on the back panel of the FT5E, respectively.

b. Check whether the 'RF11' indicator light on the module's front panel is green. If it is green, proceed to the next step. If the 'RF1' indicator light is orange or red, connect a spectrum analyzer to the broadcast and narrowcast input test points to measure broadcast and narrowcast input power. According to the obtained values, make adjustments to the broadcast and narrowcast input signals or the 'BC MGC' and 'NC MGC' parameter settings for the corresponding ports until the 'RF' indicator light turns green.

c. Check whether the 'LSR' indicator light is green. If it is green, proceed to the next step.
If the indicator light is orange, check the FT5E port alarm interface in the AIMA3000 configuration system and ensure that the laser temperature, bias current, and output power are within the normal range. If values are not within the normal range, make adjustments according to the parameters of the alarm information until the values reach a normal range. If the indicator light is red, check whether 'Laser Output' in the AIMA3000 configuration system FT5E port alarm interface is switched on. If the 'Laser Output' is switched off, set 'Laser Output Control' in the FT5E port alarm interface to 'On.' If the LSR indicator light is still red, check whether the laser temperature, bias current, and output power are within the normal range. If values are not within the range, make adjustments according to the parameters of the alarm information until the values reach the normal range.

d. Thread the fibre optic cables from the module's back panel to the front panel using the fibre guide. Arrange the cables in the fibre optic channel guide and fix them in the channel guide's grooves.3

e. Clean the fibre optic contact and optical output port (located on the front panel of the module).

1. RF2 and LSR indicator lights function the same way as RF1 and LSR1.
2. The FT5E module's 'NC RF Total Input Power' alarm is set to 'off' by default. Before checking the RF indicator lights, log in to the AIMA3000 configuration system and turn on the main and secondary alarms (select HiHi/Hi/Lo/LoLo threshold values).
3. See AIMA3000 Manual for information about using the fibre guide and wiring fibre optic cables.

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

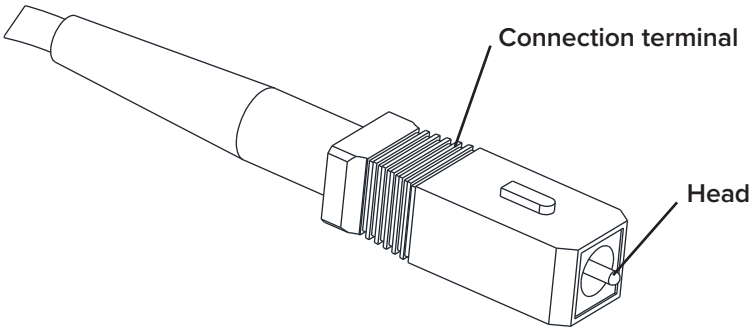

Figure 4-1 The fibre connector ends

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

To clean the front-panel optical port, use a special lint-free swab that is designed for this purpose. Dampen it with a static dissipative solvent. Apply slight pressure to the internal angled surface of the optical port, while rotating the swab 90 degrees back and forth. You may need to remove excess solvent using a dry lint-free swab. Alternatively, a cleaning pen such as the one click cleaner can be used. Always inspect the fibre-end interfaces using an appropriate scope to validate that the surfaces are adequately clean, free from damage, and dry from any solvents prior to connection.

SC one click cleaning pen

www.oneclickcleaner.com

f. Align the contact pins on the end face of the fibre optic contact with the grooves in the optical output port, and then insert the fibre optic contact, as shown in the figure. There will be a clicking sound when the contact is in place.

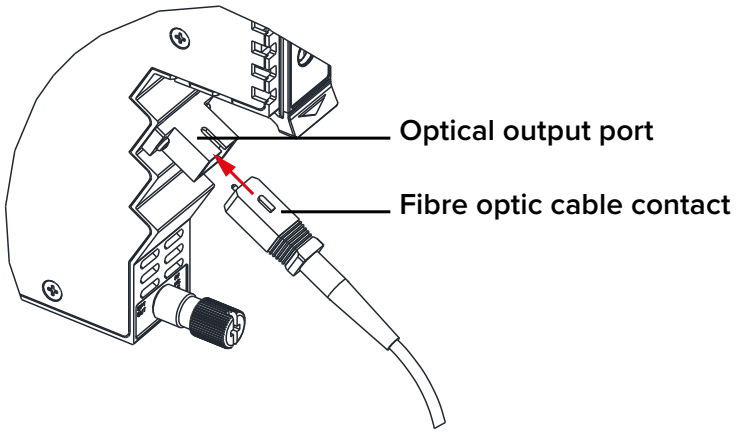

Figure 4-2. Connecting a fibre optic cable

WARNING!
The FT5E module must be installed and maintained by professionally trained personnel following safe operating procedures.
If the FT5E has idle ports and input ports, terminate them with a 75-Ω resistive load to avoid damage to the product.

WARNING!
The FT5E will produce invisible radiation during operation. Do not touch or directly look into fibre optic cable contacts and other related components.

4.3.3 LED Indicator Lights

After the module is installed and connected to a power supply, green indicator lights on the front panel indicate that the module is on.

If the input and output signals are normal, the 'STAT' indicator light will stop flickering after 5 seconds and remain green. The 'LSR1', 'RF1', 'LSR2', and 'RF2' indicator lights should be also green.

If one of broadcast/narrowcast RF input signals is too low or too high, the 'STAT' and 'RF' indicator lights may be orange or red. [1]

If an optical output signal is too low or too high, the 'STAT' and 'LSR' indicator lights may be orange or red.
See Appendix A for more information about FT5E indicator lights.

1. The FT5E module's 'NC RF Total Input Power' alarm is set to off by default. When the BC RF total input power is normal, the RF indicator light remains green. Before checking the RF indicator lights, log in to the AIMA3000 configuration system and turn on the main and secondary alarms (select HiHi/Hi/Lo/LoLo threshold values).

5 Module Configuration and Alarms

The FT5E module can be configured via the ASMM web interface or Technetix web-based NMSE system.
This manual only provides instructions for configuration using the ASMM web interface. See the NMSE manual for configuration using Technetix web-based NMSE system.

5.1 Module Configuration

5.1.1 FT5E Module Configuration Details

Select the 'Modules' option in the AIMA3000 configuration system interface. Select the FT5E module from the module list on the left (see Figure 5-1). The white area on the right side of the interface shows the FT5E module configuration details. Ports are listed under the FT5E module name in the module list on the left. When a port is selected from the list, the port configuration details are displayed in the white area on the right (see Chapter 5.1.2, Figure 5-2).

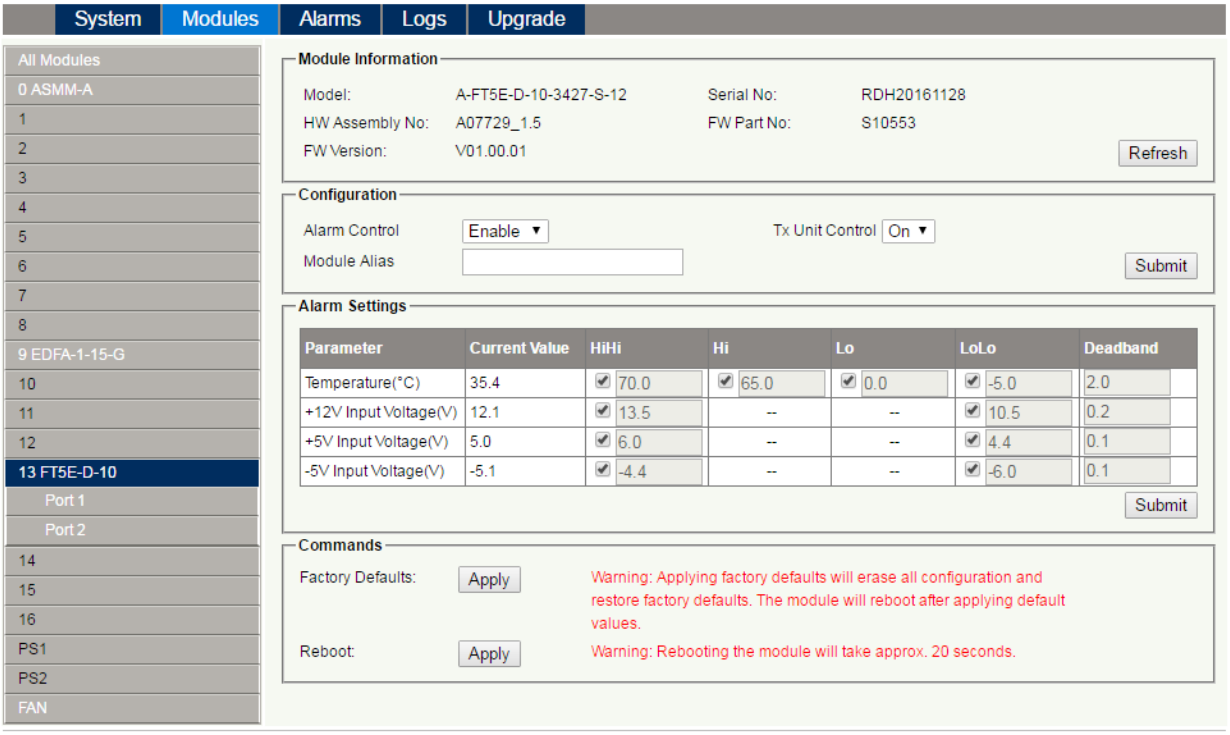

Figure 5-1 FT5E module configuration interface

FT5E module configuration details include four parts: module information, configuration, alarm settings, and module management.

Module details (read-only); the displayed items and button functions are as follows:

Item	Description
'Module Information'	Model, serial No, HW Assembly No, FW Part No, FW Version.
'Refresh'	Refreshes the web GUI.

Configuration; parameter descriptions and button functions are as follows:

Item	Description
'Alarm Control'	'Enable' - enables the alarm monitoring function; an alarm is triggered only when a malfunction occurs. The indicator lights on the module alarm status interface (Chapter 5.2.1, Figure 5-4) change in accordance with the actual situation. 'Disable' - disables the alarm monitoring function; the alarm status will remain as it was before being disabled and will not change.
'Tx Unit Control'	'On' - enables individual optical output for all port lasers (default); 'Off' - disables optical output for all port lasers.
'Module Alias'	Sets module names; after confirming, the module name will be updated in the corresponding FT5E slot in the list on the left side of the interface.
'Submit'	Saves changes to settings.

Alarm settings; parameters and button functions are as follows:

Item	Description
'Temperature'/ '+12V Input Voltage'/ '+5V Input Voltage'/ '-5V Input Voltage'	Select or unselect parameters to determine alarm settings and levels. However, the user cannot change the alarm threshold values and blind spot settings. See Table 5-1 for the default settings for each parameter.
'Submit'	Saves changes to setting.

Module Management; push button functions are as follows:

Item	Description
'Factory Defaults'	When the 'Apply' button is pressed, all FT5E settings are cleared and restored to default. After this process is completed, the module is automatically rebooted.
'Reboot'	Reboots the module. This action requires approximately 20 seconds.

Table 5-1 FT5E default alarm settings

Parameter	Unit	HiHi	Hi	Lo	LoLo
Temperature	℃	√	√	√	√
+12V Input Voltage	V	√	-	-	√
+5V Input Voltage	V	√	-	-	√
-5V Input Voltage	V	√	-	-	√

Note:

'√' When the parameter value in the selected check box exceeds the threshold value, the corresponding alarm is triggered. When the values are between the Hi and Lo threshold values, the alarm status is normal (no alarm). The secondary alarm is triggered if the Hi (Lo) threshold value is exceeded. The main alarm is triggered if the HiHi (LoLo) threshold value is exceeded.

'–' o settings available.

5.1.2 FT5E Port Configuration Details

The port configuration interface is opened by selecting a port name under the FT5E module in the list on the left side, as shown in Figure 5-2.

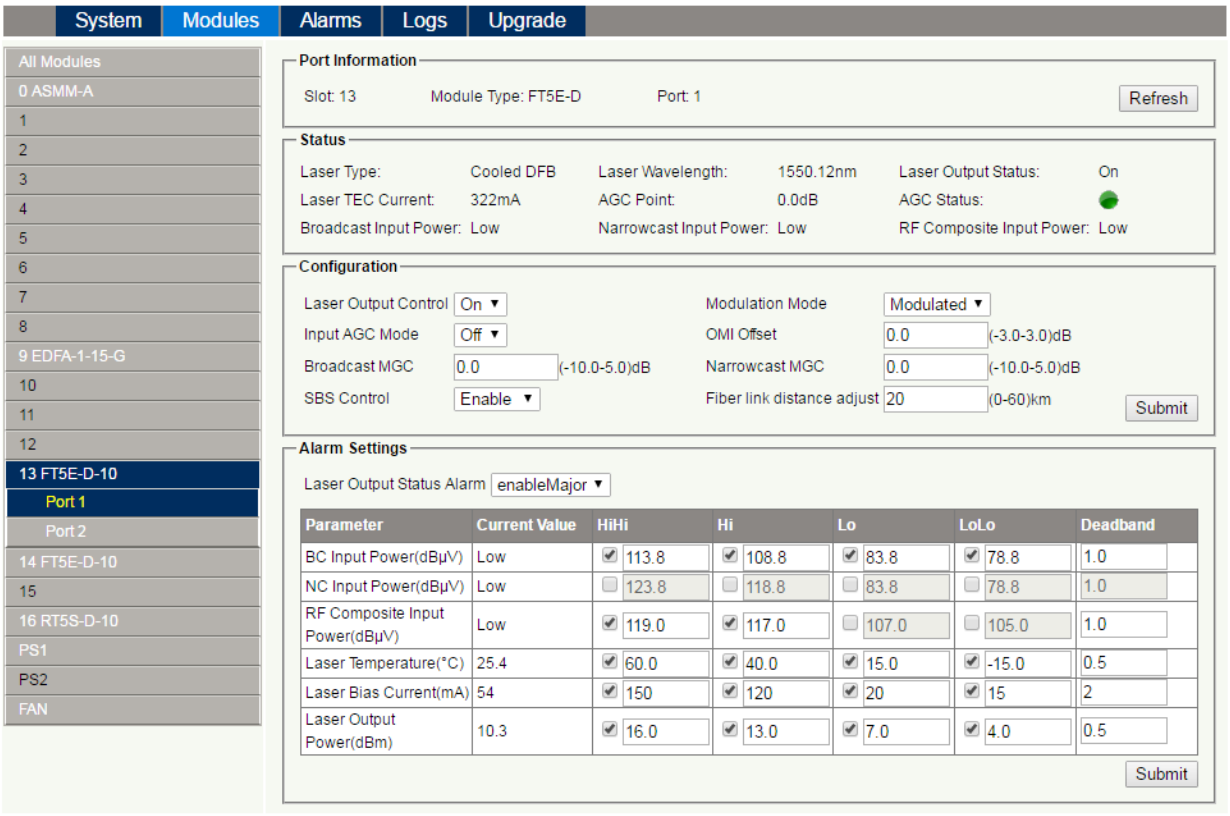

Figure 5-2 FT5E port configuration interface

FT5E port configuration details include four parts: port information, status, configuration, and alarm settings.

Port Information (read-only); the displayed items and button functions are as follows:

Item	Description
'Port Information'	Slot, module type, and port number.
'Refresh'	Refreshes the interface.

Status (read-only); the displayed items are as follows:

Item	Description
'Status'	Laser type, laser wavelength, laser output status, laser TEC current, AGC point, AGC status, broadcast input power, narrowcast input power, RF composite input power.

Configuration; parameters and button functions are as follows:

Item	Description
'Laser Output Control'	'On'; enables the port's laser optical output (default). 'Off'; disables the port's laser optical output.
'Modulation Mode'	'CW'; continuous wave; CW is higher 2dB than Modulated. 'Modulated'; modulated wave (default).
'Input AGC Mode'	'On'; switches on the AGC mode; 'Off'; switches off the AGC mode (default).
'OMI Offset'	Range: –3.0 - 3.0 dB (default: 0 dB).
'Broadcast MGC'	Range: –10.0 - 5.0 dB (default: 0 dB).
'Narrowcast MGC'	Range: –10.0 - 5.0 dB (default: 0 dB).
'SBS Control'	'Enable': Enable the SBS Control. 'Disable': Disable the SBS Control. Default is Enable.
'Fibre link distance adjust'	Range: 0 - 60 Km (default: 20 Km).
'Submit'	Saves changes to settings.

Alarm Settings; parameters and button functions are as follows:

Item	Description
'Laser Output Status Alarm'	'Set as the Main Alarm'; when the 'Laser Output Control' is 'off', the main alarm is triggered and the Parameter 3 'Laser Output' indicator light on the module's alarm status interface (Chapter 5.2.2, Figure 5-5) is red. 'Set as the Secondary Alarm'; when the 'Laser Output Control' is 'off', the secondary alarm is triggered and the Parameter 3 'Laser Output' indicator light on the module's alarm status interface is orange. 'Prohibit Alarm'; when the 'Laser Output Control' is 'off', no alarm is triggered and the Parameter 3 'Laser Output' indicator light on the module's alarm status interface is green. Default: 'Set as the Main Alarm'.

Item	Description
'BC Input Power' / 'NC Input Power' / 'RF Composite Input Power' / 'Laser Temperature' / 'Laser Bias Current' / 'Laser Output Power'	Select or unselect parameters to determine alarm settings and levels. The settings for alarm threshold values and blind spots can be selected. See Table 5-2 for the default settings for each parameter.
'Submit'	Saves changes to settings.

Table 5-2 FT5E default port alarm settings

Parameter	Unit	HiHi	Hi	Lo	LoLo	Blind
BC Input Power	dBmV	53. √	48.8 √	23.8 √	18.8 √	1.0
NC Input Power	dBmV	63	58.8	23.8	18.8	1.0
RF Composite Input Power	dBmV	59 √	57 √	47	45	1.0
Laser Temperature	°C	60 √	40 √	15 √	–15 √	0.5
Laser Bias Current	mA	15 √	120 √	20 √	15 √	0.2
Laser Optical Output Power	dBm	16 √	13 √	7 √	4 √	0.5

Note:

'√' When the parameter value in the selected check box exceeds the threshold value, the corresponding level alarm is triggered. When the value is between Hi and Lo threshold values, the alarm status is normal (no alarm). The secondary alarm is triggered if the Hi (Lo) threshold value is exceeded. The main alarm is triggered if the HiHi (LoLo) threshold value is exceeded.

5.1.3 Automatically Uploading/Downloading Module Config Files

Select 'Modules' on the AIMA3000 configuration system interface. Select 'All Modules' in the module list on the left side, as shown in Figure 5-3.

Find the FT5E module in the [Module Type] in the white section on the right side. Details about the current configuration of the FT5E can be accessed by clicking on [See Details]. Synchronisation of configuration files with the ASMM module can be set in the [Hotswap Mode]:

Item	Description
'Auto Download'	Automatic downloading of the latest FT5E configuration files from the ASMM module to the FT5E module.
'Auto Upload'	Automatic uploading of the FT5E's current configuration files to the ASMM module's database.
'Manual'	Manual setting of all parameters in the module configuration interface and module port configuration interface (for details, see Chapters 5.1.1 and 5.1.2).

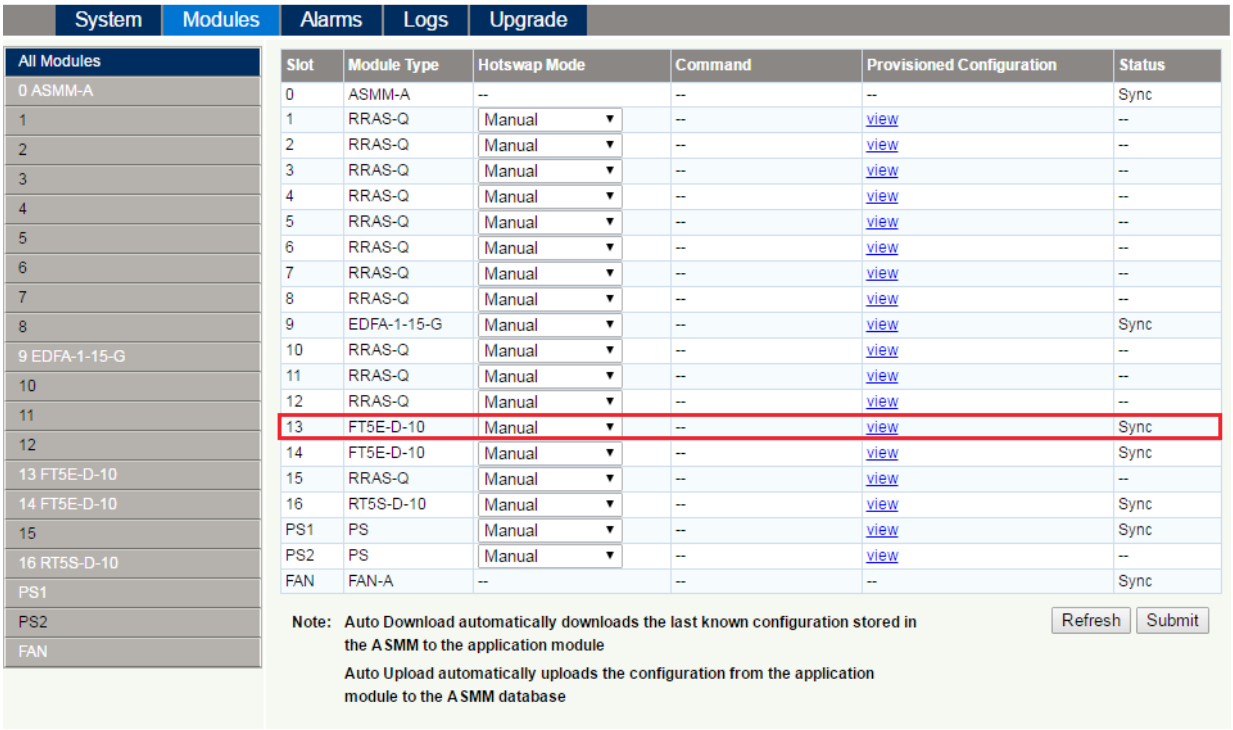

Figure 5-3 Module configuration details view and download/upload mode settings

5.2 Alarms

5.2.1 FT5E Module Alarms

Select 'Alarms' on the AIMA3000 configuration system interface and select the FT5E module from the module list on the left. The interface will open, as shown in Figure 5-4. The right side of the interface displays the alarm status details for the FT5E module and the ports listed under the FT5E module. Click on the port to see its alarm status details displayed in the white area on the right (see Chapter 5.2.2, Figure 5-5).

The FT5E module's alarm status interface shows the current values of the module's temperature, +12V input voltage, +5V input voltage, and -5V input voltage, as well as the threshold values, blind spots, and status for alarms of different levels. Press 'Refresh' to refresh information about the alarm status for each parameter of the FT5E module. See Table 5-3 for indicator lights corresponding to alarms of different levels.

Table 5-3. Indicator lights for alarms of different levels

	Normal (No Alarm)	Secondary Alarm	Main Alarm
Indicator light status			

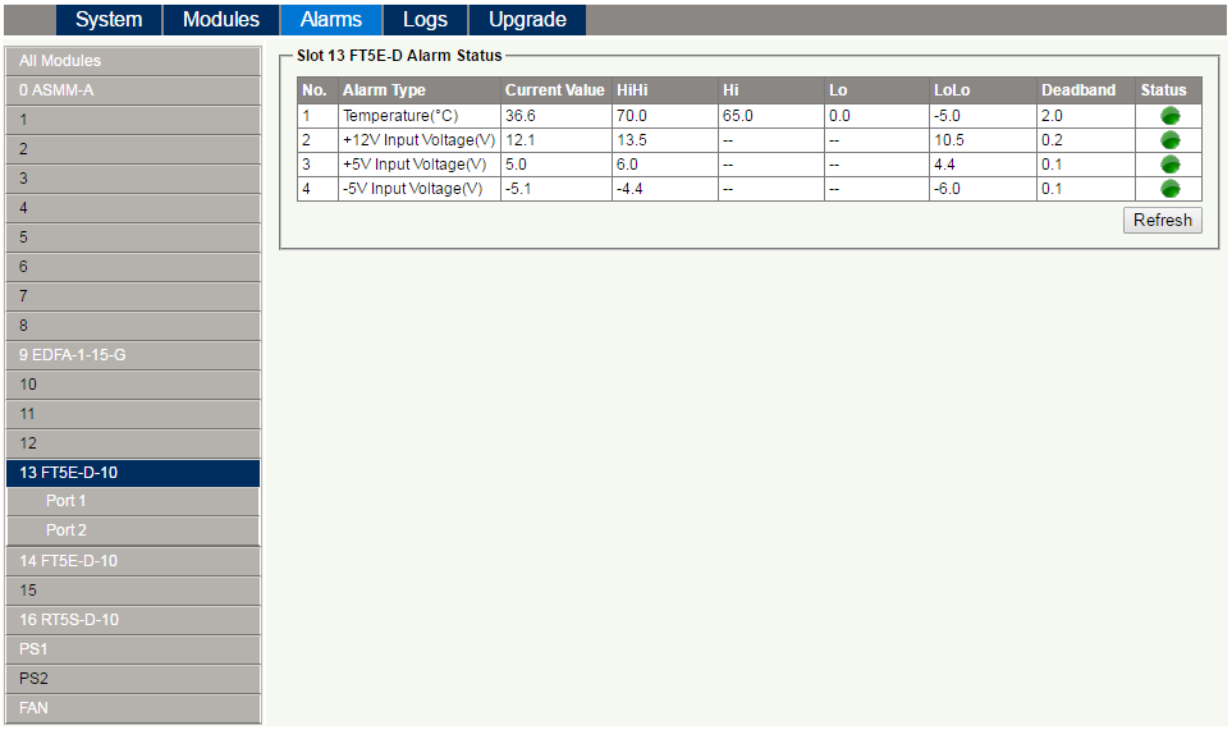

Figure 5-4 FT5E module alarm status interface

5.2.2 FT5E Port Alarms

Open the port alarm interface by clicking on the port under the FT5E module name in the module list on the left, as shown in Figure 5-5.

The FT5E port alarm status interface shows the current values of BC input power, NC input power, RF composite input power, laser temperature, laser bias current, laser output power and AGC status, as well as the alarm threshold values, blind spot, alarm status, laser output alarm status1, and AGC alarm status. See Table 5-3 for details about indicator light statuses for alarms of different levels.

Press 'Refresh' to refresh information about alarm status for each parameter in the FT5E module.

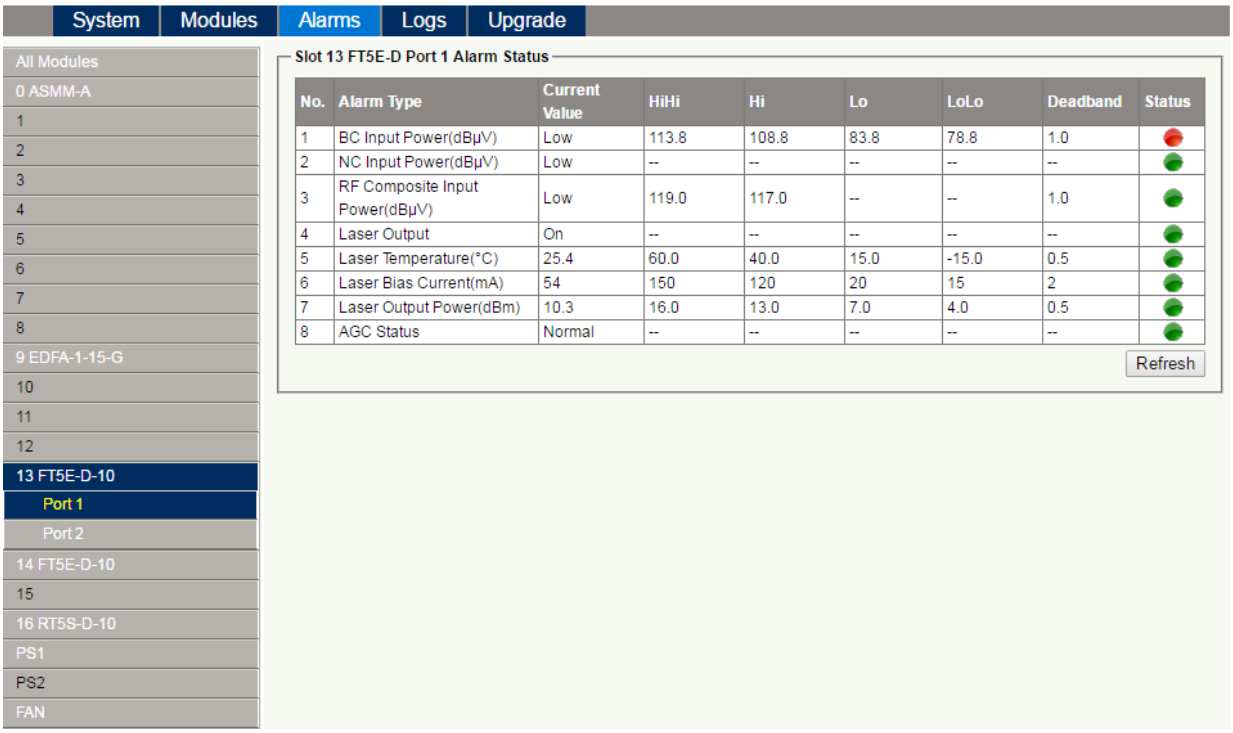

Figure 5-5 FT5E port alarm status interface

1. Laser output alarm status can be also checked in the 'Laser Output Status' in the FT5E port configuration interface (Figure 5-2).

5.3 System Logs

Select 'Logs' in the AIMA3000 configuration system interface. The white area on the right side of the interface shows all alarm logs for the installed modules (a maximum of 1000 logs can be displayed), as shown in Figure 5-6.

Use the 'First Page', 'Page Up', 'Page Down', and 'Last Page' buttons to view other log records. You can open a specific log page directly by typing in the page number in the 'Goto' text box.

If 'Delete All' is pressed, a prompt will appear asking 'Are you sure you want to delete all logs?' Select 'Confirm' to the delete all log records, or select 'Cancel' to cancel the operation.

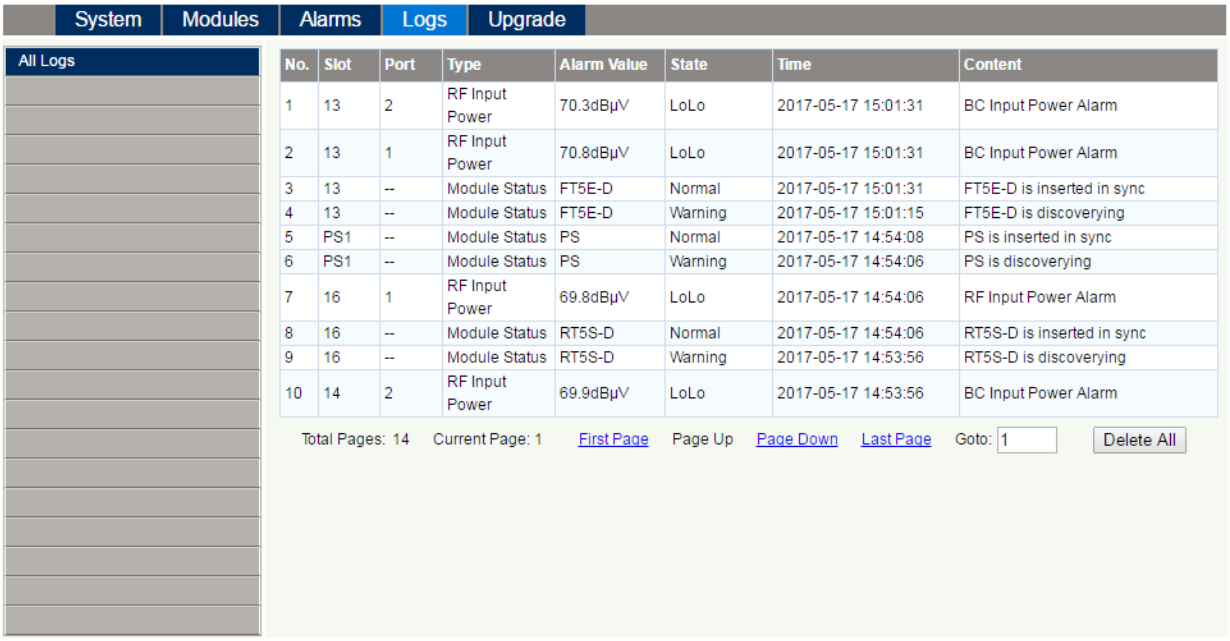

Figure 5-6 System logs

5.4 Module Upgrades

Press 'Upgrade' in the AIMA3000 configuration system interface and select FT5E from the module list on the left. The interface shown in Figure 5-7 will appear. Press 'Select File' to search for and download the latest FT5E firmware. Press 'Start Upgrade' to upgrade the firmware.

Note:

Before upgrading the module, download the latest module firmware from Technetix website. The module upgrade function in the web-interface does not support remote management. Use Technetix NMSE web-based software to automatically update, back-up, and restore FT5E configuration details. See the NMSE User Manual for more information.

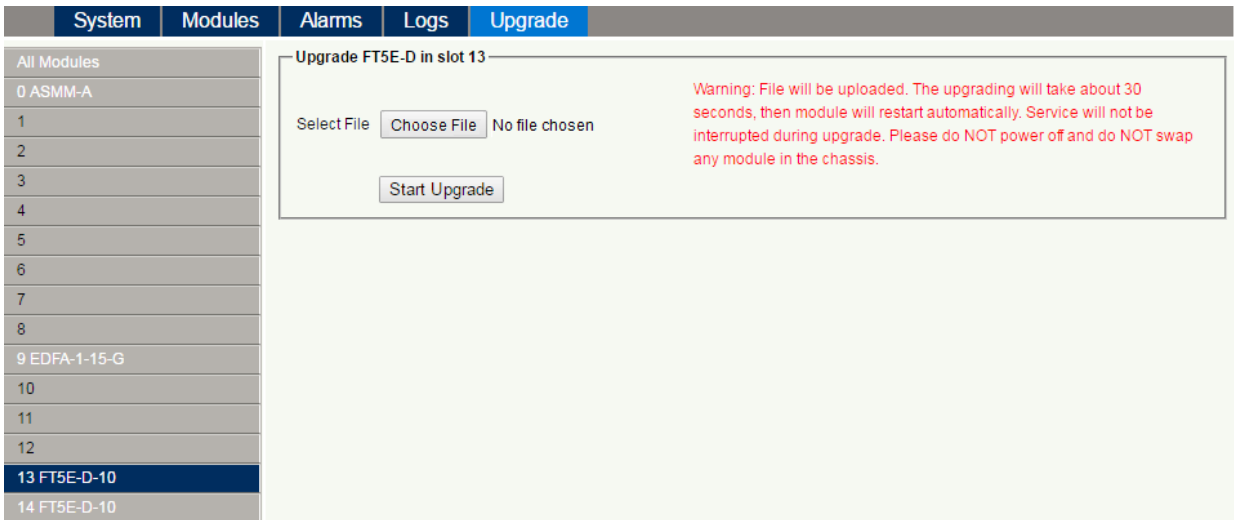

Figure 5-7 Module Upgrade interface

CAUTION!

Module will be upgraded after the firmware is uploaded. The upgrading and reboot process will take about 30s. During the upgrade, 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.

5.5 Module Operating Range

Typical Usage Conditions

94 ITU-T J.83 Annex A QAM 256, 258MHz~994MHz, 1206MHz. DOCSIS 3.1, OFDM, (Centre 1100MHz, 192MHz width), 4k FFT.

Typical Input (BC Port)

The optimal input values in the QAM environment are as follows: [1]

10dBmV/ch 94 ITU-T J.83 Annex A QAM 256, 258MHz~994MHz, 1206MHz. DOCSIS 3.1, OFDM, (Centre 1100MHz, 192MHz width), 4k FFT.

Suggest reduce the input power 1 dB to avoid the transmitter overloaded, so suggest 10dBmV/ch.

Note:

The MER indicator of the signal source is higher than 46 dB.

Input Range

MER>39dB when BC input is from 7dBmV to 13dBmV.

5.5.1 94CH QAM (including OFDM) Environment

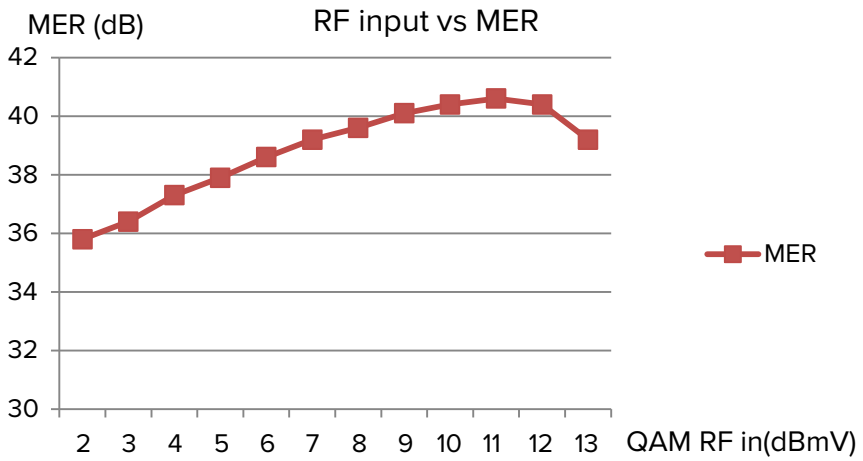

Figure 5-8 MER and BC input changes

1. Optical input power to EDFA is 5dBm, optical input power to fibre is 16.4 dBm; fibre optic cable 12 km; optical input into the receiver -5 dBm.

6 Troubleshooting

Table 6-1 FT5E troubleshooting

Indicator Light Status	Malfunction Cause	Troubleshooting / Solution
RF	BC input power value is either comparatively low or high	Adjust input signal power to achieve normal BC input signal. If the BC input power is normal but the alarm is still on, contact technetix technical support.
RF	BC input power value is either too low or too high	Adjust input signal power to achieve normal BC input signal. If the BC input power is normal but the alarm is still on, contact Technetix technical support.
STAT	Optical output power and bias current values are not within the normal range	Contact Technetix technical support.
	Power supply failure	Contact Technetix technical support.
	Temperature is too hot	Reduce the temperature in the surrounding environment of the product. If the temperature of the environment is normal but the alarm is still on, contact Technetix technical support.

Note:

The RF light is an indicator for NC and BC channels. The 'NC Input Power' in the FT5E module is set to off by default. If the main and secondary alarms of the 'NC Input Power' are enabled (HiHi/Hi/Lo/LoLo threshold values selected), check whether the NC RF signal is normal.

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

Product Name: OPSW – Optical A/B Protection Switch

Conforms to the following standards:

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

Federal Communications Commission

Appendix A: Description of LED Indicator Lights

Indicator Light Status	STAT	MODE	LSR1	RF1	LSR2	RF2
No power	No light	No light	No light	No light	No light	No light
RF	(flickering)	(flickering)	(flickering)	(flickering)	(flickering)	(flickering)
Normal operation (MGC mode, no alarm)	Steady light	(flickering)	Steady light	Steady light	Steady light	Steady light
Normal operation (AGC mode, no alarm)	Steady light	Steady light	Steady light	Steady light	Steady light	Steady light
Module/port main alarm triggered	Steady light	-	-	-	-	-
Module/port secondary triggered	Steady light	-	-	-	-	-
BC/NC input 1 RF total power – main alarm (HiHi/LoLo)	Steady light	-	-	Steady light	-	-
BC/NC input 1 RF total power – secondary alarm (Hi/Lo)	Steady light	-	-	Steady light	-	-
BC/NC input 2 RF total power – main alarm (HiHi/LoLo)	Steady light	-	-	-	-	Steady light
BC/NC input 2 RF total power – secondary alarm (Hi/Lo)	Steady light	-	-	-	-	Steady light
Laser 1 main alarm (HiHi/LoLo)	Steady light	-	Steady light	-	-	-
Laser 1 secondary alarm (Hi/Lo)	Steady light	-	Steady light	-	-	-
Laser 2 main alarm (HiHi/LoLo)	-	-	-	-	Steady light	-
Laser 2 secondary alarm (Hi/Lo)	-	-	-	-	Steady light	-

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