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FIRE™ amp

Installation and Configuration Manual

FIREamp™ 3.1 Installation and Configuration Manual

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1 Introduction

This chapter provides an overview of the FIREamp™.

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1.1 Overview

The FIREamp™ is a compact 1U WDM access/transport device that is designed to extend the power link budget of DWDM solutions. It provides amplification for a range of optical solutions from 4 wavelengths to 40 wavelengths and incorporates several types of low-noise EDFAs: Booster, Inline, Pre-Amplifier, Midstage and Raman.

Depending on the customer requirements, the FIREamp™ can operate in either APC or AGC mode.

- The AGC operation mode enables seamless wavelength add/drop functionality without interference to the other active channels. In addition, the EDFA gain is controlled, adjusted and monitored by the user.
- The APC operating mode allows the maintenance of constant output power.

The EDFAs are gain-flattened and have low Optical Signal to Noise Ratio (OSNR), thus enabling cascading of several EDFAs to form an amplified link over long distance.

The FIREamp™ is ideal for applications such as:

- Extending the optical link budget to meet distance and attenuation requirements of DWDM networks
- Supporting high-throughput Metro Ethernet connectivity over long distances
- Upgrading the optical link budget to support 10G services
- Reducing number of regenerators and sites along fiber
- Overcoming old fiber infrastructure high loss

The FIREamp™ is a highly integrated device that can incorporate up to two EDFA modules, optional DCM, and an optical switch for both protected and unprotected modes.

Two additional MNG ports may be used for transmission of the management traffic over an Optical Supervisory Channel (OSC) for remote management of the FIREamp™.

The FIREamp™ is designed to support point-to-point, chain, and ring topologies.

The FIREamp™ can be managed using Command Line Interface (CLI) (serial or Telnet/Secure Shell (SSH) over TCP connection), Web management (HTTP/HTTPS), Wave2Wave's LightWatch™ NMS/EMS (network management system), or SNMP.

All optical transceivers, both on the service side and on the WDM-uplink side, are pluggable and fully replaceable, allowing pay-as-you-grow budget planning and simplified maintenance.

The FIREamp™ unit is a 19-inch/1U ETSI compliant with dual field-replaceable AC and/or DC power supplies and a pluggable FAN unit.

1.1.1 Main Features

The FIREamp™ combines the following key features:

- Up to two amplifiers can be integrated in the device
- Amplifier types: Booster, Inline, Mid-stage, or PreAmp.
- Built-In Eye Safety Mechanism
- Protocol and Data independent
- Supporting 4/8/16/32/40 Wavelengths and Full C-Band
- Optional integrated DCM (Disparity Compensation Module).
- Two 100M Optical Supervisory Channel (OSC) management channels based on SFP optics for remote management
- Optional integrated optical switch for Facility 1+1 protection
- Automatic Laser Shutdown (ALS) on all optical ports
- Provides the following management protocols for configuration, monitoring, and service provisioning:
    - CLI over a serial or Telnet/SSH over TCP connection
    - Web-based HTTP/HTTPS management
    - SNMP management interface
    - Syslog protocol
    - Remote Authentication Dial In User Service (Radius) protocol for centralized remote user authentication
    - Simple Network Time Protocol (SNTP) for network timing
- Operates on single or dual fiber solutions
- Pluggable FAN unit for improved maintainability
- AC or DC, single or dual pluggable power supply

- Supports Operations, Administration, and Maintenance (OAM) functions:
  - Fault management
  - Optical parameters monitoring
  - External alarms

1.1.2 Typical Application

Typical applications for the FIREamp™ include:

- Extending the optical link power budget to meet distance and attenuation requirements of DWDM networks
- Providing high throughput Metro Ethernet connectivity over long distances
- Upgrading the optical link budget to support 10G services
- Reducing the number of regenerators and sites along the fiber
- Overcoming old fiber infrastructure high loss

The following figure shows some typical configurations for the FIREamp™:

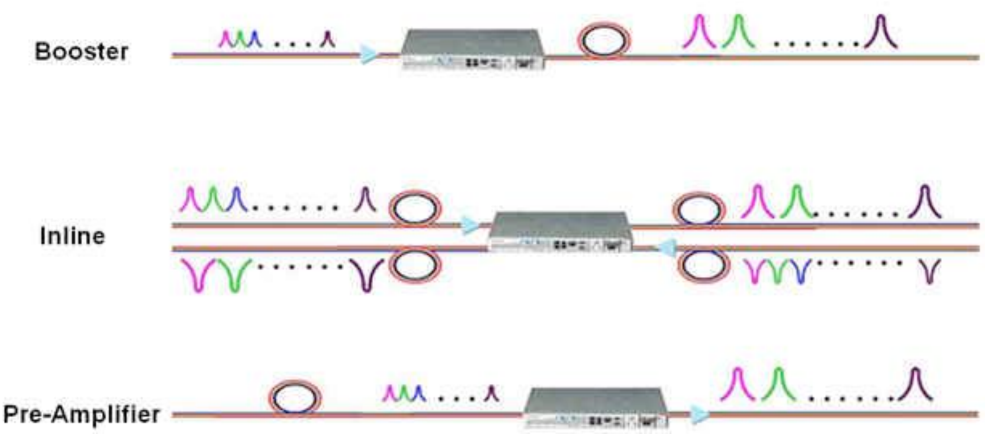


Figure 1: FIREamp™ Typical Applications

1.1.3 Physical Description

The FIREamp™ is a compact 1U unit intended for installation in 19-inch or 23-inch racks or placed on desktops or shelves.

All connections are made to the front panel. The FIREamp™ front panel also includes LEDs that indicate its operating status.

The FIREamp™ is cooled by free air convection and a pluggable cooling FAN unit. The air intake vents are located on the right side. The FIREamp™ employs a fan speed control mechanism for lower noise, improved mean time between failures (MTBF), and power save.

The following figure shows a general view of the FIREamp™.

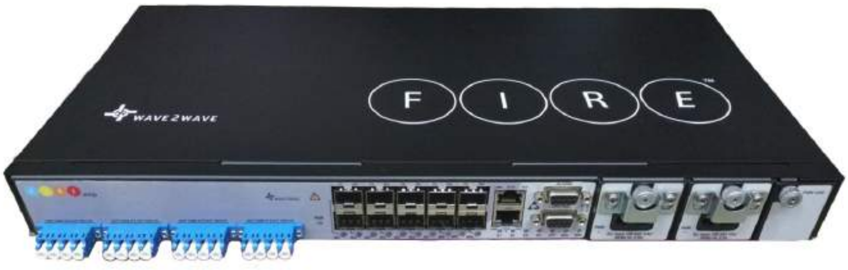


Figure 2: General View of the FIREamp™

1.2 Configurations

The FIREamp™ is designed in a modular way, thereby enabling many configurations and applications.

1.2.1 FIREamp™ Configurations

The FIREamp™ can be ordered with the configurations described in this section.

1.2.1.1 EDFA Module Configurations

The FIREamp™ can be ordered with two, one, or no EDFA modules. Each EDFA can be a Booster or Pre-Amp.

1.2.1.2 DCM Configurations

The FIREamp™ can be ordered with or without a DCM module.

1.2.1.3 Optical Switch Configurations

The FIREamp™ can be ordered with or without an Optical Switch module.

1.2.1.4 Example Configurations

The following are some examples of the available configurations of the FIREamp™:

- FIREamp™ Booster configuration:

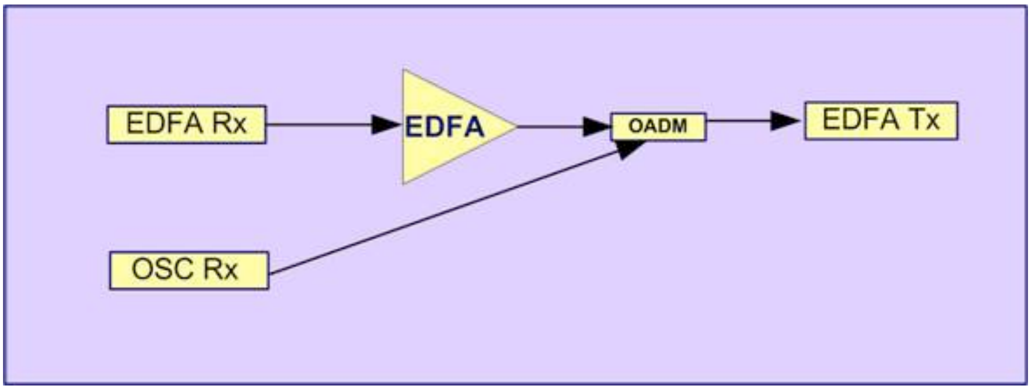


Figure 3: FIREamp™ with Booster

- FIREamp™ Pre-Amp configuration:

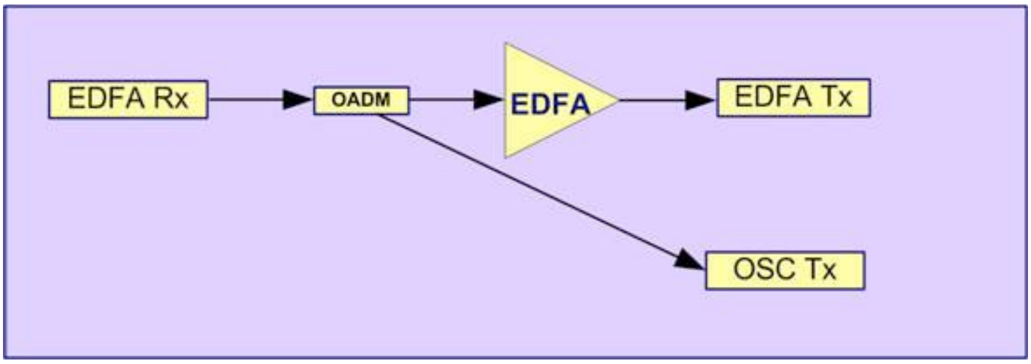


Figure 4: FIREamp™ with Pre-Amp

- FIREamp™ Inline configuration:

  This configuration can be used in Ring or Linear Add and Drop topologies.

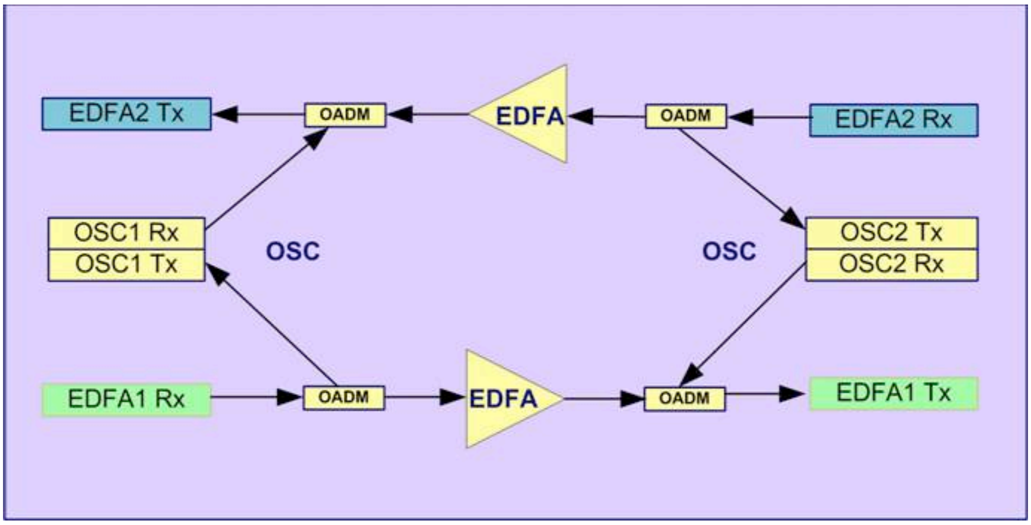


Figure 5: Inline FIREamp™ with two Inline Amplifiers

- FIREamp™ Mid-Stage configuration:

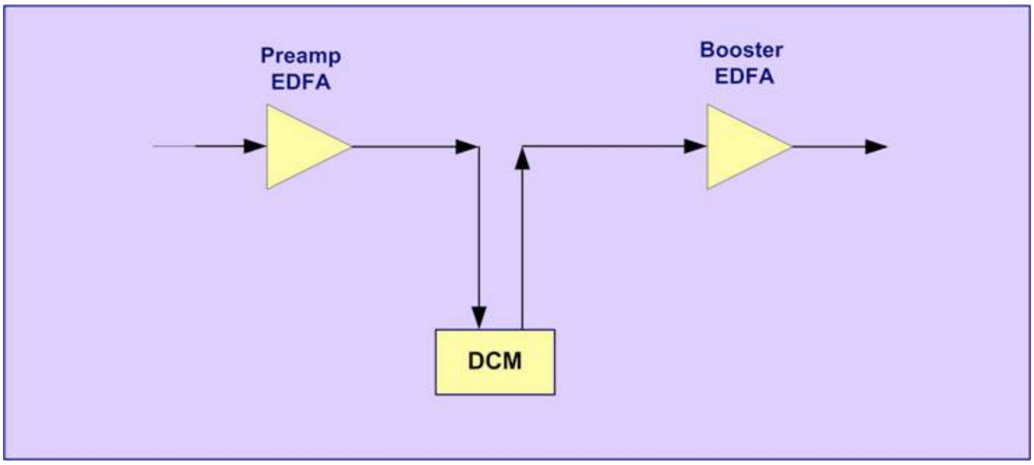


Figure 6: Mid-Stage FIREamp™ with Pre-Amp, Booster, and DCM

- FIREamp™ Booster and Optical Switch configuration:

  This is Point-to-Point topology.

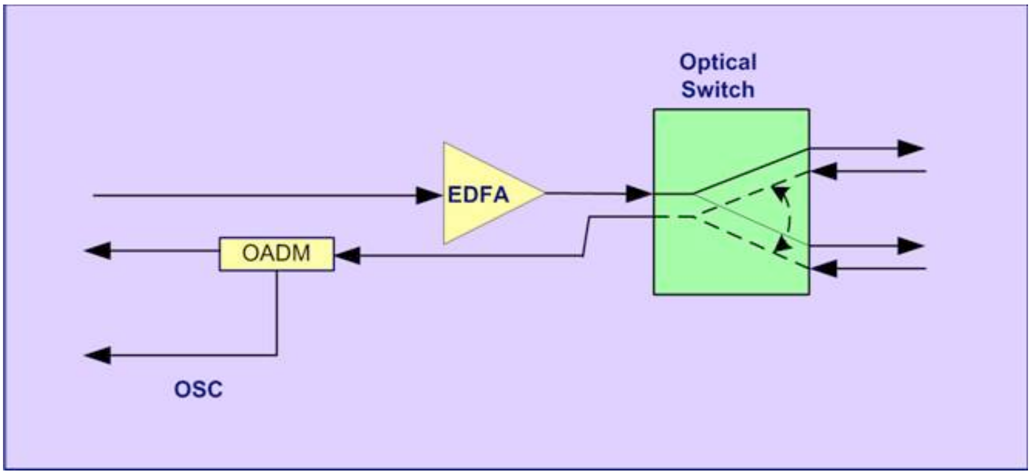


Figure 7: FIREamp™ with Booster and Optical Switch

- FIREamp™ Pre-Amp and Optical Switch configuration:

  This is Point-to-Point topology.

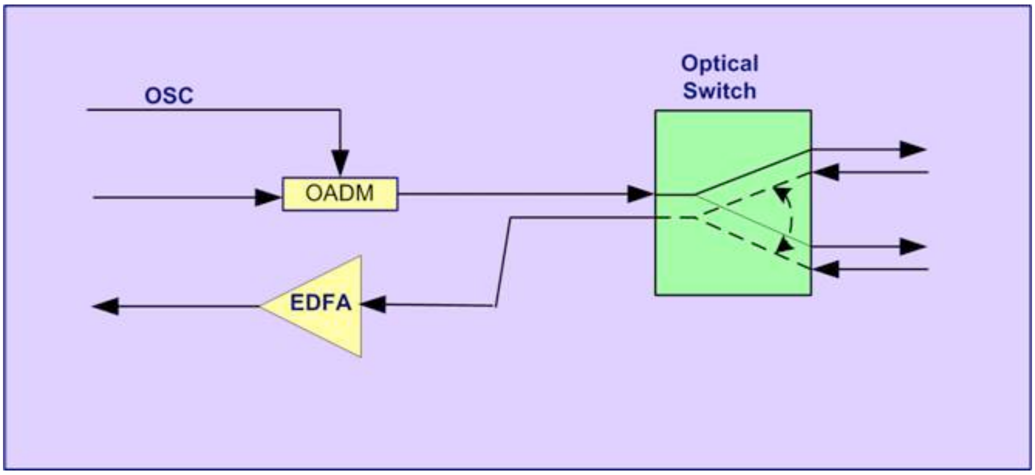


Figure 8: FIREamp™ with Pre-Amp and Optical Switch

1.3 Functional Description

This section describes the functionality of the FIREamp™.

1.3.1 FIREamp™ Ports

This section describes the FIREamp™ ports.

1.3.1.1 Optical Ports

The FIREamp™ unit has the following types of optical ports:

- MNG ports: Accept SFP optical transceivers
- In inline configuration:
  - EDFA1 and EDFA2: LC connectors
  - OSC1 and OSC2: LC connectors
- In protected point-to-point configuration
  - COM, COM1 and COM2: LC connectors
  - OSC: LC connector

For detailed information regarding the FIREamp™ connectors, see Connection Data (p. 171).

1.3.1.2 EDFA Ports

The EDFA ports are connected to the network line. They carry the common optical signal that aggregates the optical channels.

If there is a single EDFA module it will be connected to EDFA1 port. If there are two EDFA modules they will be connected to EDFA1 and EDFA2 ports.

The following table provides information regarding the fiber and connector specifications for the EDFA ports.

Table 1: EDFA Port Specifications

Specification	Requirement
Fiber type	Single mode
Fiber size	2 mm optical
Connector type	LC with protective shutters
Port type	Optical EDFA port

1.3.1.3 OSC Ports

The OSC ports are connected to the local management ports to provide remote management. In point to point configurations, the FIREamp™ uses a single OSC port (OSC1). In ring configurations, both OSC1 and OSC2 are used.

The following table provides information regarding the fiber and connector specifications for the OSC ports.

Table 2: OSC Port Specifications

Specification	Requirement
Fiber type	Single mode
Fiber size	2 mm optical
Connector type	LC with protective shutters
Port type	Optical OSC port

1.3.1.4 COM Ports

The COM, COM1 and COM2 ports are used in protected configuration of the FIREamp™.

- COM port connected to the optical signal
- COM1 port connected to the Working fiber.
- COM2 port connected to the Protection fiber.

The following table provides information regarding the fiber and connector specifications for the COM port.

Table 3: COM Port Specifications

Specification	Requirement
Fiber type	Single mode
Fiber size	2 mm optical

Specification	Requirement
Connector type	LC with protective shutters
Port type	Optical COM port

1.3.1.4.1 APS for COM Ports

The FIREamp™ uses optional optical switch to provide signal protection to the client signal.

In protected configuration, the FIREamp™ supports unidirectional, non-revertive, 1+1 facility protection APS. The facility protection ensures service continuity in case of a fiber break.

- **Unidirectional**: Each side selects the Active line independently.
- **Non-revertive**: To reduce the number of traffic hits, no switching occurs if the traffic is restored on the Standby line while there are no faults on the Active line.
- **1+1 channel**: The transmitted traffic is copied to both lines.

The facility protection ensures service continuity in case of a fiber break. The APS is supported in point-to-point topologies.

1.3.1.5 ALARM Port

The FIREamp™ has an ALARM (or External Alarm) port for the environmental alarm. This port supports one input and one output.

The following table provides information regarding the specifications for the ALARM port. For more information, see ALARM Connector (p. 171).

Table 4: ALARM Port Specifications

Specification	Requirement
Connector type	9-pin D-type female

1.3.1.6 Management Ports

This section describes the FIREamp™ management ports.

1.3.1.6.1 CONTROL Port

The RS-232 asynchronous supervisory port has a DCE interface that supports a data rate of 9600 bps.

Initial configuration of FIREamp™ is performed using the CLI management interface from any ASCII terminal (dumb terminal or personal computer (PC) running a terminal emulation program) directly connected to the FIREamp™ serial control connector.

After the initial configuration, the FIREamp™ may be managed, supervised, and configured by a Web browser or an SNMP network management system.

The following table provides information regarding the specifications for the CONTROL port.

Table 5: CONTROL Port Specifications

Specification	Requirement
Interface type	Serial RS-232 asynchronous DCE
Connector type	9-pin D-type female

1.3.1.6.2 Ethernet Management Port

The FIREamp™ can be accessed through the 10/100 Base-T management port, using SNMP, HTML (for Web browsers), or with CLI over Telnet/SSH over TCP connection.

The following table provides information regarding the specifications for the ETH port.

Table 6: ETH Port Specifications

Specification	Requirement
Interface type	10/100 Base-T
Connector type	RJ-45 Category 5

1.3.1.6.3 MNG Ports

The FIREamp™ is equipped with two SFP based MNG ports labeled "MNG 1" and "MNG 2". These ports enable remote management of a FIREamp™ unit or local cascading in a multi-chassis application.

This management channel is multiplexed as an extra OSC wavelength. The FIREamp™ supports two OSC channels for multi-chassis application and for remote management with facility protection. The facility protection is for the management network when the two management ports are active and there is more than one management route between the nodes. In point-to-point topology without protection, only one OSC port is needed on each side (it can be either of the two). For a protected point-to-point or ring topology, both OSC ports should be used.

The FIREamp™ uses the standard Rapid Spanning Tree Protocol (RSTP) protocol to uniquely determine the route for the management traffic between the nodes, and to dynamically change the management route should a facility failure occur.

The following table provides information regarding the fiber and connector specifications for the MNG ports.

Table 7: MNG Port Specifications

Specification	Requirement
Fiber type	**Single mode:**

Specification	Requirement
	• CWDM configuration: 1290 or 1310 nm • DWDM configuration: 1490 or 1510 nm **Multi-mode:** • 850 nm
Fiber size	2 mm optical fiber
Connector type	LC
Port type	MNG
Transceiver type	SFP

1.3.2 FIREamp™ Modules

This section describes the FIREamp™ modules.

1.3.2.1 EDFA Modules

The FIREamp™ may be ordered with one or two EDFA modules that are used to amplify the optical power of the DWDM signal. The EDFA modules can be used as a Booster and/or Pre-Amp.

- **Booster EDFA**: Used on the Tx path.
- **Pre-Amp EDFA**: Used on the Rx path.

1.3.2.2 Optical Switch Module

The FIREamp™ may be ordered with an Optical Switch module.

On the input side, the Optical Switch enables incoming signals in optical fiber to be selectively switched from one fiber to another.

On the output side the optical signals are duplicated to both fibers.

The optical switch is applicable only to point-to-point topology.

The Optical Switch performs APS based on the received optical power level of the incoming aggregated optical signal.

In protected configuration, the FIREamp™ supports unidirectional, non-revertive, 1+1 facility protection APS. The facility protection ensures service continuity in case of a fiber break.

- Unidirectional: Each side selects the Active line independently.
- Non-revertive: To reduce the number of traffic hits, no switching occurs if the traffic is restored on the Standby line while there are no faults on the Active line.
- 1+1 channel: The transmitted traffic is copied to both lines.

The facility protection ensures service continuity in case of a fiber break.

1.3.2.3 DCM Module

The FIREamp™ may be ordered with a DCM module that is used for for Disparity Compensation in Inline topologies.

1.3.2.4 Power Supply Unit

FIREamp™ is available with AC and DC power supplies:

- **AC**: 100 to 240 VAC, 50/60 Hz, 1.5A maximum
- **DC**: -48 VDC, 3A maximum

The maximum power consumption of the FIREamp™ is 24W.

The FIREamp™ may be ordered with one or two AC and/or DC power supply units. The power supplies are redundant and replaceable without causing traffic interference.

Note: Both AC and DC PSUs can be used in the same unit.

The unit does not have a power ON/OFF switch, and therefore starts operating as soon as the power is connected.

1.3.2.5 FAN Unit

The FIREamp™ is available with a pluggable and replaceable FAN unit. The air intake vents are located on the right side. The FAN unit has an automatic speed control mechanism that supports lower noise, improved MTBF and power saving.

⚠ **Caution:** Air intake vents should be clear of obstruction.

1.3.3 Management Functionality

The management functionality includes:

- Fault management for displaying alarms and events detected during FIREamp™ operation
- Configuring parameters
- Status monitoring
- User management for user and password authentication
- Maintenance functions, including software upgrade, and system restart
- Displaying the network topology

1.3.3.1 Management Protocols

This section describes the management protocols.

1.3.3.1.1 CLI Management

For initial IP configuration and several other management tasks, the FIREamp™ supports CLI ASCII management. CLI management is accessible via the CONTROL serial port or Telnet/SSH over TCP connection.

For more information, see CLI (p. 157).

1.3.3.1.2 Web-based Management

The FIREamp™ supervision and configuration functions can be performed using a standard Web browser.

For detailed information on Web-based management, see Configuration Management (p. 89).

1.4 Technical Specifications

Optical Amplifier (EDFA)	Number of Modules	Up to 2
	Output Power	• **Booster**: 14 dBm, 17 dBm, 20 dBm, 23 dBm • **Pre-Amp**: +5 dBm
	Optical Gain	• **Booster**: +10 to +22 dB • **Pre-Amp**: +18 dB
	Input Power	• **Booster**: -24 to +16 dBm • **Pre-Amp**: -36 to -15 dBm
	AGC	Keeps the amplifier gain fixed without dependency when adding or removing services.
	APC	Keeps the amplifier output power fixed without dependency when adding or removing services.
	Eye Safety	Automatic laser power reduction upon fiber cut or disconnection.
Disparity Compensation Module (DCM)	Number of modules	0 or 1
	Range	40 to 240 Km in 20 Km steps
	Fiber diameter	One of: • G.652 • G.653 • G.654 • G.655
	Spacing	50, 100 Ghz

Supervisory and Management Port	CONTROL Port	Used for initial configuration of the node IP or for local access to CLI. • **Interface**: RS-232 • **Connector**: 9-pin D-type, female • **Format**: Asynchronous • **Baud rate**: 9600 bps • **Word format**: 8 bits, no parity, 1 stop bit, and 1 start bit • **Flow control**: None
	ETH Port	Management LAN port for out-of-band access. • **Interface**: 10/100 Base-T • **Connector**: RJ-45 **Note:** Initial IP configuration can be done via RS-232.
	MNG1 and MNG2 Ports	Optical management ports: • **Interface**: 100 Base-FX • **Connector**: SFP transceiver • **CWDM**: 1290 nm or 1310 nm single mode • **DWDM**: 1490 nm or 1510 nm single mode • **Multi-mode fiber**: 850 nm **Note:** IP of the MNG port can be configured using the Web application.
COM Ports	COM, COM1 and COM2 (in protected configuration)	One or two fixed duplex LC connectors. • **Fiber type**: Single mode • **Fiber size**: 2 mm optical • **Connector type**: LC with protective shutters • **Port type**: Optical COM port
Environment Alarm	ALARM Port	Used for external office alarms. • **Connector**: DB-9, female • **Environmental**: 1 input and 1 output
System LEDs	PWR	• **Green blinking**: Power-up stage • **Green**: Normal operation
	CRT	• **OFF**: No Critical alarm detected • **Red**: Critical alarm detected
	MAJ	• **OFF**: No Major alarm detected • **Red**: Major alarm detected
	MIN	• **OFF**: No Minor alarm detected • **Red**: Minor alarm detected
MNG Port LEDs	MNG1 and MNG2	• **OFF**: Admin Down • **Green**: Normal operation • **Red**: Alarm detected

Amplifier LEDs	E1 and E2	• **OFF**: Admin Down or EDFA module is not installed • **Green**: The corresponding amplifier is operational • **Red**: EDFA failure detected
PROT Port LEDs	OPR	Not implemented
	MASTER	Not implemented
ETH Port LEDs	LINK	• **Green**: Normal operation Link integrity signal is detected by the corresponding LAN port.
	ACT	• **Yellow blinking**: Transmit and/or receive activity detected on the port.
PSU LEDs	PWR	• **Green**: Normal operation • **Red**: PSU failure detected
Network Management	Protocols	• CLI over RS-232 • CLI over Telnet/SSH over TCP connection • Web HTTP/HTTPS over TCP • SNMPv2c over UDP • Syslog • Radius • SNTP • TFTP and FTP for file upload and download
	Alarms	Current alarms are available. Each alarm is time stamped.
	Event Messages	Last 512 events and audit messages are available. Each message is time stamped.
	Log File	The events and audit messages are stored in the FIREamp™ system log files, which can be exported to a text file for offline viewing.
ALS	Optical Ports	ALS is available for the MNG ports.
Power Supply	Number of Units	1 or 2
	Redundancy	Single or dual feeding, pluggable
	AC Source	100 to 240 VAC, 50/60 Hz, 1.5A maximum
	DC Source	–48 VDC, 3A maximum
	Power Consumption	24W maximum
	Protective Earthing Conductor	18 AWG minimum
Fans	Maintenance	Removable and hot pluggable
	Flow	1.14 cubic meter/minute (4 fans 0.286 m3/min each)
Physical Dimensions	Height	44 mm/1.733" (1 RU)

	Width	440 mm/17.32"
	Depth	230 mm/9.05"
	Weight	5.5 kg/12. 1lbs maximum
	Mounting Options	19", 23", ETSI rack mountable
Environment	Normal Operating Temperature	0° to +45°C/+32° to +113°F
	Storage Temperature	-25° to +55°C/-13° to +131°F
	Normal Operating Humidity	5% to 85% RH non-condensing
	Storage Humidity	Up to 95% RH
EMC	Standards	• ETSI EN 300 386 • ETSI EN 55024 • ETSI EN 55022 • IEC/EN 61000-3-2 • IEC/EN 61000-3-3 • IEC/EN 61000-4-2 • IEC/EN 61000-4-3 • IEC/EN 61000-4-4 • IEC/EN 61000-4-5 • IEC/EN 61000-4-6 • IEC/EN 61000-4-11 • AS/NZS CISPR 22 • FCC Class A CFR 47 Part 15 Subpart B
Safety	Standards	• IEC/EN 60825-1 • IEC/EN 60825-2 • IEC/EN/UL 60950-1 • Telcordia SR-332, Issue 2 • RoHS 5/6

2 Installation

This chapter provides installation information and instructions for the FIREamp™.

In this Chapter

2.1 Safety Precautions

This section describes the safety precautions.

2.1.1 General Safety Precautions

The following are the general safety precautions:

- The equipment should be used in a restricted access location only.
- No internal settings, adjustment, maintenance, and repairs may be performed by the operator or the user; such activities may be performed only by skilled service personnel who are aware of the hazards involved.
- Always observe standard safety precautions during installation, operation, and maintenance of this product.

2.1.2 Electrical Safety Precautions

⚠ **Warning:** Dangerous voltages may be present on the cables connected to the FIREamp™:

- Never connect cables to a FIREamp™ unit if it is not properly installed and grounded.
- Disconnect the power cable before removing a pluggable power supply unit.

⚠ **Grounding:** For your protection and to prevent possible damage to equipment when a fault condition occurs on the cables connected to the equipment (for example, a lightning stroke or contact with high voltage power lines), the case of the FIREamp™ unit must be properly grounded at all times. Any interruption of the protective (grounding) connection inside or outside the equipment, or the disconnection of the protective ground terminal, can make this equipment dangerous. Intentional interruption is prohibited.

Before connecting any cables, the protective ground terminal of the FIREamp™ must be connected to a protective ground (see Connection Data (p. 171)).

The grounding connection is also made through the power cable, which must be inserted in a power socket (outlet) with protective ground contact. Therefore, the power cable plug must always be inserted in a socket outlet provided with a protective ground contact, and the protective action must not be negated by use of an extension cord (power cable) without a protective conductor (grounding).

Whenever FIREamp™ units are installed in a rack, make sure that the rack is properly grounded and connected to a reliable, low resistance grounding system.

2.1.2.1 Laser Safety Classification

The laser beam of the FIREamp™ optical modules is off when the status of the port is set to **Admin Down**.

In general, the FIREamp™ unit is equipped with laser devices that comply with Class 1M. However, the FIREamp™ laser complies with the higher Class 3B when equipped with Booster EDFA with the output power of 23 dBm.

According to the IEC EN60825-2 standard, the following warning applies to Class 1M laser products.

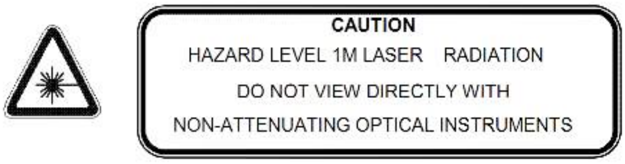

CAUTION
HAZARD LEVEL 1M LASER RADIATION
DO NOT VIEW DIRECTLY WITH
NON-ATTENUATING OPTICAL INSTRUMENTS

Figure 9: Class 1M Laser Warning

The following warning applies to Class 3B laser products.

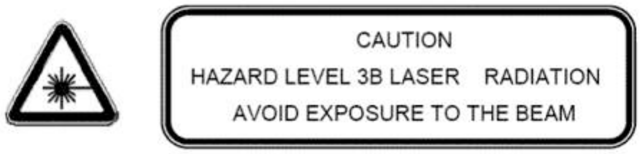


Figure 10: Class 3B Laser Warning

FIREamp™ units are shipped with protective covers installed on all the optical connectors. Do not remove these covers until you are ready to connect optical cables to the connectors. Keep the covers for reuse, to reinstall the cover over the optical connector as soon as the optical cable is disconnected.

2.1.2.2 Laser Safety Statutory Warning and Operating Precautions

All personnel involved in equipment installation, operation, and maintenance must be aware that the laser radiation is invisible. Therefore, the personnel must strictly observe the applicable safety precautions and, in particular, must avoid looking straight into optical connectors, either directly or using optical instruments.

In addition to the general precautions described in this section, be sure to observe the following warnings when operating a product equipped with a laser device. Failure to observe these warnings could result in fire, bodily injury, and damage to the equipment.

⚠ **Warning:** To reduce the risk of exposure to hazardous radiation:

- Do not try to open the enclosure. There are no user serviceable components inside.
- Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.
- Allow only authorized service technicians to repair the unit.

2.1.3 Protection against Electrostatic Discharge

An electrostatic discharge (ESD) occurs between two objects when an object carrying static electrical charges touches or is brought near the other object. Static electrical charges appear as a result of friction between surfaces of insulating materials or separation of two such surfaces. They may also be induced by electrical fields.

Routine activities, such as walking across an insulating floor, friction between garment parts, and friction between objects, can easily build charges up to levels that may cause damage, especially when humidity is low.

⚠ **Caution:** FIREamp™ internal boards contain components sensitive to ESD. To prevent ESD damage, do not touch internal components or connectors. If you are not using a wrist strap, before touching a FIREamp™ unit or performing any internal settings on the FIREamp™, it is recommended to discharge the electrostatic charge of your body by touching the frame of a grounded equipment unit.

Whenever feasible during installation, use standard ESD protection wrist straps to discharge electrostatic charges. It is also recommended to use garments and packaging made of anti-static materials, or materials that have high resistance, yet are not insulators.

2.2 Site Requirements

This section describes the FIREamp™ site requirements.

2.2.1 Physical Requirements

The FIREamp™ units are intended for installation in 19-inch or 23-inch racks or placed on desktops or shelves. All the connections are made to the front panel.

2.2.2 Power Requirements

AC-powered FIREamp™ units should be installed within 1.5m (5 feet) of an easily accessible, grounded AC outlet capable of furnishing the required AC supply voltage, of 100 to 240 VAC, 50/60 Hz, and 1.5A maximum.

DC-powered FIREamp™ units require a -48 VDC, 3A maximum DC power source with the positive terminal grounded. In addition, the DC power connector contains the chassis (frame) ground terminal (see Power Connectors (p. 174)).

2.2.3 Ambient Requirements

The recommended ambient operating temperature of the FIREamp™ is 0° to +45°C/+32° to +113°F, at a relative humidity of 5% to 85%, non-condensing.

The FIREamp™ is cooled by free air convection and a pluggable cooling FAN unit. The air intake vents are located on the right side.

⚠ **Caution:** Do not obstruct these vents.

The FIREamp™ contains a fan speed control for lower noise, improved MTBF and power save.

2.2.4 Electromagnetic Compatibility Considerations

The FIREamp™ is designed to comply with the electromagnetic compatibility (EMC) requirements of Sub Part J of FCC Rules, Part 15, for Class A electronic equipment and additional applicable standards.

To meet these standards, the following conditions are necessary:

- The FIREamp™ must be connected to a low resistance grounding system.
- Whenever feasible, shielded cables must be used.

2.3 FIREamp™ Front Panel

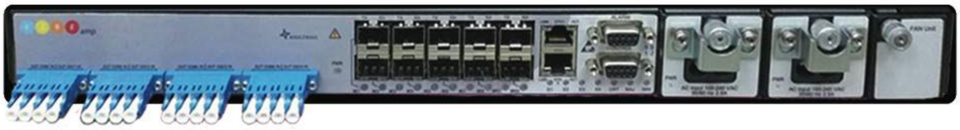


Figure 11: FIREamp™ Front Panel

2.3.1 Ring or Linear Add/Drop Configuration

The FIREamp™ front panel in ring or linear add/drop configuration contains the following connectors:

- Optical ports labeled "EDFA1", "EDFA2", "OSC1" and "OSC2"

- Two MNG ports labeled "MNG1" and "MNG2"
- 10/100 Base-T LAN connector labeled "ETH"
- CONTROL connector: RS-232 port
- External alarms connector labeled "ALARM"
- Power connections

2.3.2 Protected Point-to-Point Configuration

The front panel protected point-to-point configuration contains the following connectors:

- Optical ports labeled "COM", "OSC", "COM1" and "COM2",
- Two MNG ports labeled "MNG1" and "MNG2"
- 10/100 Base-T LAN connector labeled "ETH"
- CONTROL connector: RS-232 port
- External alarms connector labeled "ALARM"
- Power connections

2.3.3 Front Panel LEDs

The LEDs are located on the FIREamp™ front panel.

For the list of LEDs and their functions, see Technical Specifications.

2.4 Installing the FIREamp™ Unit

FIREamp™ units are intended for installation in 19-inch or 23-inch racks or placed on desktops or shelves.

⚠ **Caution:** Before installing a FIREamp™ unit, review the Safety Precautions (p. 17).

After installing the system, it is necessary to configure it in accordance with the specific user's requirements. The preliminary system configuration is performed through a supervision terminal directly connected to the FIREamp™ (for procedures for using the terminal, see Operation and Preliminary Configuration (p. 27)). The software necessary for using the terminal is stored in the FIREamp™.

2.4.1 Package Contents

The FIREamp™ package includes the following items:

- FIREamp™ unit
- Ethernet cable

- RS-232 terminal cable
- Power cord
  - **AC power**: AC power cord equipped with the appropriate plug (depending on customer location)
  - **DC power**: DC power cord
- Kit for rack installation: 19", 23" (if ordered), or 600 mm ETSI (if ordered)
- Fiber tray (if ordered)

2.4.2 Required Equipment

The cables needed to connect to the FIREamp™ depend on the FIREamp™ application. You can use standard cables or prepare the appropriate cables yourself (see Connection Data (p. 171)).

2.4.3 Cable Connections

Before starting, refer to the site installation plan and identify the cables intended for connection to this FIREamp™ unit (see Site Requirements (p. 19) and Connection Data (p. 171)).

2.4.3.1 Optical Cable Handling Precautions

Make sure that all the optical connectors are closed at all times, either by the appropriate protective caps or by the mating cable connector. Do not remove the protective cap until an optical fiber is connected to the corresponding connector, and immediately install a protective cap after a cable is disconnected.

- (Recommended) Before installing optical cables, thoroughly clean their connectors using an approved cleaning kit.
- When connecting optical cables, make sure to prevent cable twisting and avoid sharp bends. Unless otherwise specified by the optical cable manufacturer, the minimum fiber bending radius is 35 mm. Always leave some slack, to prevent stress.
- (Recommended) Install plastic supports on each cable connector. These supports determine the fiber bending radius at the connector entry point and also prevent stress at this point.

2.4.3.2 Connecting the FIREamp™ to Ground and Power

⚠ **Warning:** Any interruption of the protective (grounding) conductor (inside or outside the device) or disconnecting the protective earth terminal can make the device dangerous. Intentional interruption is prohibited.

⚠ **Grounding:**

- Before switching this FIREamp™ unit on and connecting any other cable, the FIREamp™ protective ground terminals must be connected to protective ground. This connection is made through the AC or DC power cable.
- The power cord plug should only be inserted in an outlet provided with a protective ground (earth) contact. The protective action must not be negated by using an extension cord (power cable) without a protective conductor (grounding).

⚠ **Warning:** Dangerous voltages may be present on the cables connected to the FIREamp™:

- Never connect cables to a FIREamp™ unit if it is not properly installed and grounded. This means that its power cable must be inserted in an outlet provided with a protective ground (earth) contact before connecting any user or network cable to the FIREamp™.
- Disconnect all the cables connected to the connectors of the FIREamp™ before disconnecting the FIREamp™ power cable.

⚠ **Caution:** The FIREamp™ does not have a power ON/OFF switch, and therefore it starts operating as soon as power is applied. To control the connection of power to the FIREamp™, it is recommended to use an external power ON/OFF switch that disconnects all poles simultaneously. For example, the circuit breaker used to protect the supply line to the FIREamp™ may also serve as the ON/OFF switch. This type of circuit breaker should be rated 10A.

Power should be supplied to the FIREamp™ through a power cable terminated in an appropriate plug, in accordance with the required power source.

To connect the FIREamp™ to ground and power:

1. Connect one end of the power cable to each FIREamp™ power connector.
2. When ready to apply power, insert the plug at the other end of the power cable into a socket (outlet) with a protective ground contact.

   The **PWR** LED of the FIREamp™ lights up and starts blinking.

2.4.3.3 Cabling the Management Ports

You can cable the following management connections:

- MNG port
- CONTROL port
- ETH port

2.4.3.3.1 Cabling the MNG Port

To cable the MNG port:

1. Remove the protective plug from the selected MNG port (MNG1 or MNG2) and insert an SFP transceiver.

2. Connect the MNG port to the LC connector labeled "OSC".

2.4.3.3.2 Cabling the CONTROL Port

To cable the CONTROL port:

- Connect the local console to the 9-pin CONTROL port using a straight cable (a cable wired point-to-point).

  For specific information regarding pin allocations in the FIREamp™ connectors, see Connection Data (p. 171).

2.4.3.3.3 Cabling the ETH Port

To cable the ETH port:

- Connect the 10/100 Base-T ETH port to the local LAN using a cable with an RJ-45 connector.

  For specific information regarding pin allocations in the FIREamp™ connectors, see Connection Data (p. 171).

2.5 Connection Schemata

This section presents schemata for cabling the FIREamp™ in two different topologies.

2.5.1 Example of FIREamp™ in Ring Topology

The following figure illustrates the FIREamp™ connected in ring or linear add/drop topology.

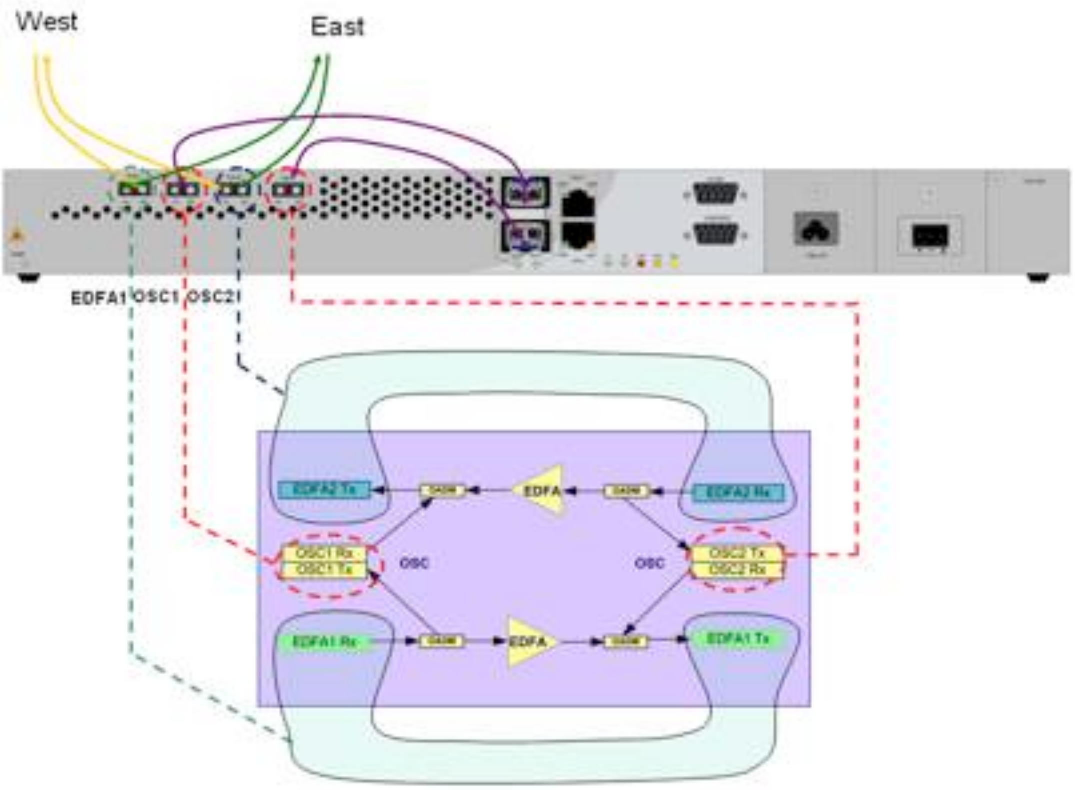


Figure 12: Example of a FIREamp™ in a Ring Topology

In this example the optical ports of the FIREamp™ are connected as follows:

- The EDFA1 Rx and EDFA2 Tx are connected to the fiber coming from West
- The EDFA2 Rx and EDFA1 Tx are connected to the fiber coming from East
- The MNG1 port is connected to OSC1
- The MNG2 port is connected to OSC2

2.5.2 Example of FIREamp™ in Point-to-Point Topology

The following figure illustrates the FIREamp™ connected in protected point-to-point topology.

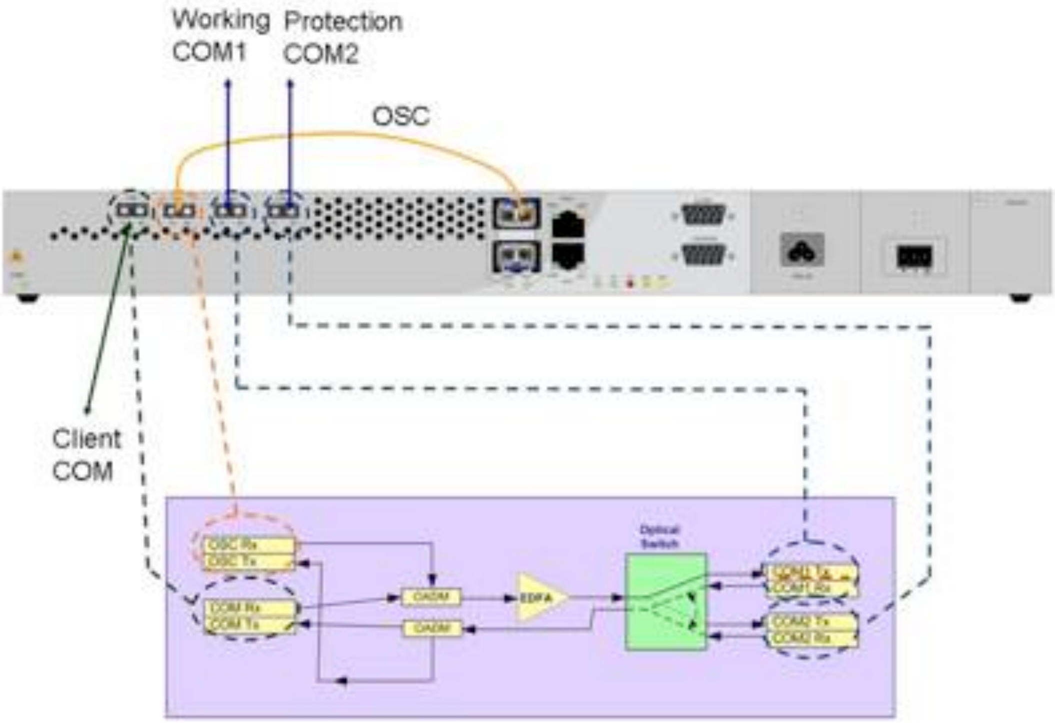


Figure 13: Example of a FIREamp™ in a Protected Point-to-Point Topology

In this example the optical ports of the FIREamp™ are connected as follows:

- The COM port is connected to the client fiber
- The COM1 and COM2 ports are connected to the Working and Protection fibers
- The OSC port is connected to MNG1

3 Operation and Preliminary Configuration

This chapter provides general operating instructions and preliminary configuration instructions for FIREamp™ units. It also explains how to access the Web application and CLI.

In this Chapter

3.1 Operating Instructions

This section provides instructions for connecting and configuring the terminal, and for turning on the FIREamp™.

3.1.1 Connecting and Configuring the Terminal

To connect and configure the terminal:

1. Connect a terminal to the CONTROL connector of the FIREamp™ using a straight (point-to-point) cable.

   Any standard VT-100 ASCII terminal (dumb terminal or PC emulating an ASCII terminal) equipped with an RS-232 communication interface can be used for FIREamp™ preliminary configuration (the exact pinout of the connector is described in Connection Data (p. 171)).
2. Check that the installation and the required cable connections have been correctly performed (see Installing the FIREamp™ Unit (p. 21)).
3. Configure the terminal as follows:
   - **9600 kbps**
   - **1 start bit**
   - **8 data bits**
   - **No parity**
   - **1 stop bit**
   - **Full-duplex**
   - **Echo off**
   - **Disable any type of flow control**

3.1.2 Turning on the FIREamp™

⚠ **Warning:** Do not connect the power before the unit is in the designated position. The FIREamp™ does not have a power ON/OFF switch and therefore starts operating as soon as the power is connected.

To turn on the FIREamp™:

1. Connect the FIREamp™ to the power source (see Connecting the FIREamp™ to Ground and Power (p. 22)).

   The **PWR** LED lights up and blinks during power up; all other LEDs (except **ETH**) are off during this time.

2. Wait for the completion of the power-up initialization and LED testing before starting to work on the system. This takes approximately one minute.

   The **PWR** LED lights steadily, and all other LEDs display the FIREamp™ status.

3.2 Performing Preliminary Configuration

You may perform the preliminary IP configuration using CLI via the CONTROL port. This port can be directly connected to a terminal using a cable wired point to point (see Connection Data (p. 171)).

For more information about the CLI commands, see CLI (p. 157).

As an alternative to using a local terminal, the first time preliminary configuration can also be performed via the Web browser, or via CLI over Telnet/SSH over TCP connection, using the default IP address **192.192.192.1** and subnet mask **255.255.255.0**.

To perform preliminary configuration:

1. Log in to the terminal.

   Note: The CLI of the FIREamp™ is user/password protected to ensure secure access.

   1. At the prompt, type the following CLI command: **login**

      The prompt to enter the user name appears.

   2. Type the default user name: **admin**

      The prompt to enter the password appears.

   3. Type the default password: **admin**

2. Configure the Ethernet port IP address via the terminal in order to support the Web-based application.

   1. Acquire the Ethernet IP address using CLI if needed (see Configure Interface Ethernet IP Command (p. 166)).

   2. At the prompt, type the following CLI command:

configure interface ethernet ip <addr> [-n <netmask>] [-g <gateway>]

Example: Configure the IP address to **192.168.0.100** with subnet mask **255.255.255.0**.

```
FIREamp™> configure interface ethernet ip 192.168.0.100 –n
255.255.255.0
```

Table 8: Configure Interface Ethernet IP Command Options

Attribute	Description	Format/Values
<addr>	IP address	Dot notation For example: 192.168.0.100 Default: 192.192.192.1
<netmask>	Subnet mask	• Dot notation For example: 255.255.255.0 • Hexadecimal notation For example: ffffff00 • Subnet mask of the IP class corresponding to the specified address Default: Subnet mask of the IP class corresponding to the specified address
<gateway>	Gateway IP address	Dot notation For example: 192.168.0.1

3.3 Accessing the Web Application

This section provides instructions for accessing the Web application.

3.3.1 Web Browser Requirements

The following are the Web browser requirements:

- Microsoft® Internet Explorer® version 8 or above
- Mozilla® Firefox® version 7 or above
- Google Chrome™ version 15 or above

The Web user interface enables user configuration via HTTP/HTTPS client (using default IP address **192.192.192.1** and subnet mask **255.255.255.0**).

The default address can be changed by the user. If a different IP address is desired, it is necessary to configure the Ethernet port interface IP address of the FIREamp™ before accessing the Web (see Performing Preliminary Configuration (p. 28)).

3.3.2 Prerequisites for Accessing the Web Application

The following are the prerequisites for accessing the Web application:

- The FIREamp™ is properly installed.
- The FIREamp™ is connected to a Web browser.
- Any pop-up blocking software is disabled.
- JavaScript should be enabled in the browser.

3.3.3 Logging In to the Web Application

To log in to the Web application:

1. Acquire the Ethernet IP address using CLI if needed (see Configure Interface Ethernet IP Command (p. 166)).
2. Open the Web browser.
3. In the address field of the browser, type the **IP address** of the FIREamp™ in the following format:

   `http://IP_address` (for HTTP access)

   or

   `https://IP_address` (for HTTP secure access)

   (**`<IP_address>`** stands for the actual IP address of the FIREamp™)
4. Press **Enter**.

   The Login window opens.

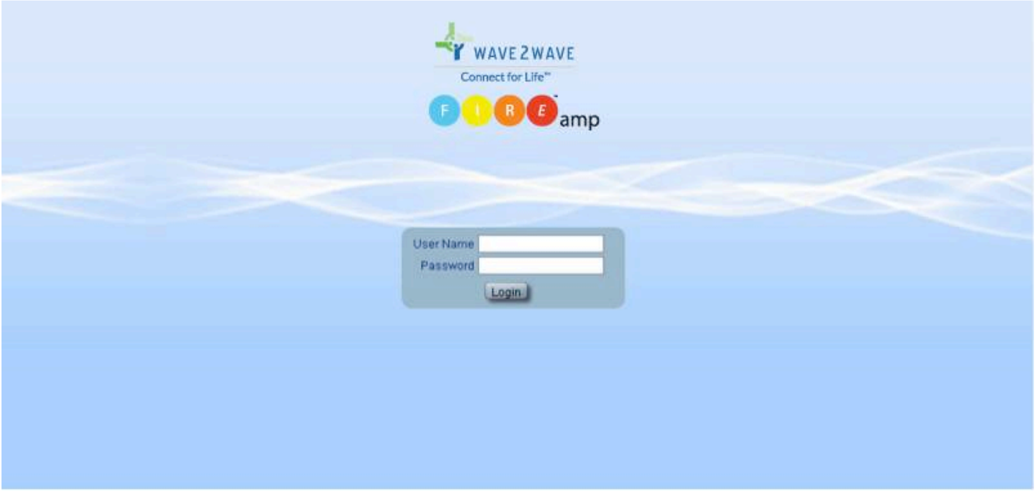


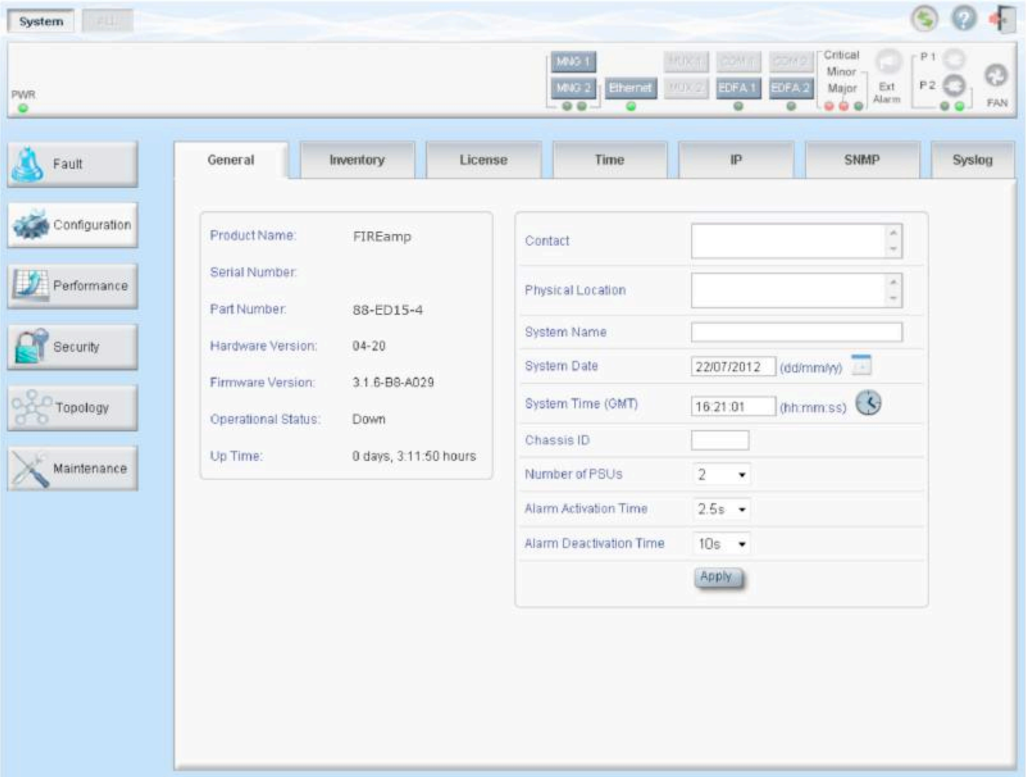
Figure 14: Login Window

5. In the **User Name** field, type the name of the user.

   Note: The user name and password are case sensitive.
6. In the **Password** field, type the password.

   Only alphanumeric characters without spaces are allowed.
7. Click **Login**.

The System Configuration window opens displaying the **General** tab.



Product Name: FIREamp
Serial Number:
Part Number: 88-ED15-4
Hardware Version: 04-20
Firmware Version: 3.1.6-B8-A029
Operational Status: Down
Up Time: 0 days, 3:11:50 hours

Contact
Physical Location
System Name
System Date 22/07/2012 (dd/mm/yy)
System Time (GMT) 16:21:01 (hh:mm:ss)
Chassis ID
Number of PSUs 2
Alarm Activation Time 2.5s
Alarm Deactivation Time 10s
Apply

Figure 15: System Configuration Window

3.3.4 Navigating the Web Application

This section describes the FIREamp™ item buttons, sidebar buttons, and tabs.

3.3.4.1 Item Buttons

The following figure shows an example of the item buttons used for performing operations in the Web application.

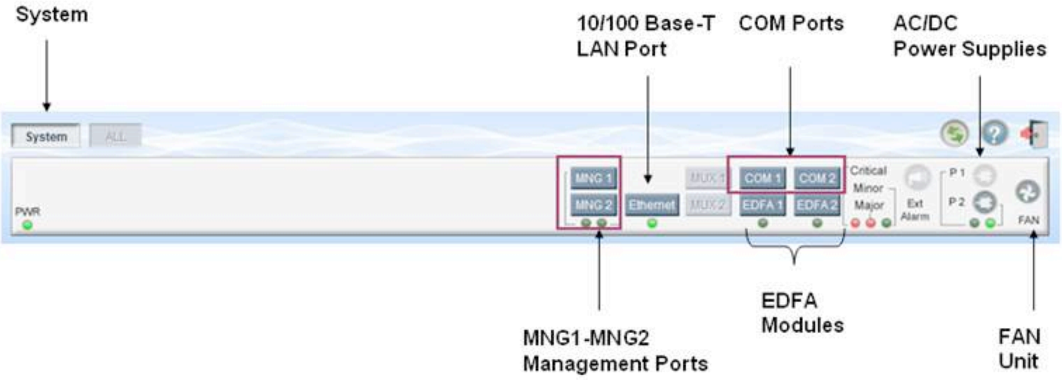


Figure 16: FIREamp™ Item Buttons

The buttons displayed vary according to the configuration. For example, if the FIREamp™ does not have an EDFA module installed, the **EDFA** button is disabled.

The buttons displayed also vary according to the context of the window. For example, the **MUX** button is disabled in the System Maintenance window because no maintenance operations are defined for this module.

3.3.4.2 Sidebar Buttons

The following figure shows the sidebar buttons.

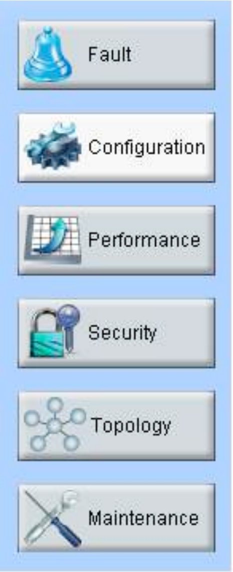


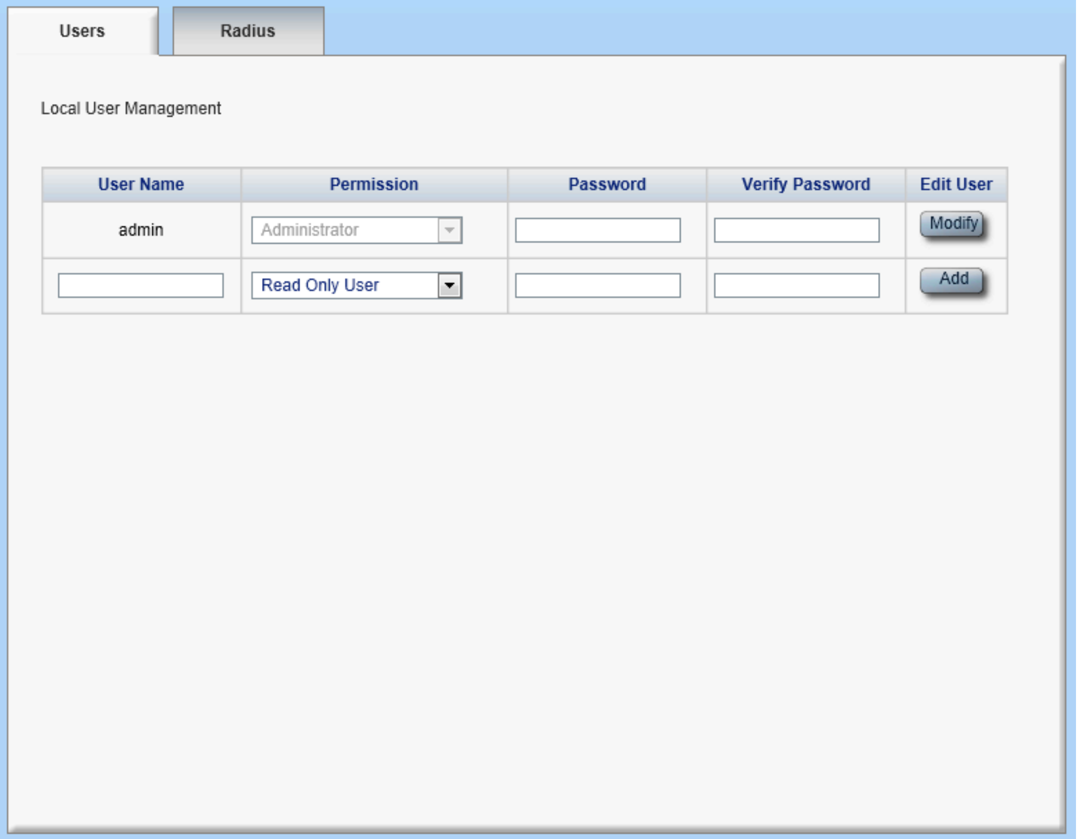
Figure 17: FIREamp™ Sidebar Buttons

Use the sidebar buttons to do the following:

- **Fault**: View FIREamp™ faults
- **Configuration**: Configure the FIREamp™ parameters
- **Performance**: View port performance monitoring and optical parameters monitoring
- **Security**: Manage users' accounts
- **Topology**: View the network topology
- **Maintenance**: Perform maintenance tasks for the FIREamp™

3.3.4.3 FIREamp™ Tabs

The following figure shows an example of the tabs used for performing system configuration operations in the Web application.



Local User Management

User Name	Permission	Password	Verify Password	Edit User
admin	Administrator			Modify
	Read Only User			Add

Figure 18: FIREamp™ Tabs (Example)

The tabs displayed vary according to the user permissions. For example, the **Radius** tab is displayed only for a user with Administrator account.

3.3.5 Logging Out of the Web Application

To log out of the Web application:

- Click **Logout** .

  You are logged out.

4 Security Management

This chapter describes how to manage users' accounts.

In this Chapter

4.1 User Access Levels

The FIREamp™ supports the following types of users.

Table 9: User Access Levels

User Type	Permissions	Notes
Administrator		
Administrator	Access and editing permissions for all functions; can add and delete users, change access levels, and change passwords.	• **User name**: admin • **Password**: admin (default) **Note:** You can change the password. However, the user name cannot be changed and is set to "admin" by default.
Non-Administrator		
Read/Write User	View menus and manage the node; cannot manage other users but can change their own password (see Changing Your Password (p. 42)).	
Read Only User	View menus only; no editing permissions except to change their own password (see Changing Your Password (p. 42)).	

4.2 User Authentication Methods

The access to the FIREamp™ Web application and CLI is protected. Therefore, before performing any operation on the device, the user needs to log in to the node by entering a user name and password, which is then authenticated by the node.

There are two methods for user authentication:

- Local authentication
- Remote authentication

4.2.1 Local Authentication

The local authentication method is always enabled. The authentication is performed against a local database stored in the node.

Local authentication requires that an updated list of user names and passwords be provided to each node in the network.

4.2.2 Remote Authentication

The FIREamp™ supports centralized authentication, implemented with the Radius protocol as defined by RFC-2865.

The remote authentication method is optional, and can be enabled or disabled by the network administrator. The authentication is performed against a centralized database stored on a Radius server.

The remote authentication allows the network administer to keep the updated list of user names and passwords on a Radius server.

When a user tries to log in and the user name and password are not on the local user list, if the Radius authentication is enabled, the node communicates with the Radius server and performs remote user authentication. If the user name and password are on the remote user list, the log in succeeds.

4.2.2.1 Attribute Value Pairs

The Radius Attribute Value Pairs (AVP) carry data in both the request and the response for the authentication.

The following table lists the attributes used by the remote Radius authentication.

Table 10: Attributes Used

Attribute	AVP Type	Access-Request	Access-Accept	Format/Values
User-Name	1	√	√	The name of the user as carried by the Radius **Access-Request**. Format: String
User-Password	2	√	√	The password of the user as carried by the Radius **Access-Request**. Format: String

Attribute	AVP Type	Access-Request	Access-Accept	Format/Values
Class	25	-	√	The access level granted to the user as carried by the Radius **Access-Accept**. Format: String Allowed values: • **1**: read-only access • **2**: read-write access • **4**: admin access

4.2.2.2 Shared Secret

The Radius protocol does not transmit passwords in clear text between the Radius client and server. Rather, a shared secret is used along with the MD5 hashing algorithm to encrypt passwords. The shared secret string is not sent over the network; therefore that same key should be independently configured to the Radius clients and server.

4.2.2.3 Server Redundancy

For improved redundancy, the FIREamp™ can use one or two Radius servers: Server #1 and Server #2.

Note: There is no precedence between the Radius servers; therefore, the authentication response is taken from the first server to answer.

4.2.2.4 Setting Up Radius

Before using Radius, the network administration should set up the Radius servers and enable Radius authentication.

To set up Radius:

1. Launch one or two Radius servers on Windows/Unix systems that are accessible to the nodes via the IP network.
2. Configure the Radius servers with **Shared Secret** string that will be used by the Radius servers and clients.
3. Enter the user name, password, and permission of all users to the Radius servers.
4. Configure the access information to the Radius servers for the Radius clients of the nodes.
5. Enable Radius authentication for all nodes.

4.2.2.5 Configuring the Radius Server

Note: The server configuration process may look different on different Radius server packages.

An Administrator can configure the Radius server.

To configure the Radius server:

1. Configure the **Authentication Port** (default port is 1812).

   Note: If a firewall exists between the nodes to the Radius servers, make sure that it does not block the chosen port.

2. Configure the **Shared Secret**.
3. For each user, configure the following attributes:
   - **User-Name**

     Only alphanumeric characters without spaces are allowed.

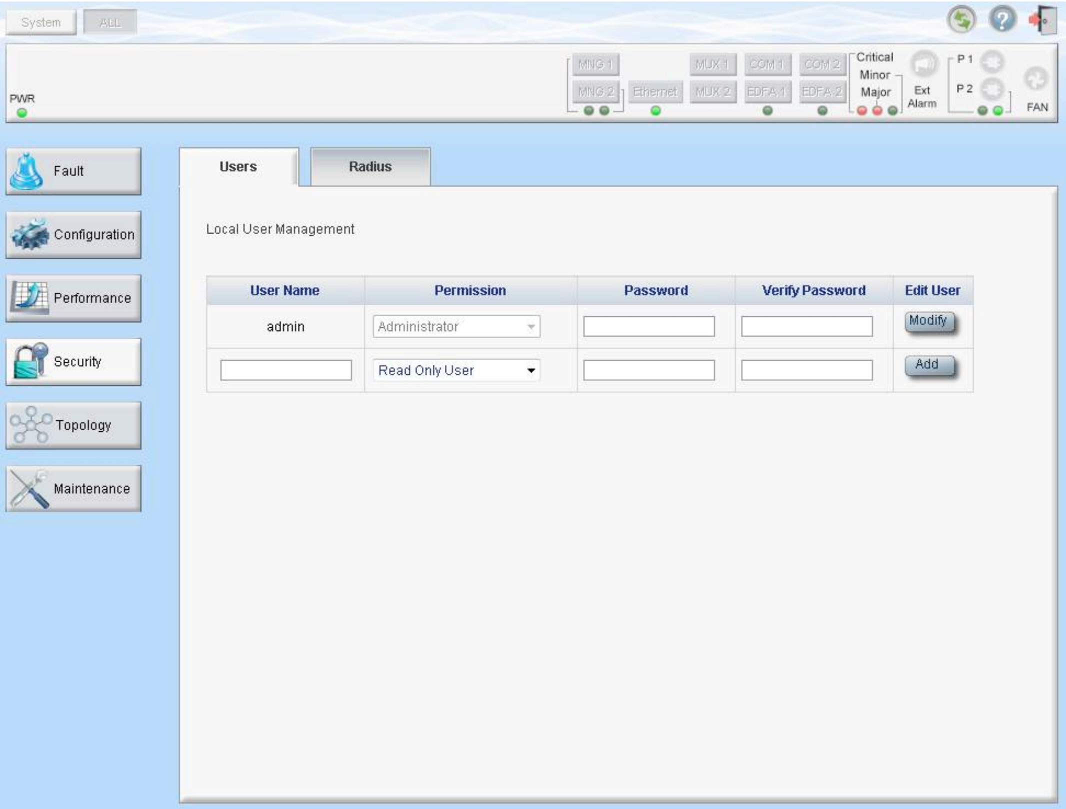
   - **User-Password**

     Only alphanumeric characters without spaces are allowed.

   - **Class**

   For a description of the attributes, see Attribute Value Pairs (p. 36).

4.3 Security Settings



Local User Management

User Name	Permission	Password	Verify Password	Edit User
admin	Administrator			Modify
	Read Only User			Add

Figure 19: Security Settings Window

Use the Security Settings window to do the following:

- **Users tab (Administrator)**: Add a new user, change a user password, change a user permission level, and delete a user

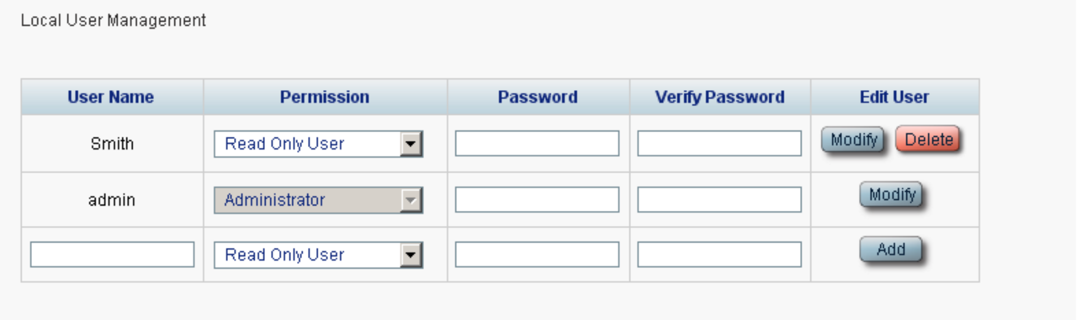
- **Users tab (Non-Administrator)**: Change your password
- **Radius tab (Administrator)**: Configure the Radius client

To open the Security Settings window:

- Click **Security**.

  The Security Settings window opens.

4.3.1 Users Tab (Administrator)



Local User Management

User Name	Permission	Password	Verify Password	Edit User
Smith	Read Only User			Modify Delete
admin	Administrator			Modify
	Read Only User			Add

Figure 20: Users Tab (Administrator)

An Administrator can use the Users tab to manage the user list for local authentication:

- Add a new user
- Change a user password
- Change a user permission level
- Delete a user

4.3.1.1 Adding a New User

An Administrator can use the Users tab to add a new user.

To add a new user:

1. Click the **Users** tab.

   The Users tab opens displaying all users and their permission levels.
2. Fill in the fields as explained in the following table.
3. Click **Add**.

   The new user is added.

Table 11: Users Tab Parameters (Administrator)

Parameter	Description	Format/Values
User Name	The name of the user.	Only alphanumeric characters without spaces are allowed.
Permission	The permission level for the user.	Administrator, Read/Write User, Read Only User (see User Access Levels (p. 35))

Parameter	Description	Format/Values
Password	The password for the user.	Only alphanumeric characters without spaces are allowed. **Note:** The password is hidden for security reasons.
Verify Password	The password for the user again.	Only alphanumeric characters without spaces are allowed. **Note:** The password is hidden for security reasons.

4.3.1.2 Changing a User Permission Level

An Administrator can use the Users tab to change a user permission level.

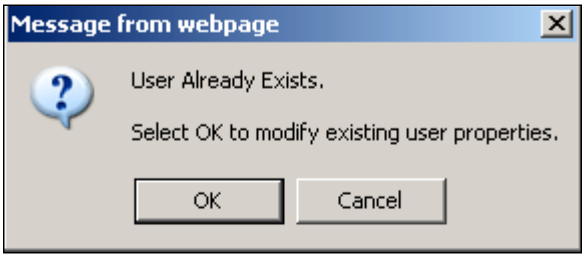
To change a user permission level:

1. Click the **Users** tab.

   The Users tab opens displaying all users and their permission levels.

2. Find the user whose password you want to change.
3. From the **Permission** drop-down list, select the new permission level for this user (see User Access Levels (p. 35)).
4. Click **Modify**.

   The following confirmation message appears.



Message from webpage

User Already Exists.

Select OK to modify existing user properties.

Figure 21: Confirm Changes

5. Click **OK**.

   The new permission level is assigned to the specified user.

4.3.1.3 Changing a User Password

An Administrator can use the Users tab to change all user passwords.

Note: For security reasons, it is recommended to change the default **admin** password. If the Administrator password has been changed and is unknown, contact Wave2Wave Technical Support.

To change a user password:

1. Click the **Users** tab.

   The Users tab opens displaying all users and their permission levels.

2. Find the user whose password you want to change.

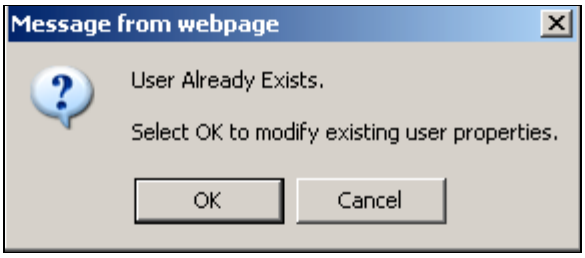
3. In the **Password** field, type the new password.

   Only alphanumeric characters without spaces are allowed.

   Note: The password is hidden for security reasons.

4. In the **Verify Password** field, type the new password again.
5. Click **Modify**.

   The following confirmation message appears.



Message from webpage

User Already Exists.

Select OK to modify existing user properties.

Figure 22: Confirm Changes

6. Click **OK**.

   The new password is assigned to the specified user.

4.3.1.4 Deleting a User

An Administrator can use the Users tab to delete a user.

Note: The **admin** user cannot be deleted.

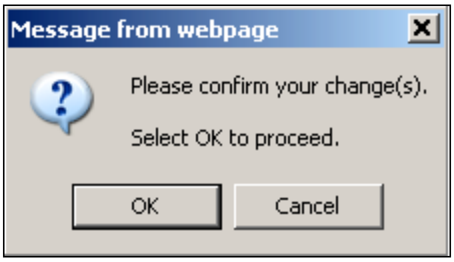
To delete a user:

1. Click the **Users** tab.

   The Users tab opens displaying all users and their permission levels.

2. Find the user you want to delete.
3. Click **Delete**.

   The following confirmation message appears.



Message from webpage

Please confirm your change(s).

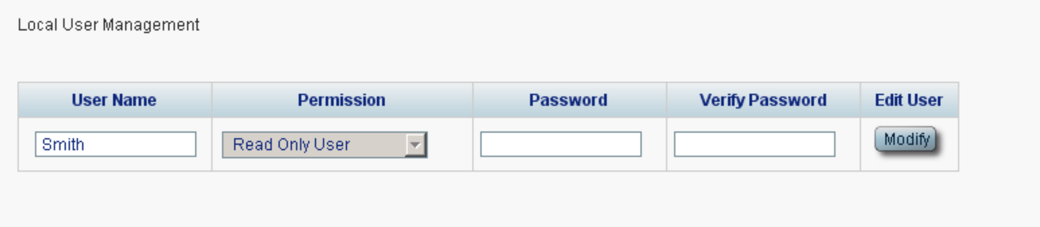
Select OK to proceed.

Figure 23: Confirm Delete

4. Click **OK**.

   The specified user is deleted.

4.3.2 Users Tab (Non-Administrator)



Local User Management

User Name	Permission	Password	Verify Password	Edit User
Smith	Read Only User			Modify

Figure 24: Users Tab (Non-Administrator)

Non-administrator users cannot manage other users; however, they can use the Users tab to change their own password if they are on the local user list.

4.3.2.1 Changing Your Password

A non-administrator can use the Users tab to change their own password.

To change your password:

1. Click the **Users** tab.

   The Users tab opens displaying your user name and permissions.

2. In the **Password** field, type the new password.

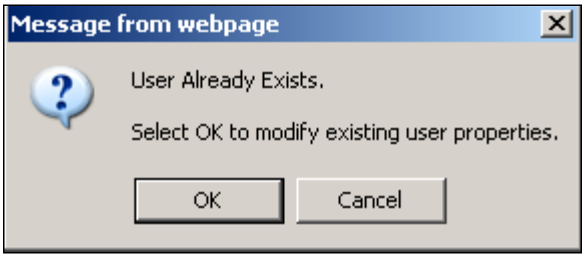
   Only alphanumeric characters without spaces are allowed.

   Note: The password is hidden for security reasons.

3. In the **Verify Password** field, type the new password again to be certain that it was typed correctly.

4. Click **Modify**.

   The following confirmation message appears.



Message from webpage

User Already Exists.

Select OK to modify existing user properties.

Figure 25: Confirm Changes

5. Click **OK**.

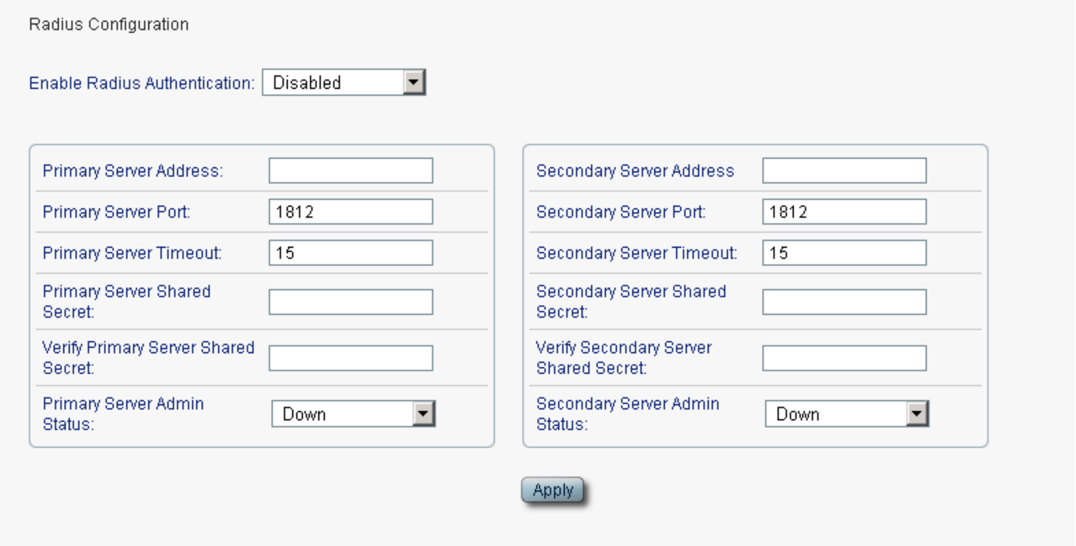
   Your password is changed.

Table 12: Users Tab Parameters (Non-Administrator)

Parameter	Description	Format/Values
User Name	Your user name.	Only alphanumeric characters without spaces are allowed. **Note:** This field is read only.

Parameter	Description	Format/Values
Permission	Your permission level for the user.	Read-Write User, Read Only User **Note:** This field is read only.
Password	Your password.	Only alphanumeric characters without spaces are allowed. **Note:** The password is hidden for security reasons.
Verify Password	Your password again.	Only alphanumeric characters without spaces are allowed. **Note:** The password is hidden for security reasons.

4.3.3 Radius Tab (Administrator)



Radius Configuration

Enable Radius Authentication: Disabled

Primary Server Address:		Secondary Server Address	
Primary Server Port:	1812	Secondary Server Port:	1812
Primary Server Timeout:	15	Secondary Server Timeout:	15
Primary Server Shared Secret:		Secondary Server Shared Secret:	
Verify Primary Server Shared Secret:		Verify Secondary Server Shared Secret:	
Primary Server Admin Status:	Down	Secondary Server Admin Status:	Down

Figure 26: Radius Tab (Administrator)

An Administrator can use the Radius tab to configure the Radius client on the node.

4.3.3.1 Configuring the Radius Client

An Administrator can use the Radius tab to configure the Radius client on the node.

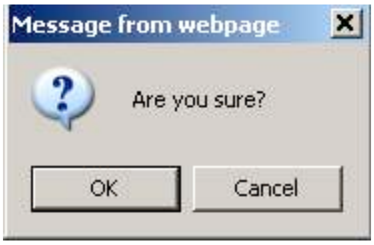
Note: For the remote Radius authentication to be activated, the **Enable Radius Authentication** must be set to **Enabled** and the **Admin Status** of at least one server must be set to **Up**.

To configure the Radius client:

1. Click the **Radius** tab.

   The Radius tab opens displaying the Radius configuration.
2. Fill in the fields as explained in the following table.
3. Click **Apply**.

The following confirmation message appears.



Message from webpage

Are you sure?

Figure 27: Confirm Configuration

4. Click **OK**.

   The Radius client is configured.

Table 13: Radius Tab Parameters (Administrator)

Parameter	Description	Format/Values
Enable Radius Authentication	Whether or not to enable the Radius authentication.	Enabled, Disabled
Primary Server Address	The IP address of the primary server.	Dot notation For example: `192.168.0.100`
Primary Server Port	The port number of the primary server.	1812 (default)
Primary Server Timeout	The amount of time before the primary server times out (in seconds).	Integer
Primary Server Shared Secret	The shared secret for the primary server.	Free text
Verify Primary Server Shared Secret	The shared secret for the primary server again.	Free text
Primary Server Admin Status	The administrative status of the primary server.	Up, Down
Secondary Server Address	The IP address of the secondary server.	Dot notation For example: `192.168.0.100`
Secondary Server Port	The port number of the secondary server.	1812 (default)
Secondary Server Timeout	The amount of time before the secondary server times out (in seconds).	Integer
Secondary Server Shared Secret	The shared secret for the secondary server.	Free text
Verify Secondary Server Shared Secret	The shared secret for the secondary server again.	Free text
Secondary Server Admin Status	The administrative status of the secondary server.	Up, Down

5 Fault Management

This chapter describes the FIREamp™ fault management, which is used to localize and identify problems in the network incorporating FIREamp™ units.

In this Chapter

5.1 Fault Views

This section describes the following Fault views:

- Alarms
- Events
- Configuration Changes

5.1.1 Alarms

The FIREamp™ keeps a list of the alarms currently detected on the system. When an alarm is detected, the **Alarm Rise** event is generated and the alarm is added to the list. When the **Alarm Clear** is detected, the alarm is removed from the list.

The following information is stored for each alarm:

- **Date and Time**: The date and time when the alarm was detected.
- **Source**: The entity that caused the alarm.
- **Severity**: The severity of the alarm.
- **Type**: The type of the alarm.
- **Service Affecting**: **Yes** or **No** according to the alarm impact.

5.1.2 Events

The FIREamp™ continuously monitors the traffic signals and other exceptional conditions. Whenever such a condition occurs, the FIREamp™ generates a time stamped event message and sends it as an SNMP notification to the registered management systems. The FIREamp™ logs the history of the last 512 events in a cyclic buffer that can be browsed by the Web application or by SNMP management systems.

In addition, the events and audit messages are printed in the FIREamp™ system log files, which can be exported to a text file for offline viewing.

The FIREamp™ provides the following events:

- **Alarm Rise**: Alarms are standing faults. They are raised after a configurable stabilization period of several seconds. These events are generated when a new alarm occurs.
- **Alarm Clear**: Alarms are standing faults. They are cleared after a configurable stabilization period of several seconds. These events are generated when an alarm is cleared.
- **Cold Restart**: These are standard SNMP events that are generated after a Cold Restart to the node.
- **Warm Restart**: These are standard SNMP events that are generated after a Warm Restart to the node.
- **Test Status Changed**: These events are generated when the loopback or PRBS test status of a port is changed.
- **Protection Switching Event**: These events are generated when protection switching occurs.
- **Inventory Change**: These events are generated when the node inventory is changed.
- **Unsolicited Event**: These events are generated when an exceptional event occurs.
- **Configuration Change**: These events are generated when the node configuration is changed.

5.1.3 Configuration Changes

The FIREamp™ generates an event when the configuration of a node is explicitly changed by the user and stores the event in the Configuration Changes log for auditing.

5.2 General Faults Viewing Procedure

The following is the general procedure for viewing the FIREamp™ faults. The specific procedures for each item are provided in the following sections.

To view the FIREamp™ faults:

1. Click **Fault**.

2. Click the desired button in the upper portion of the window to select the item to view:

   - **System** (see System Faults (p. 47))
   - **All** (see All Faults (p. 53))
   - **MNG** (see Management Port Faults (p. 59))
   - **Ethernet** (see Ethernet Port Faults (p. 65))
   - **EDFA** (if exists) (see EDFA Module Faults (p. 71))
   - **COM** (if exists) (see COM Port Faults (p. 77))
   - **PSU** (see PSU Faults (p. 83))

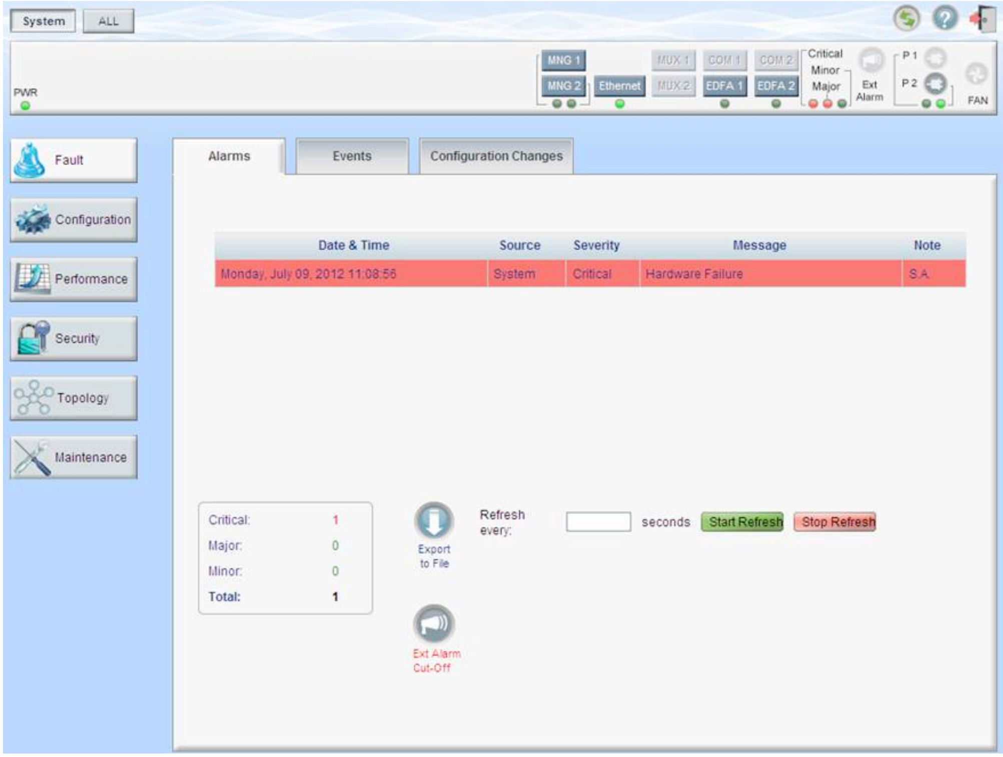
   The appropriate Fault window opens.

3. Click one of the following tabs:

   - **Alarms**
   - **Events**
   - **Configuration Changes**

     The appropriate tab opens. Note that some or all of the fields may be read only.

5.3 System Faults



Date & Time	Source	Severity	Message	Note
Monday, July 09, 2012 11:08:56	System	Critical	Hardware Failure	S.A.

Critical:	1
Major:	0
Minor:	0
Total:	**1**

Refresh every: seconds

Figure 28: System Fault Window

Use the System Fault window to do the following:

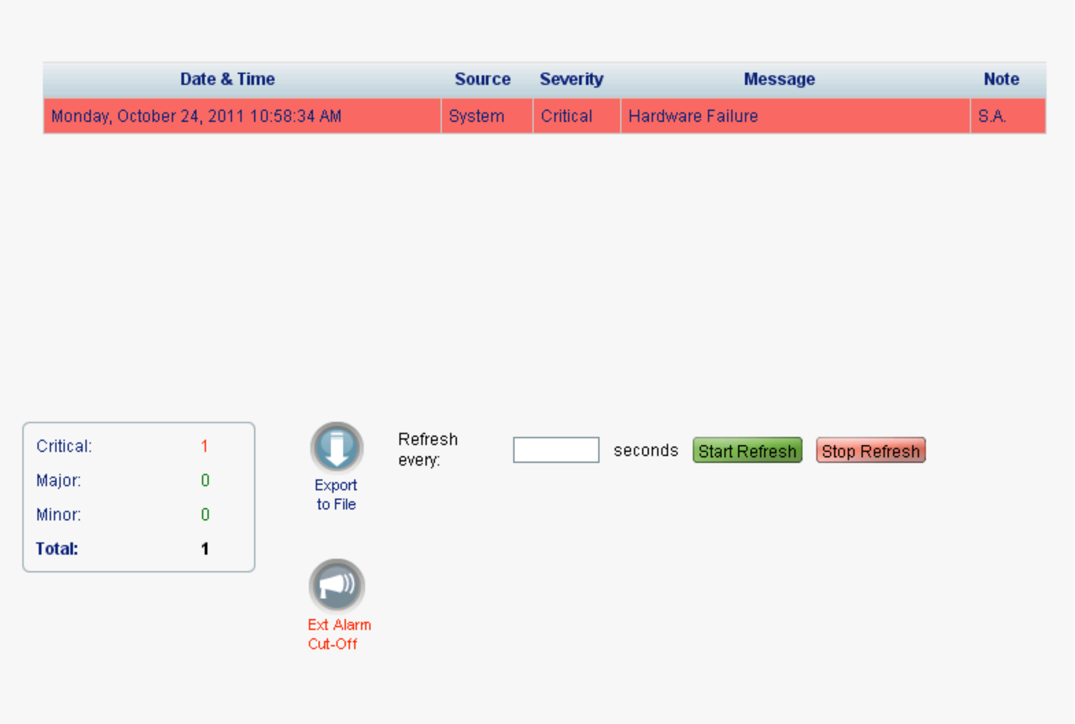
- **Alarms tab**: View the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Event Log tab**: View the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Configuration Changes tab**: View the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display

To open the System Fault window:

1. Click **Fault**.
2. Click **System**.

   The System Fault window opens.

5.3.1 Alarms Tab



Date & Time	Source	Severity	Message	Note
Monday, October 24, 2011 10:58:34 AM	System	Critical	Hardware Failure	S.A.

Critical:	1
Major:	0
Minor:	0
Total:	**1**

Figure 29: Alarms Tab

Use the Alarms tab to view the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view current alarms:

1. Click the **Alarms** tab.

The Alarms tab opens displaying the list of current alarms along with the problems in the node. The fields are read only and explained in the following table.

The color of the alarm background indicates the severity of the alarm:

- **Red**: Critical or Major alarm
- **Yellow**: Minor alarm

Note: The LED display reflects the actual LED indications on the unit. For the list of LEDs and their functions, see Technical Specifications.

2. To export the list of alarms to a file:
    1. Click **Export to File** .

       The Opening table.csv dialog box appears.
    2. Click **Save File**.
    3. Click **OK**.
3. To set the refresh rate of the Fault display:
    1. In the **Refresh every** field, type the number of seconds that the window should refresh.

       The minimum refresh rate is 2 seconds.
    2. Click **Start Refresh**.

       The information is automatically updated after the specified number of seconds.
4. To refresh the Fault display manually, click **Refresh** .

   The information is updated immediately.
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.
6. To turn off the external alarm, click **Ext Alarm Cut-Off** .

   The external alarm caused by the current faults turns off; new faults will activate the external alarm again.

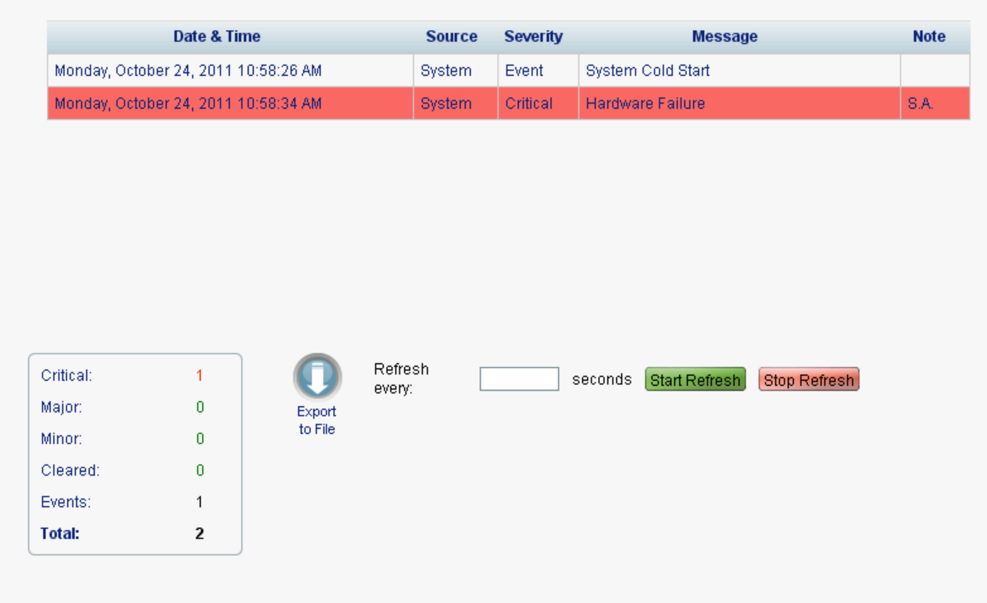
   Note: This action does not clear any alarms.

Table 14: Alarms Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the alarm was detected.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the alarm.	
Severity	The severity of the alarm.	Critical, Major, Minor

Parameter	Description	Format/Values
Message	The type of alarm.	
Note	Whether or not the alarm is service affecting.	• **S.A.**: The alarm is service affecting. • **Blank**: The alarm is not service affecting.

5.3.2 Events Tab



Date & Time	Source	Severity	Message	Note
Monday, October 24, 2011 10:58:26 AM	System	Event	System Cold Start	
Monday, October 24, 2011 10:58:34 AM	System	Critical	Hardware Failure	S.A.

Critical:	1
Major:	0
Minor:	0
Cleared:	0
Events:	1
Total:	**2**

Figure 30: Events Tab

Use the Events tab to view the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Event Log:

1. Click the **Events** tab.

   The Events tab opens displaying the list of events and history of the node's fault notifications. The fields are read only and explained in the following table.

   The color of the event background indicates the severity of the event:

   - **Red**: Indicates the occurrence of a Critical or Major alarm
   - **Yellow**: Indicates the occurrence of a Minor alarm
   - **Green**: Indicates that the corresponding alarm is cleared
   - **White**: Indicates informational messages

2. To export the Event Log to a file:

   1. Click **Export File** ⬇.

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** ⟳.

   The information is updated immediately.

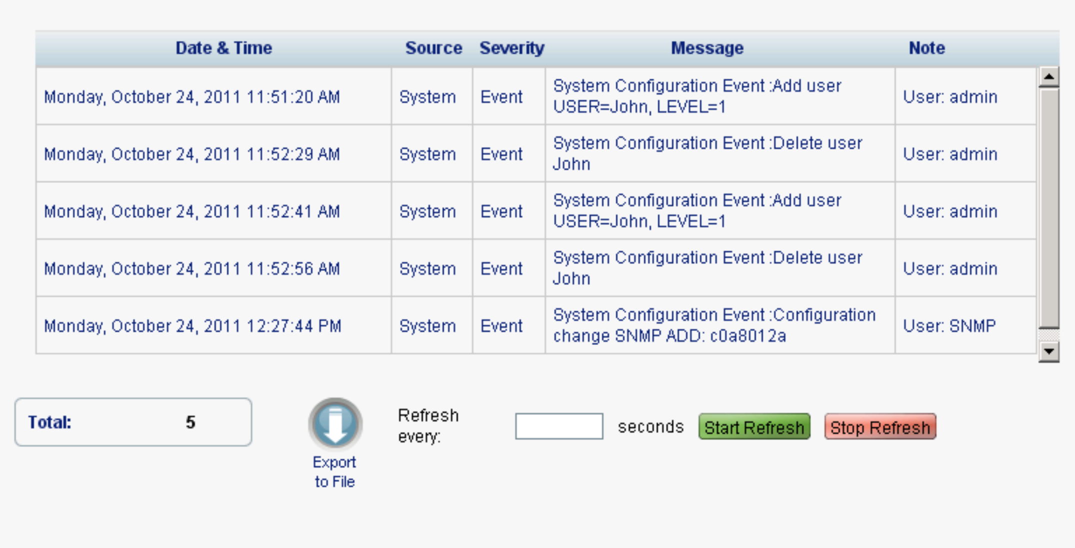
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 15: Events Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the event occurred.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the event.	
Severity	The severity of the event.	Critical, Major, Minor, Cleared, Event
Message	The type of event.	
Note	Information related to the event.	• **S.A.**: The event is service affecting. • **Blank**: The event is not service affecting. • **Other**: Information related to the event.

5.3.3 Configuration Changes Tab



Date & Time	Source	Severity	Message	Note
Monday, October 24, 2011 11:51:20 AM	System	Event	System Configuration Event :Add user USER=John, LEVEL=1	User: admin
Monday, October 24, 2011 11:52:29 AM	System	Event	System Configuration Event :Delete user John	User: admin
Monday, October 24, 2011 11:52:41 AM	System	Event	System Configuration Event :Add user USER=John, LEVEL=1	User: admin
Monday, October 24, 2011 11:52:56 AM	System	Event	System Configuration Event :Delete user John	User: admin
Monday, October 24, 2011 12:27:44 PM	System	Event	System Configuration Event :Configuration change SNMP ADD: c0a8012a	User: SNMP

Total: 5

Figure 31: Configuration Changes Tab

Use the Configuration Changes tab to view the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Configuration Changes Log:

1. Click the **Configuration Changes** tab.

   The Configuration Changes tab opens displaying the list of Configuration events and history of the node's fault notifications. The fields are read only and explained in the following table.

2. To export the Configuration Changes Log to a file:

   1. Click **Export to File** ⬇.

      The Opening table.csv dialog box appears.

   2. Click **Save File.**

   3. Click **OK.**

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** ⟳.

The information is updated immediately.

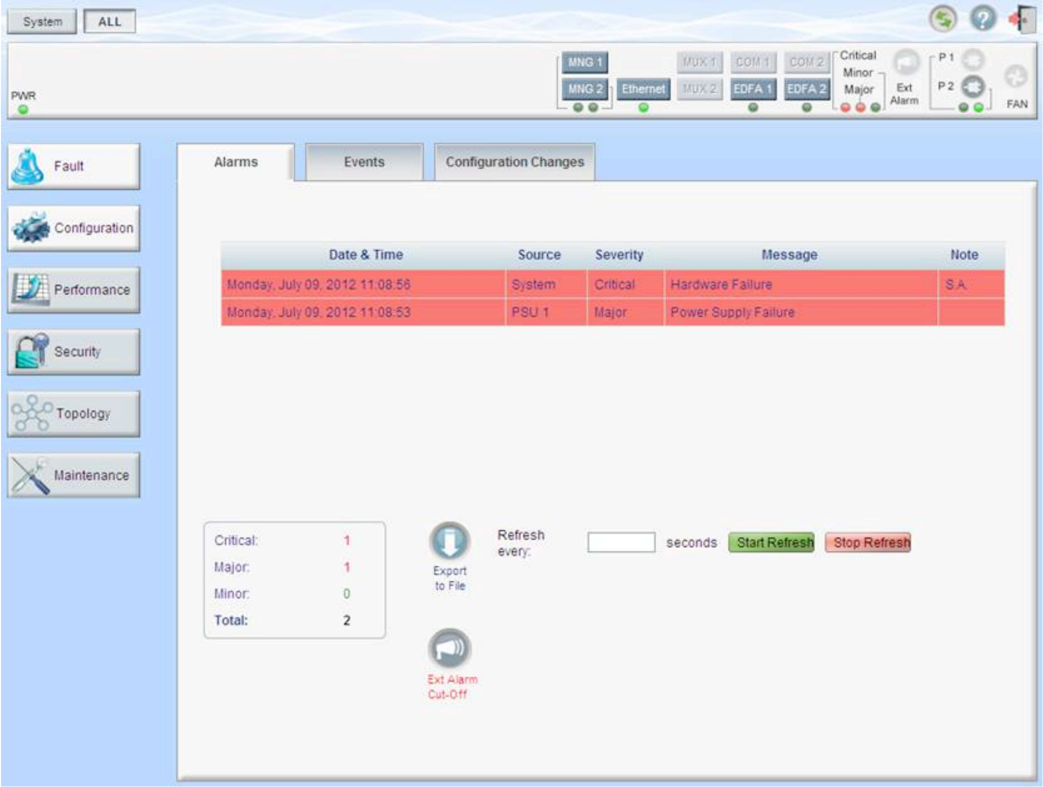
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 16: Configuration Changes Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the change was made.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the change.	
Severity	The severity of the change.	Critical, Major, Minor, Cleared, Event
Message	The type of change.	
Note	Information related to the change.	

5.4 All Faults



Date & Time	Source	Severity	Message	Note
Monday, July 09, 2012 11:08:56	System	Critical	Hardware Failure	S.A.
Monday, July 09, 2012 11:08:53	PSU 1	Major	Power Supply Failure	

Critical:	1
Major:	1
Minor:	0
Total:	2

Figure 32: All Fault Window

Use the All Fault window to do the following:

- **Alarms tab**: View the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Events tab**: View the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display

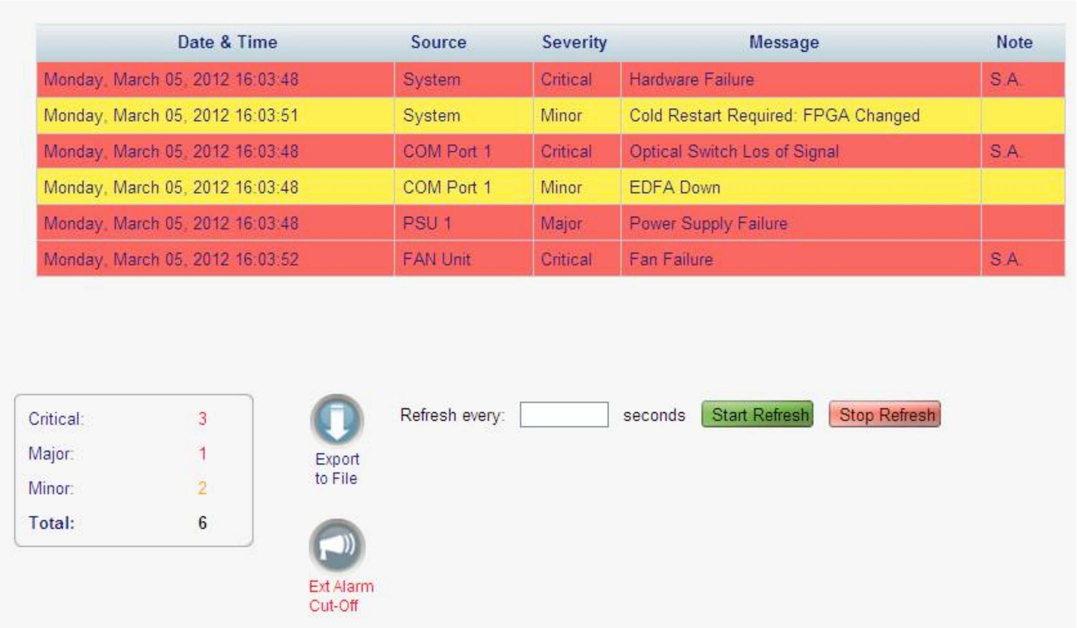
- **Configuration Changes tab**: View the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display

To open the All Fault window:

1. Click **Fault**.
2. Click **All**.

   The All Fault window opens.

5.4.1 Alarms Tab



Date & Time	Source	Severity	Message	Note
Monday, March 05, 2012 16:03:48	System	Critical	Hardware Failure	S.A.
Monday, March 05, 2012 16:03:51	System	Minor	Cold Restart Required: FPGA Changed	
Monday, March 05, 2012 16:03:48	COM Port 1	Critical	Optical Switch Los of Signal	S.A.
Monday, March 05, 2012 16:03:48	COM Port 1	Minor	EDFA Down	
Monday, March 05, 2012 16:03:48	PSU 1	Major	Power Supply Failure	
Monday, March 05, 2012 16:03:52	FAN Unit	Critical	Fan Failure	S.A.

Critical:	3
Major:	1
Minor:	2
Total:	6

Figure 33: Alarms Tab

Use the Alarms tab to view the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view current alarms:

1. Click the **Alarms** tab.

   The Alarms tab opens displaying the list of current alarms along with the problems in the node. The fields are read only and explained in the following table.

   The color of the alarm background indicates the severity of the alarm:

   - **Red**: Critical or Major alarm
   - **Yellow**: Minor alarm

   Note: The LED display reflects the actual LED indications on the unit. For the list of LEDs and their functions, see Technical Specifications.

2. To export the list of alarms to a file:

    1. Click **Export to File** ⬇.

        The Opening table.csv dialog box appears.

    2. Click **Save File**.

    3. Click **OK**.

3. To set the refresh rate of the Fault display:

    1. In the **Refresh every** field, type the number of seconds that the window should refresh.

        The minimum refresh rate is 2 seconds.

    2. Click **Start Refresh**.

        The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** ⟳.

    The information is updated immediately.

5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

    The automatic refresh is stopped and the **Refresh every** field is cleared.

6. To turn off the external alarm, click **Ext Alarm Cut-Off** 📢.

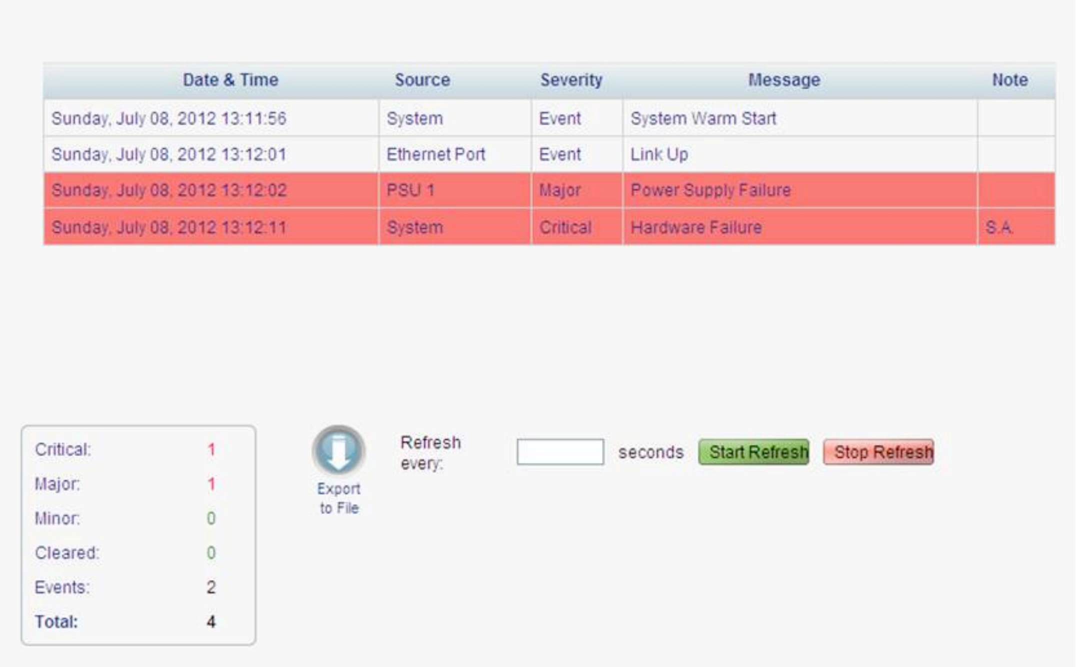
    The external alarm caused by the current faults turns off; new faults will activate the external alarm again.

    Note: This action does not clear any alarms.

Table 17: Alarms Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the alarm was detected.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the alarm.	
Severity	The severity of the alarm.	Critical, Major, Minor
Message	The type of alarm.	
Note	Whether or not the alarm is service affecting.	• **S.A.**: The alarm is service affecting. • **Blank**: The alarm is not service affecting.

5.4.2 Events Tab



Date & Time	Source	Severity	Message	Note
Sunday, July 08, 2012 13:11:56	System	Event	System Warm Start	
Sunday, July 08, 2012 13:12:01	Ethernet Port	Event	Link Up	
Sunday, July 08, 2012 13:12:02	PSU 1	Major	Power Supply Failure	
Sunday, July 08, 2012 13:12:11	System	Critical	Hardware Failure	S.A.

Critical:	1
Major:	1
Minor:	0
Cleared:	0
Events:	2
Total:	4

Figure 34: Events Tab

Use the Events tab to view the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Event Log:

1. Click the **Events** tab.

   The Events tab opens displaying the list of events and history of the node's fault notifications. The fields are read only and explained in the following table.

   The color of the event background indicates the severity of the event:

   - **Red**: Indicates the occurrence of a Critical or Major alarm
   - **Yellow**: Indicates the occurrence of a Minor alarm
   - **Green**: Indicates that the corresponding alarm is cleared
   - **White**: Indicates informational messages

2. To export the Event Log to a file:

   1. Click **Export File** ⇩.

      The Opening table.csv dialog box appears.

   2. Click **Save File**.
   3. Click **OK**.

3. To set the refresh rate of the Fault display:

1. In the **Refresh every** field, type the number of seconds that the window should refresh.

   The minimum refresh rate is 2 seconds.

2. Click **Start Refresh**.

   The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** .

   The information is updated immediately.

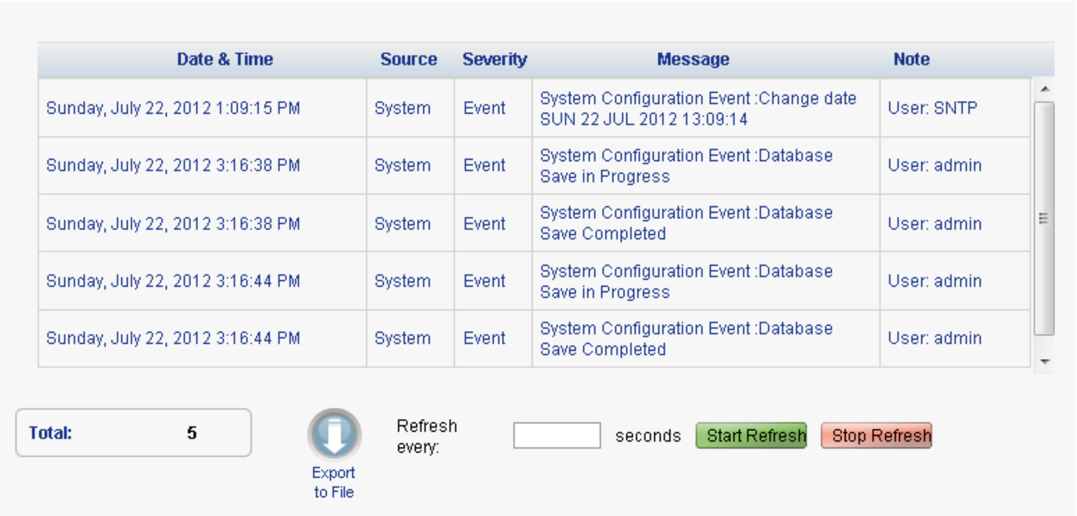
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 18: Events Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the event occurred.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the event.	
Severity	The severity of the event.	Critical, Major, Minor, Cleared, Event
Message	The type of event.	
Note	Information related to the event.	• **S.A.**: The event is service affecting. • **Blank**: The event is not service affecting. • **Other**: Information related to the event.

5.4.3 Configuration Changes Tab



Date & Time	Source	Severity	Message	Note
Sunday, July 22, 2012 1:09:15 PM	System	Event	System Configuration Event :Change date SUN 22 JUL 2012 13:09:14	User: SNTP
Sunday, July 22, 2012 3:16:38 PM	System	Event	System Configuration Event :Database Save in Progress	User: admin
Sunday, July 22, 2012 3:16:38 PM	System	Event	System Configuration Event :Database Save Completed	User: admin
Sunday, July 22, 2012 3:16:44 PM	System	Event	System Configuration Event :Database Save in Progress	User: admin
Sunday, July 22, 2012 3:16:44 PM	System	Event	System Configuration Event :Database Save Completed	User: admin

Total: 5

Figure 35: Configuration Changes Tab

Use the Configuration Changes tab to view the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Configuration Changes Log:

1. Click the **Configuration Changes** tab.

   The Configuration Changes tab opens displaying the list of Configuration events and history of the node's fault notifications. The fields are read only and explained in the following table.

2. To export the Configuration Changes Log to a file:

   1. Click **Export to File** ⬇.

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** 🔄.

   The information is updated immediately.

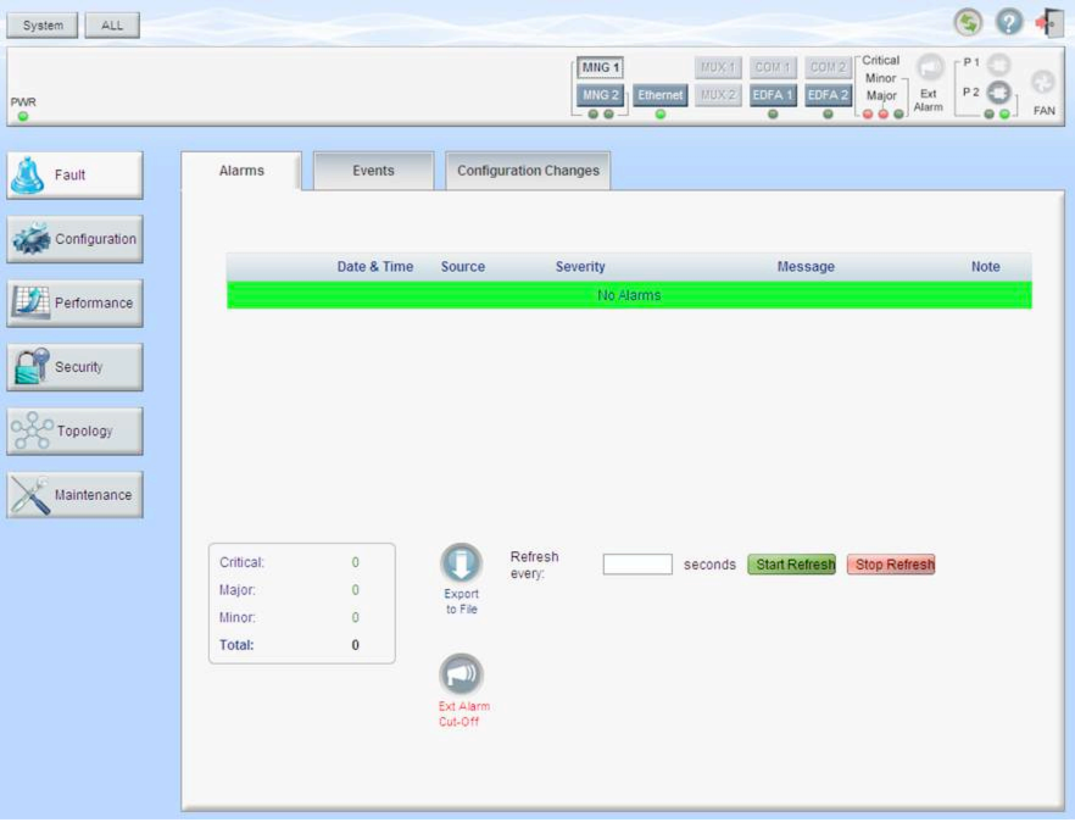
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 19: Configuration Changes Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the change was made.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the change.	
Severity	The severity of the change.	Critical, Major, Minor, Cleared, Event
Message	The type of change.	
Note	Information related to the change.	

5.5 Management Port Faults



Date & Time	Source	Severity	Message	Note
			No Alarms	

Critical:	0
Major:	0
Minor:	0
Total:	0

Refresh every: seconds

Figure 36: Management Port Fault Window

Use the Management Port Fault window to do the following:

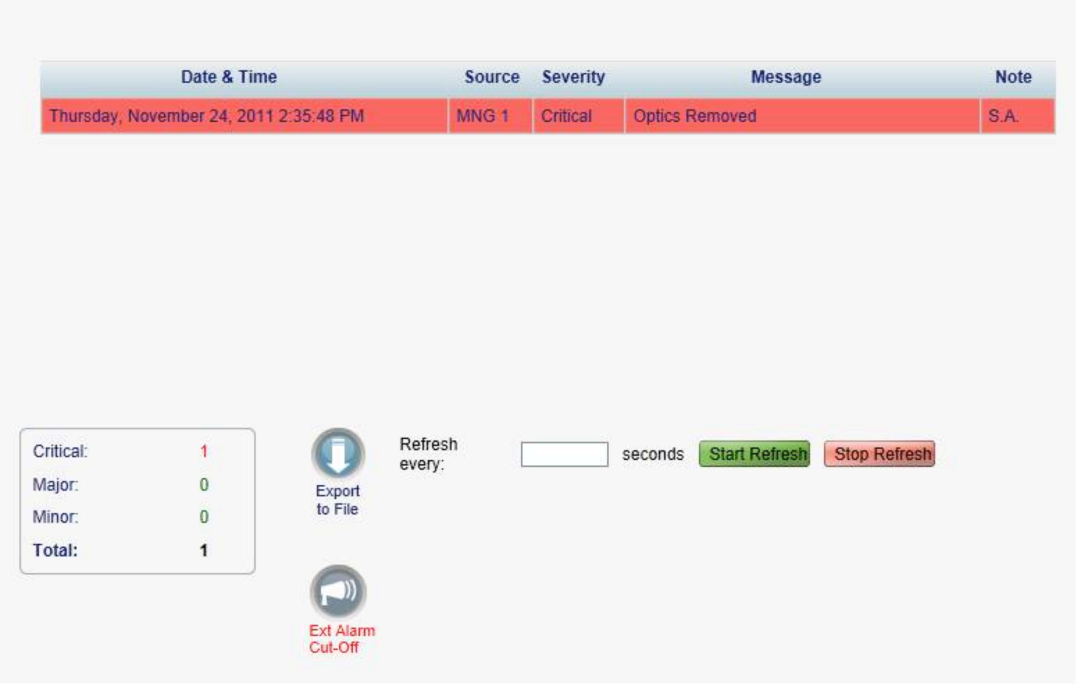
- **Alarms tab**: View the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Event Log tab**: View the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Configuration Changes tab**: View the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display

To open the Management Port Fault window:

1. Click **Fault**.
2. Click an **MNG** button to select the management port.

   The appropriate Management Port Fault window opens.

5.5.1 Alarms Tab



Date & Time	Source	Severity	Message	Note
Thursday, November 24, 2011 2:35:48 PM	MNG 1	Critical	Optics Removed	S.A.

Critical:	1
Major:	0
Minor:	0
Total:	**1**

Figure 37: Alarms Tab

Use the Alarms tab to view the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view current alarms:

1. Click the **Alarms** tab.

   The Alarms tab opens displaying the list of current alarms along with the problems in the node. The fields are read only and explained in the following table.

   The color of the alarm background indicates the severity of the alarm:

   - **Red**: Critical or Major alarm
   - **Yellow**: Minor alarm

   Note: The LED display reflects the actual LED indications on the unit. For the list of LEDs and their functions, see Technical Specifications.

2. To export the list of alarms to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.
   3. Click **OK**.

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh**.

   The information is updated immediately.

5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

6. To turn off the external alarm, click **Ext Alarm Cut-Off**.

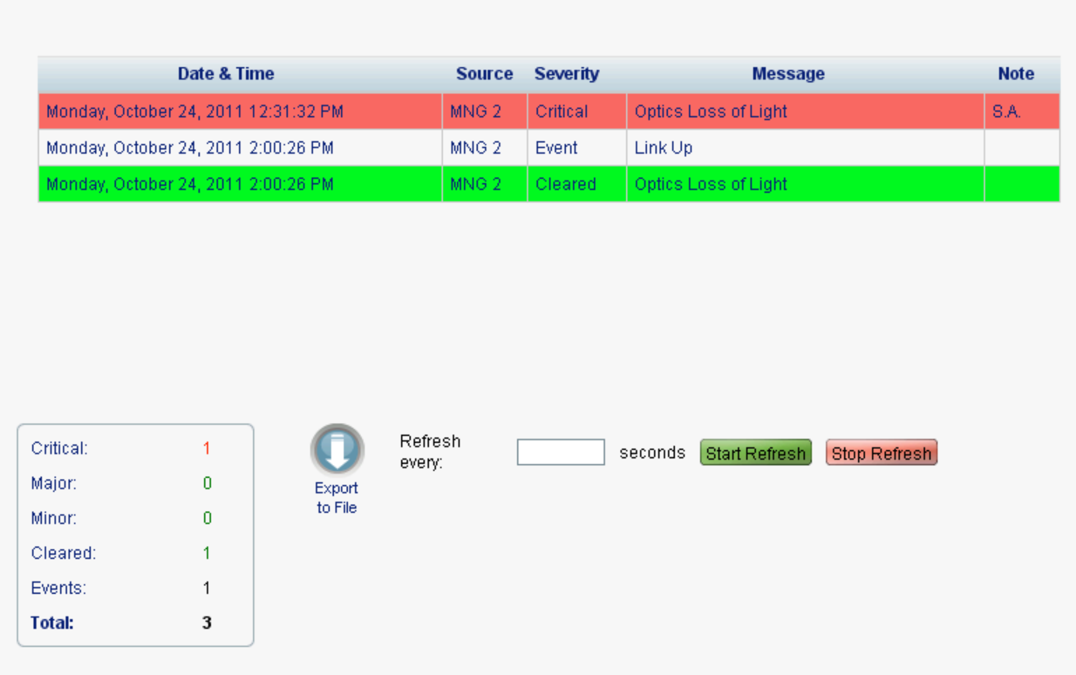
   The external alarm caused by the current faults turns off; new faults will activate the external alarm again.

   Note: This action does not clear any alarms.

Table 20: Alarms Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the alarm was detected.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the alarm.	
Severity	The severity of the alarm.	Critical, Major, Minor
Message	The type of alarm.	
Note	Whether or not the alarm is service affecting.	• **S.A.**: The alarm is service affecting. • **Blank**: The alarm is not service affecting.

5.5.2 Events Tab



Date & Time	Source	Severity	Message	Note
Monday, October 24, 2011 12:31:32 PM	MNG 2	Critical	Optics Loss of Light	S.A.
Monday, October 24, 2011 2:00:26 PM	MNG 2	Event	Link Up	
Monday, October 24, 2011 2:00:26 PM	MNG 2	Cleared	Optics Loss of Light	

Critical:	1
Major:	0
Minor:	0
Cleared:	1
Events:	1
Total:	**3**

Figure 38: Events Tab

Use the Events tab to view the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Event Log:

1. Click the **Events** tab.

   The Events tab opens displaying the list of events and history of the node's fault notifications. The fields are read only and explained in the following table.

   The color of the event background indicates the severity of the event:

   - **Red**: Indicates the occurrence of a Critical or Major alarm
   - **Yellow**: Indicates the occurrence of a Minor alarm
   - **Green**: Indicates that the corresponding alarm is cleared
   - **White**: Indicates informational messages

2. To export the Event Log to a file:

   1. Click **Export File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File.**
   3. Click **OK.**

3. To set the refresh rate of the Fault display:

1. In the **Refresh every** field, type the number of seconds that the window should refresh.

   The minimum refresh rate is 2 seconds.

2. Click **Start Refresh**.

   The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** ⟳.

   The information is updated immediately.

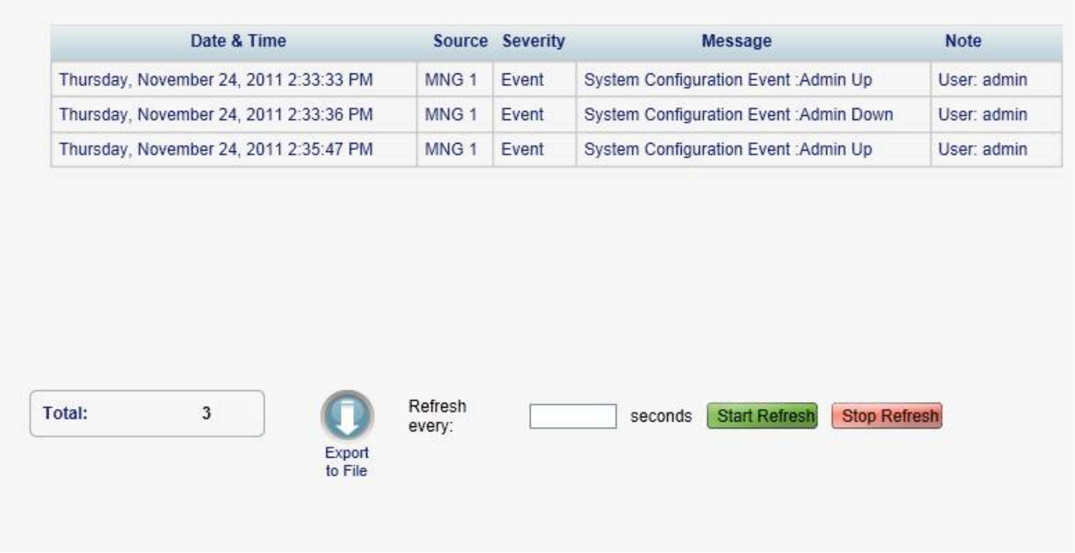
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 21: Events Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the event occurred.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the event.	
Severity	The severity of the event.	Critical, Major, Minor, Cleared, Event
Message	The type of event.	
Note	Information related to the event.	• **S.A.**: The event is service affecting. • **Blank**: The event is not service affecting. • **Other**: Information related to the event.

5.5.3 Configuration Changes Tab



Date & Time	Source	Severity	Message	Note
Thursday, November 24, 2011 2:33:33 PM	MNG 1	Event	System Configuration Event :Admin Up	User: admin
Thursday, November 24, 2011 2:33:36 PM	MNG 1	Event	System Configuration Event :Admin Down	User: admin
Thursday, November 24, 2011 2:35:47 PM	MNG 1	Event	System Configuration Event :Admin Up	User: admin

Total: 3

Figure 39: Configuration Changes Tab

Use the Configuration Changes tab to view the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Configuration Changes Log:

1. Click the **Configuration Changes** tab.

   The Configuration Changes tab opens displaying the list of Configuration events and history of the node's fault notifications. The fields are read only and explained in the following table.

2. To export the Configuration Changes Log to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** .

   The information is updated immediately.

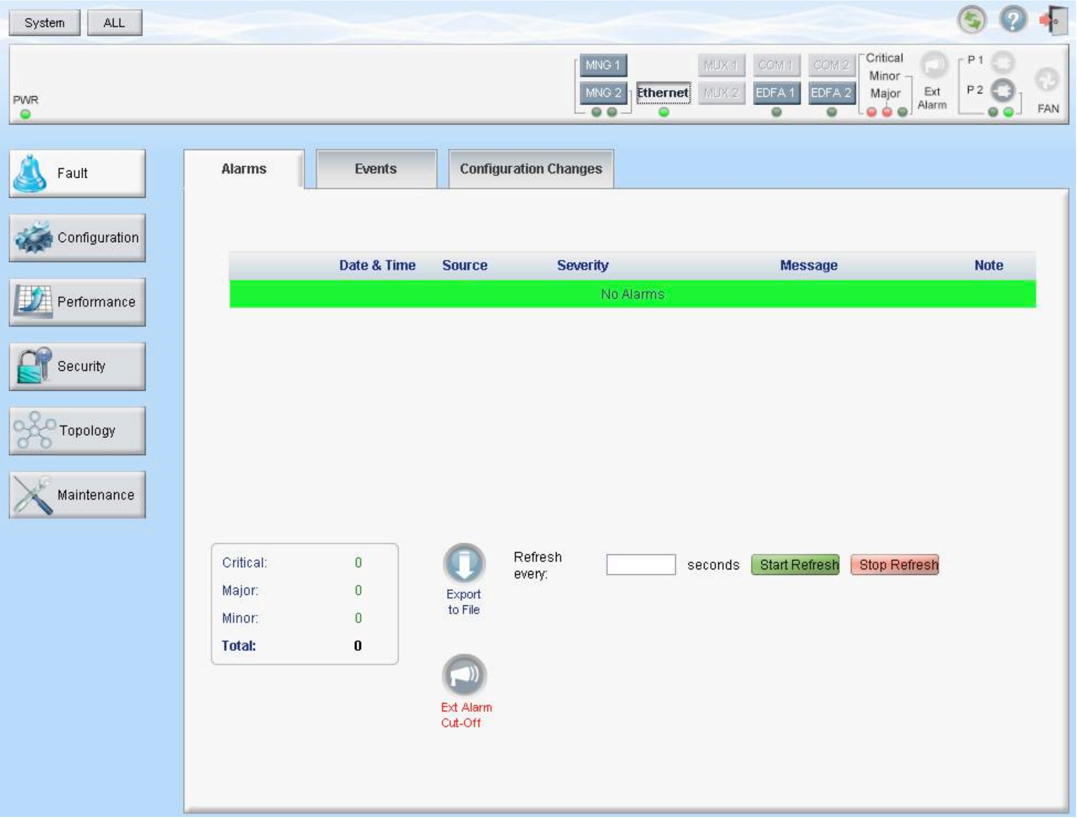
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 22: Configuration Changes Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the change was made.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the change.	
Severity	The severity of the change.	Critical, Major, Minor, Cleared, Event
Message	The type of change.	
Note	Information related to the change.	

5.6 Ethernet Port Faults



Date & Time	Source	Severity	Message	Note
No Alarms				

Critical:	0
Major:	0
Minor:	0
Total:	**0**

Figure 40: Ethernet Port Fault Window

Use the Ethernet Port Fault window to do the following:

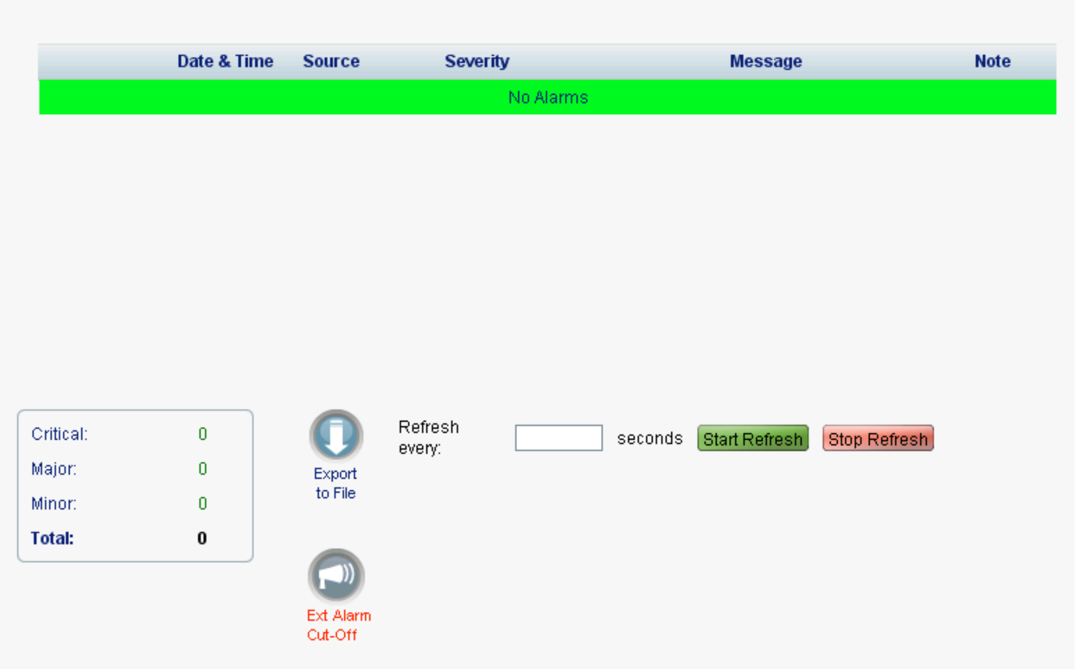
- **Alarms tab**: View the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Event Log tab**: View the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Configuration Changes tab**: View the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display

To open the Ethernet Port Fault window:

1. Click **Fault**.
2. Click **Ethernet** to select the Ethernet port.

   The Ethernet Port Fault window opens.

5.6.1 Alarms Tab



Date & Time	Source	Severity	Message	Note
No Alarms				

Critical:	0
Major:	0
Minor:	0
Total:	**0**

Figure 41: Alarms Tab

Use the Alarms tab to view the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view current alarms:

1. Click the **Alarms** tab.

   The Alarms tab opens displaying the list of current alarms along with the problems in the node. The fields are read only and explained in the following table.

   The color of the alarm background indicates the severity of the alarm:

   - **Red**: Critical or Major alarm
   - **Yellow**: Minor alarm

   Note: The LED display reflects the actual LED indications on the unit. For the list of LEDs and their functions, see Technical Specifications.

2. To export the list of alarms to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.
   3. Click **OK**.

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** .

   The information is updated immediately.

5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

6. To turn off the external alarm, click **Ext Alarm Cut-Off** .

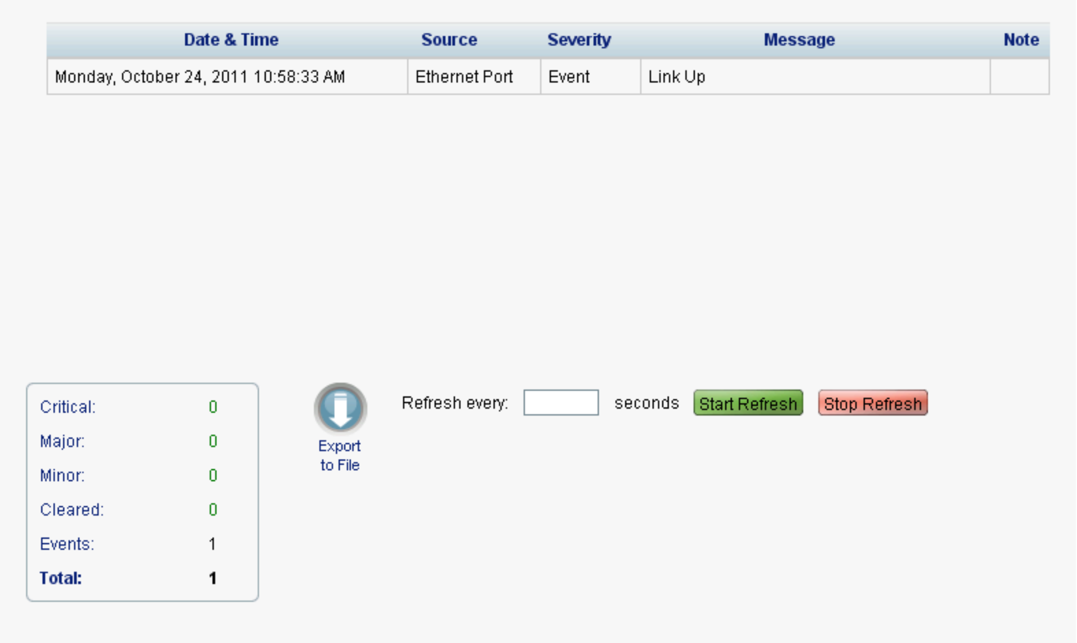
   The external alarm caused by the current faults turns off; new faults will activate the external alarm again.

   Note: This action does not clear any alarms.

Table 23: Alarms Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the alarm was detected.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the alarm.	
Severity	The severity of the alarm.	Critical, Major, Minor
Message	The type of alarm.	
Note	Whether or not the alarm is service affecting.	• **S.A.**: The alarm is service affecting. • **Blank**: The alarm is not service affecting.

5.6.2 Events Tab



Date & Time	Source	Severity	Message	Note
Monday, October 24, 2011 10:58:33 AM	Ethernet Port	Event	Link Up	

Critical:	0
Major:	0
Minor:	0
Cleared:	0
Events:	1
Total:	**1**

Figure 42: Events Tab

Use the Events tab to view the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Event Log:

1. Click the **Events** tab.

   The Events tab opens displaying the list of events and history of the node's fault notifications. The fields are read only and explained in the following table.

   The color of the event background indicates the severity of the event:

   - **Red**: Indicates the occurrence of a Critical or Major alarm
   - **Yellow**: Indicates the occurrence of a Minor alarm
   - **Green**: Indicates that the corresponding alarm is cleared
   - **White**: Indicates informational messages

2. To export the Event Log to a file:

   1. Click **Export File** ⬇.

      The Opening table.csv dialog box appears.

   2. Click **Save File**.
   3. Click **OK**.

3. To set the refresh rate of the Fault display:

1. In the **Refresh every** field, type the number of seconds that the window should refresh.

   The minimum refresh rate is 2 seconds.

2. Click **Start Refresh**.

   The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** ⟳.

   The information is updated immediately.

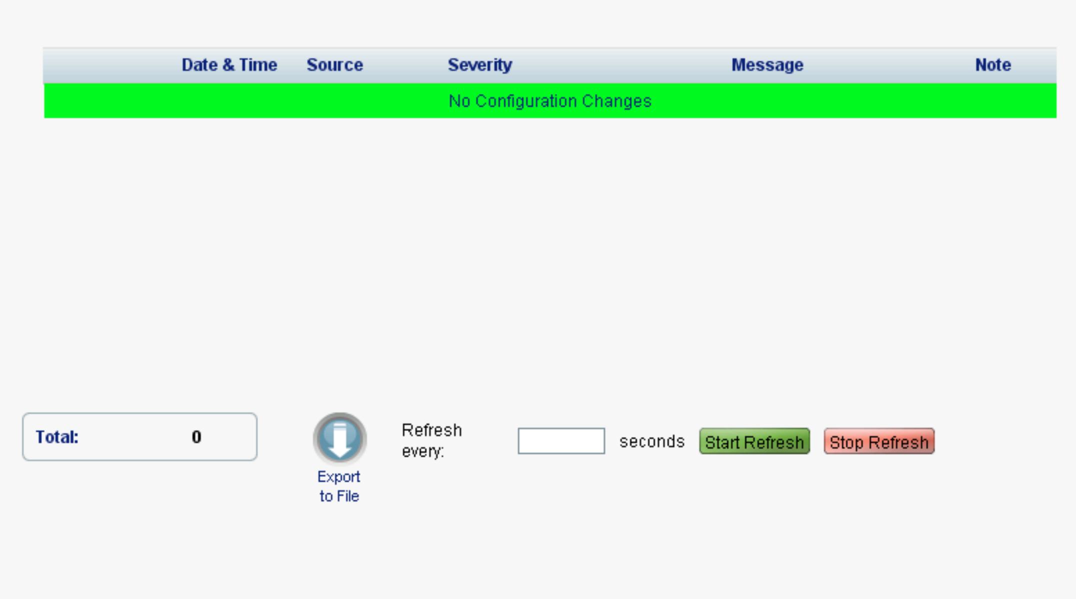
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 24: Events Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the event occurred.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the event.	
Severity	The severity of the event.	Critical, Major, Minor, Cleared, Event
Message	The type of event.	
Note	Information related to the event.	• **S.A.**: The event is service affecting. • **Blank**: The event is not service affecting. • **Other**: Information related to the event.

5.6.3 Configuration Changes Tab



Date & Time	Source	Severity	Message	Note
No Configuration Changes				

Total: 0

Figure 43: Configuration Changes Tab

Use the Configuration Changes tab to view the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Configuration Changes Log:

1. Click the **Configuration Changes** tab.

   The Configuration Changes tab opens displaying the list of Configuration events and history of the node's fault notifications. The fields are read only and explained in the following table.

2. To export the Configuration Changes Log to a file:

   1. Click **Export to File** ⬇.

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** ⟳.

   The information is updated immediately.

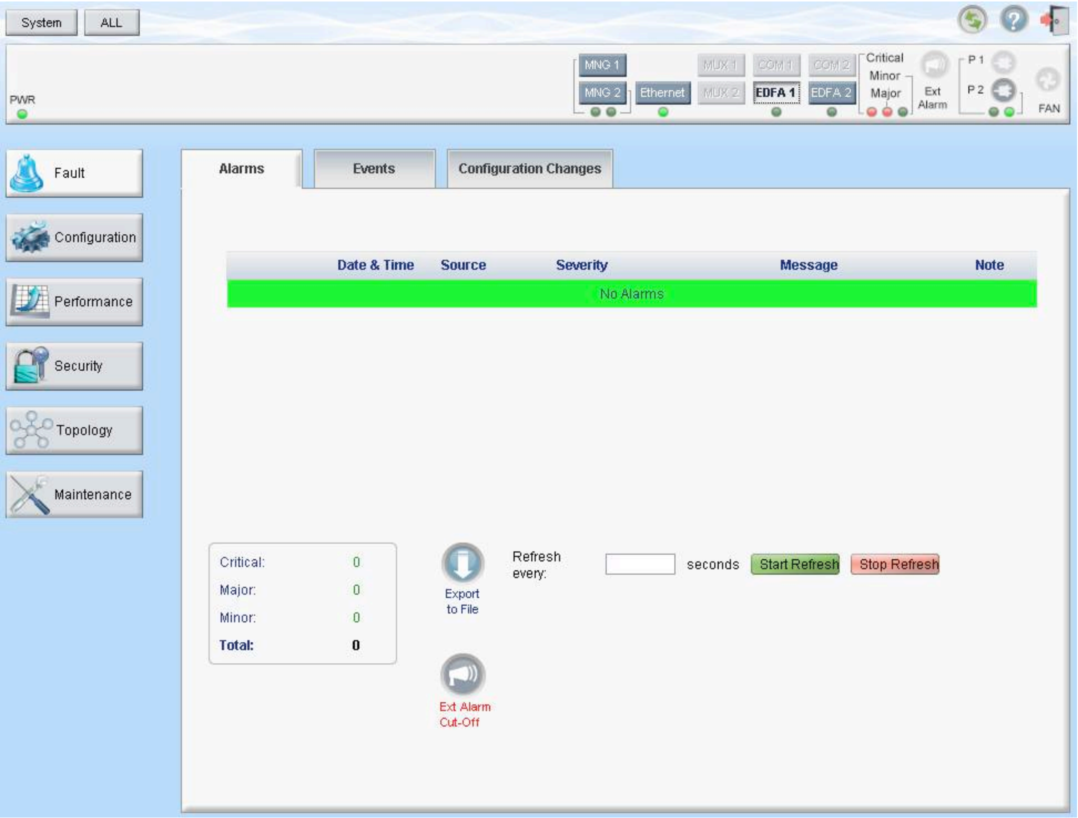
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 25: Configuration Changes Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the change was made.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the change.	
Severity	The severity of the change.	Critical, Major, Minor, Cleared, Event
Message	The type of change.	
Note	Information related to the change.	

5.7 EDFA Faults



Date & Time	Source	Severity	Message	Note
No Alarms				

Critical:	0
Major:	0
Minor:	0
Total:	**0**

Figure 44: EDFA Fault Window

Note: The EDFA button is enabled only if an EDFA module is installed.

Use the EDFA Fault window to do the following:

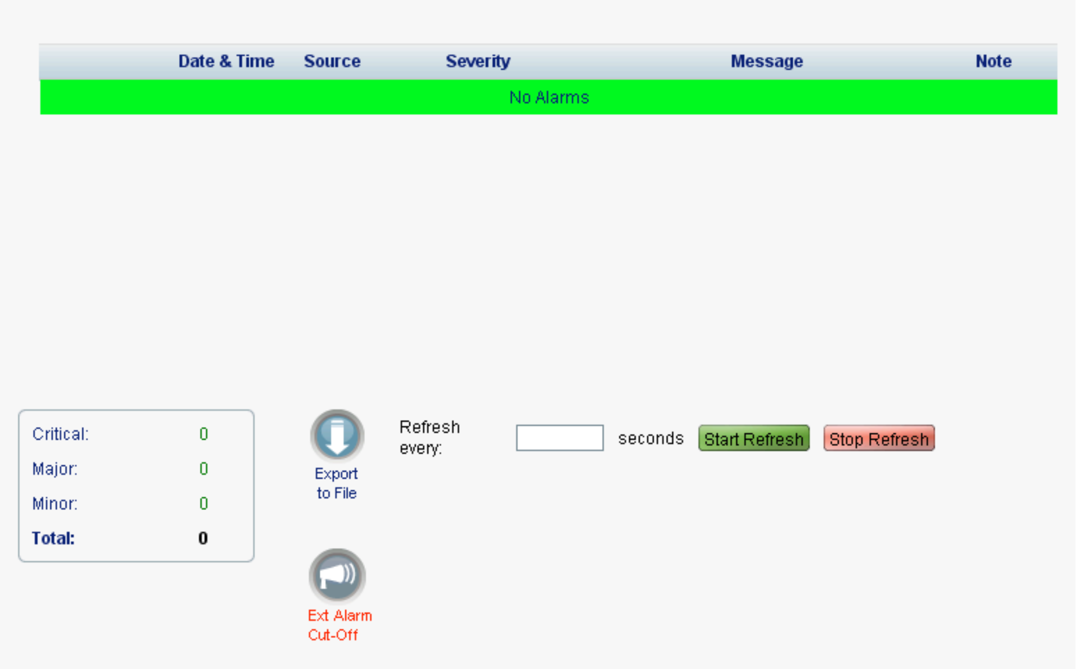
- **Alarms tab**: View the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Event Log tab**: View the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Configuration Changes tab**: View the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display

To open the EDFA Fault window:

1. Click **Fault**.
2. Click an **EDFA** button to select the EDFA module.

   The appropriate EDFA Module Fault window opens.

5.7.1 Alarms Tab



Date & Time	Source	Severity	Message	Note
No Alarms				

Critical:	0
Major:	0
Minor:	0
Total:	**0**

Figure 45: Alarms Tab

Use the Alarms tab to view the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view current alarms:

1. Click the **Alarms** tab.

   The Alarms tab opens displaying the list of current alarms along with the problems in the node. The fields are read only and explained in the following table.

   The color of the alarm background indicates the severity of the alarm:

   - **Red**: Critical or Major alarm
   - **Yellow**: Minor alarm

   Note: The LED display reflects the actual LED indications on the unit. For the list of LEDs and their functions, see Technical Specifications.

2. To export the list of alarms to a file:

   1. Click **Export to File** ⬇.

      The Opening table.csv dialog box appears.

   2. Click **Save File.**
   3. Click **OK.**

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** .

   The information is updated immediately.

5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

6. To turn off the external alarm, click **Ext Alarm Cut-Off** .

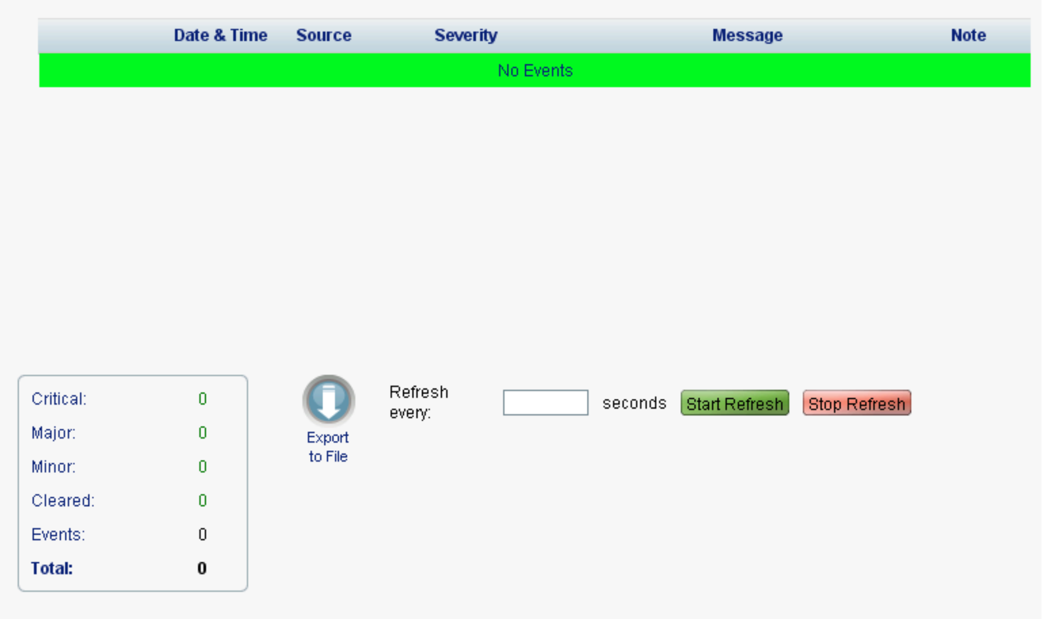
   The external alarm caused by the current faults turns off; new faults will activate the external alarm again.

   Note: This action does not clear any alarms.

Table 26: Alarms Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the alarm was detected.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the alarm.	
Severity	The severity of the alarm.	Critical, Major, Minor
Message	The type of alarm.	
Note	Whether or not the alarm is service affecting.	• **S.A.**: The alarm is service affecting. • **Blank**: The alarm is not service affecting.

5.7.2 Events Tab



Date & Time	Source	Severity	Message	Note
No Events				

Critical:	0
Major:	0
Minor:	0
Cleared:	0
Events:	0
Total:	**0**

Refresh every: seconds

Figure 46: Events Tab

Use the Events tab to view the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Event Log:

1. Click the **Events** tab.

   The Events tab opens displaying the list of events and history of the node's fault notifications. The fields are read only and explained in the following table.

   The color of the event background indicates the severity of the event:

   - **Red**: Indicates the occurrence of a Critical or Major alarm
   - **Yellow**: Indicates the occurrence of a Minor alarm
   - **Green**: Indicates that the corresponding alarm is cleared
   - **White**: Indicates informational messages

2. To export the Event Log to a file:

   1. Click **Export File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.
   3. Click **OK**.

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

The minimum refresh rate is 2 seconds.

2. Click **Start Refresh**.

   The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** .

   The information is updated immediately.

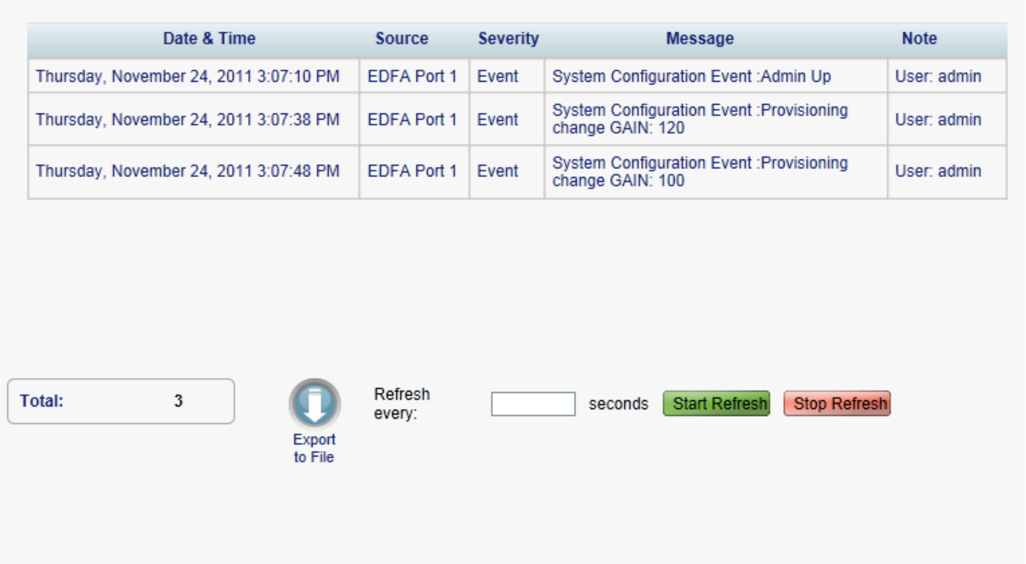
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 27: Events Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the event occurred.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the event.	
Severity	The severity of the event.	Critical, Major, Minor, Cleared, Event
Message	The type of event.	
Note	Information related to the event.	• **S.A.**: The event is service affecting. • **Blank**: The event is not service affecting. • **Other**: Information related to the event.

5.7.3 Configuration Changes Tab



Date & Time	Source	Severity	Message	Note
Thursday, November 24, 2011 3:07:10 PM	EDFA Port 1	Event	System Configuration Event :Admin Up	User: admin
Thursday, November 24, 2011 3:07:38 PM	EDFA Port 1	Event	System Configuration Event :Provisioning change GAIN: 120	User: admin
Thursday, November 24, 2011 3:07:48 PM	EDFA Port 1	Event	System Configuration Event :Provisioning change GAIN: 100	User: admin

Total: 3

Figure 47: Configuration Changes Tab

Use the Configuration Changes tab to view the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Configuration Changes Log:

1. Click the **Configuration Changes** tab.

   The Configuration Changes tab opens displaying the list of Configuration events and history of the node's fault notifications. The fields are read only and explained in the following table.

2. To export the Configuration Changes Log to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** .

   The information is updated immediately.

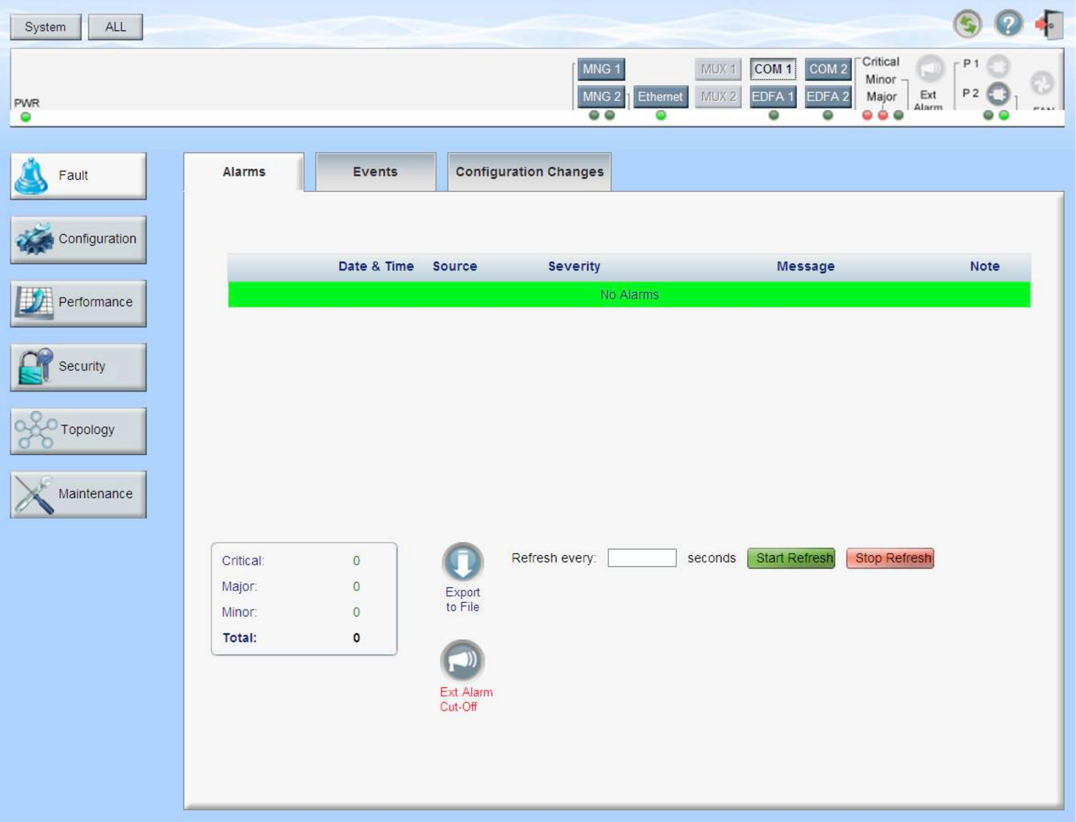
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 28: Configuration Changes Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the change was made.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the change.	
Severity	The severity of the change.	Critical, Major, Minor, Cleared, Event
Message	The type of change.	
Note	Information related to the change.	

5.8 COM Port Faults



Date & Time	Source	Severity	Message	Note
No Alarms				

Critical:	0
Major:	0
Minor:	0
Total:	**0**

Refresh every: seconds

Figure 48: COM Port Fault Window

Note: The COM ports are enabled only if an Optical Switch module is installed.

Use the COM Port Fault window to do the following:

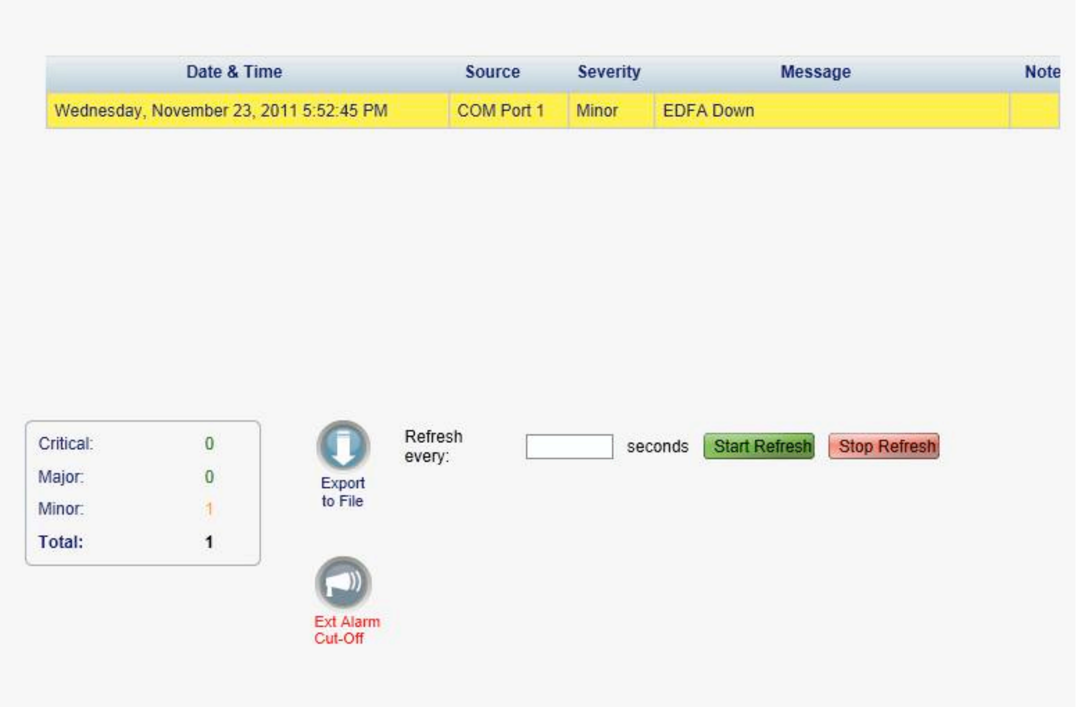
- **Alarms tab**: View the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Event Log tab**: View the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Configuration Changes tab**: View the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display

To open the COM Port Fault window:

1. Click **Fault**.
2. Click a **COM** button to select the COM port.

   The appropriate COM Port Fault window opens.

5.8.1 Alarms Tab



Date & Time	Source	Severity	Message	Note
Wednesday, November 23, 2011 5:52:45 PM	COM Port 1	Minor	EDFA Down	

Critical:	0
Major:	0
Minor:	1
Total:	**1**

Figure 49: Alarms Tab

Use the Alarms tab to view the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view current alarms:

1. Click the **Alarms** tab.

   The Alarms tab opens displaying the list of current alarms along with the problems in the node. The fields are read only and explained in the following table.

   The color of the alarm background indicates the severity of the alarm:

   - **Red**: Critical or Major alarm
   - **Yellow**: Minor alarm

   Note: The LED display reflects the actual LED indications on the unit. For the list of LEDs and their functions, see Technical Specifications.

2. To export the list of alarms to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.
   3. Click **OK**.

3. To set the refresh rate of the Fault display:

    1. In the **Refresh every** field, type the number of seconds that the window should refresh.

        The minimum refresh rate is 2 seconds.

    2. Click **Start Refresh**.

        The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** .

    The information is updated immediately.

5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

    The automatic refresh is stopped and the **Refresh every** field is cleared.

6. To turn off the external alarm, click **Ext Alarm Cut-Off** .

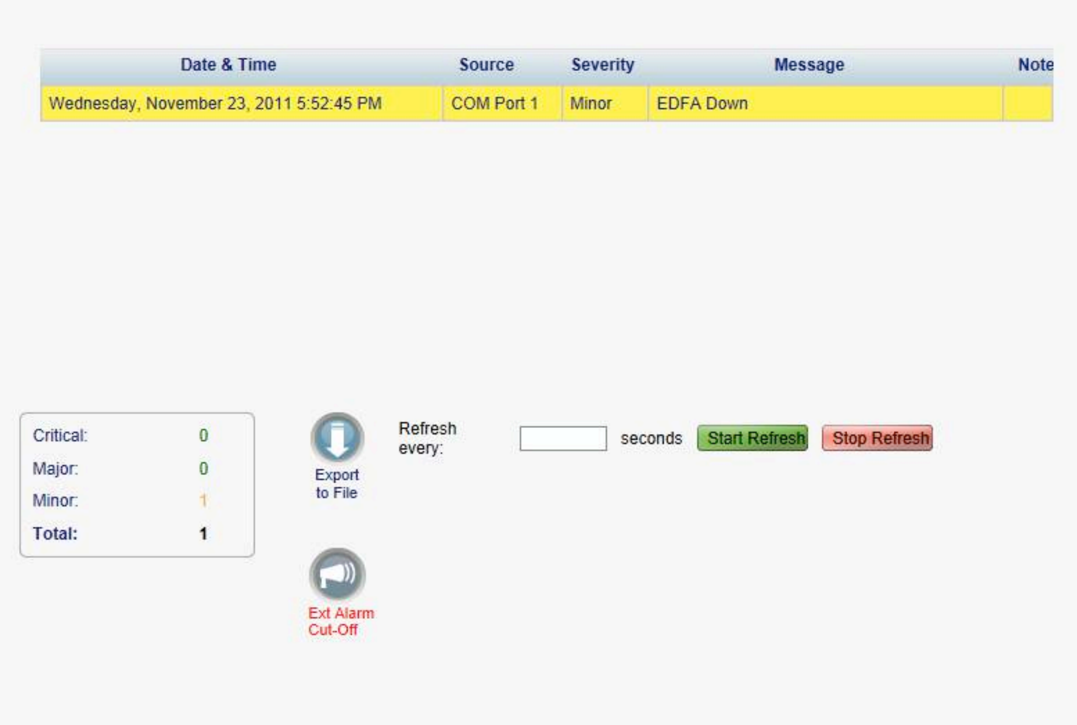
    The external alarm caused by the current faults turns off; new faults will activate the external alarm again.

    Note: This action does not clear any alarms.

Table 29: Alarms Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the alarm was detected.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the alarm.	
Severity	The severity of the alarm.	Critical, Major, Minor
Message	The type of alarm.	
Note	Whether or not the alarm is service affecting.	• **S.A.**: The alarm is service affecting. • **Blank**: The alarm is not service affecting.

5.8.2 Events Tab



Date & Time	Source	Severity	Message	Note
Wednesday, November 23, 2011 5:52:45 PM	COM Port 1	Minor	EDFA Down	

Critical:	0
Major:	0
Minor:	1
Total:	**1**

Figure 50: Events Tab

Use the Events tab to view the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Event Log:

1. Click the **Events** tab.

   The Events tab opens displaying the list of events and history of the node's fault notifications. The fields are read only and explained in the following table.

   The color of the event background indicates the severity of the event:

   - **Red**: Indicates the occurrence of a Critical or Major alarm
   - **Yellow**: Indicates the occurrence of a Minor alarm
   - **Green**: Indicates that the corresponding alarm is cleared
   - **White**: Indicates informational messages

2. To export the Event Log to a file:

   1. Click **Export File** ⬇.

      The Opening table.csv dialog box appears.

   2. Click **Save File**.
   3. Click **OK**.

3. To set the refresh rate of the Fault display:

    1. In the **Refresh every** field, type the number of seconds that the window should refresh.

       The minimum refresh rate is 2 seconds.

    2. Click **Start Refresh**.

       The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** .

   The information is updated immediately.

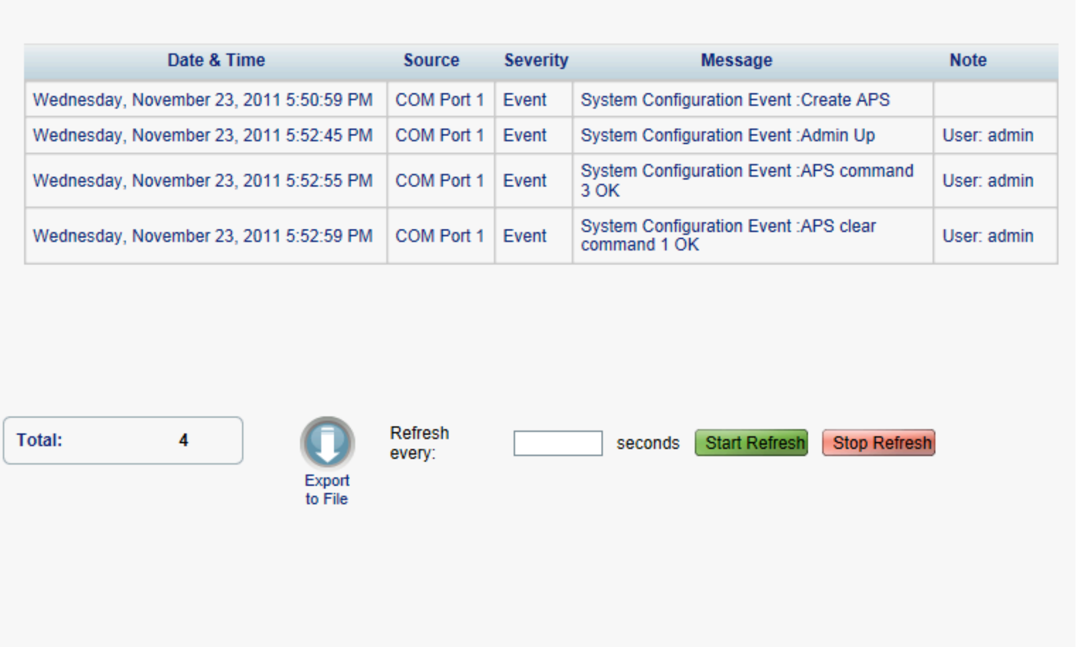
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 30: Events Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the event occurred.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the event.	
Severity	The severity of the event.	Critical, Major, Minor, Cleared, Event
Message	The type of event.	
Note	Information related to the event.	• **S.A.**: The event is service affecting. • **Blank**: The event is not service affecting. • **Other**: Information related to the event.

5.8.3 Configuration Changes Tab



Date & Time	Source	Severity	Message	Note
Wednesday, November 23, 2011 5:50:59 PM	COM Port 1	Event	System Configuration Event :Create APS	
Wednesday, November 23, 2011 5:52:45 PM	COM Port 1	Event	System Configuration Event :Admin Up	User: admin
Wednesday, November 23, 2011 5:52:55 PM	COM Port 1	Event	System Configuration Event :APS command 3 OK	User: admin
Wednesday, November 23, 2011 5:52:59 PM	COM Port 1	Event	System Configuration Event :APS clear command 1 OK	User: admin

Total: 4

Figure 51: Configuration Changes Tab

Use the Configuration Changes tab to view the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Configuration Changes Log:

1. Click the **Configuration Changes** tab.

   The Configuration Changes tab opens displaying the list of Configuration events and history of the node's fault notifications. The fields are read only and explained in the following table.

2. To export the Configuration Changes Log to a file:

   1. Click **Export to File** ⇩.

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** .

   The information is updated immediately.

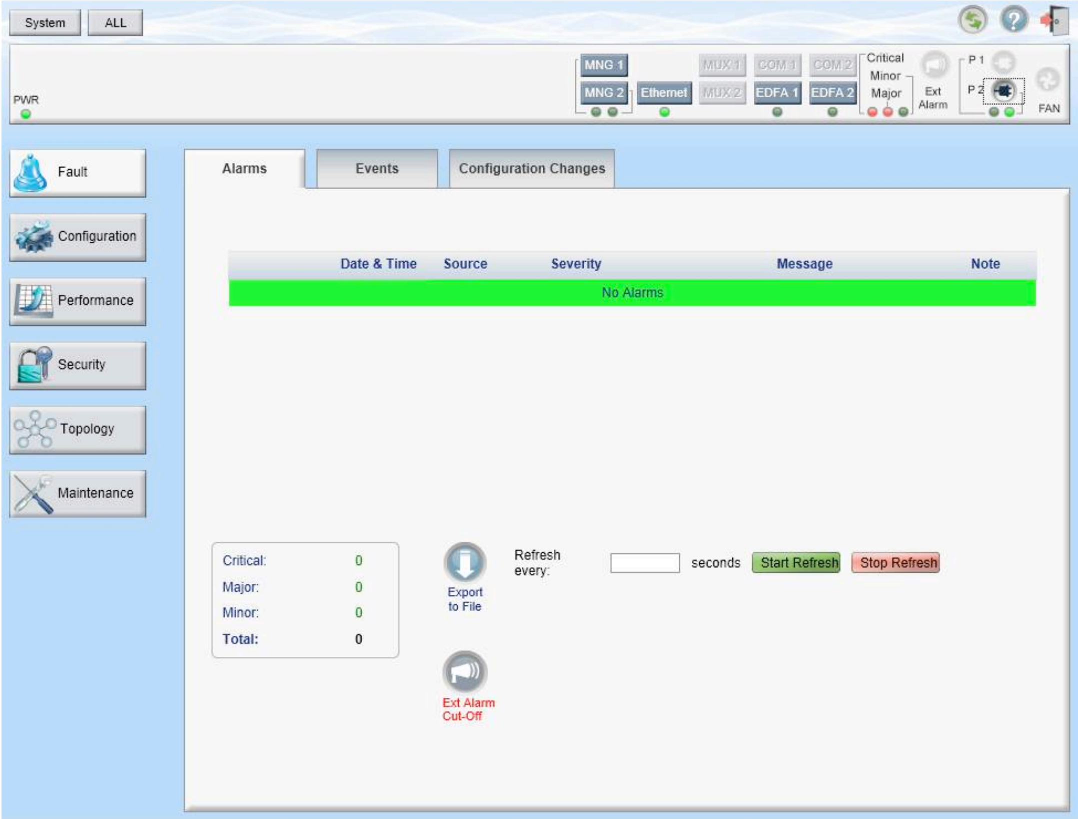
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 31: Configuration Changes Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the change was made.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the change.	
Severity	The severity of the change.	Critical, Major, Minor, Cleared, Event
Message	The type of change.	
Note	Information related to the change.	

5.9 PSU Faults



Date & Time	Source	Severity	Message	Note
No Alarms				

Critical:	0
Major:	0
Minor:	0
Total:	0

Figure 52: PSU Fault Window

Use the PSU Fault window to do the following:

- **Alarms tab**: View the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display

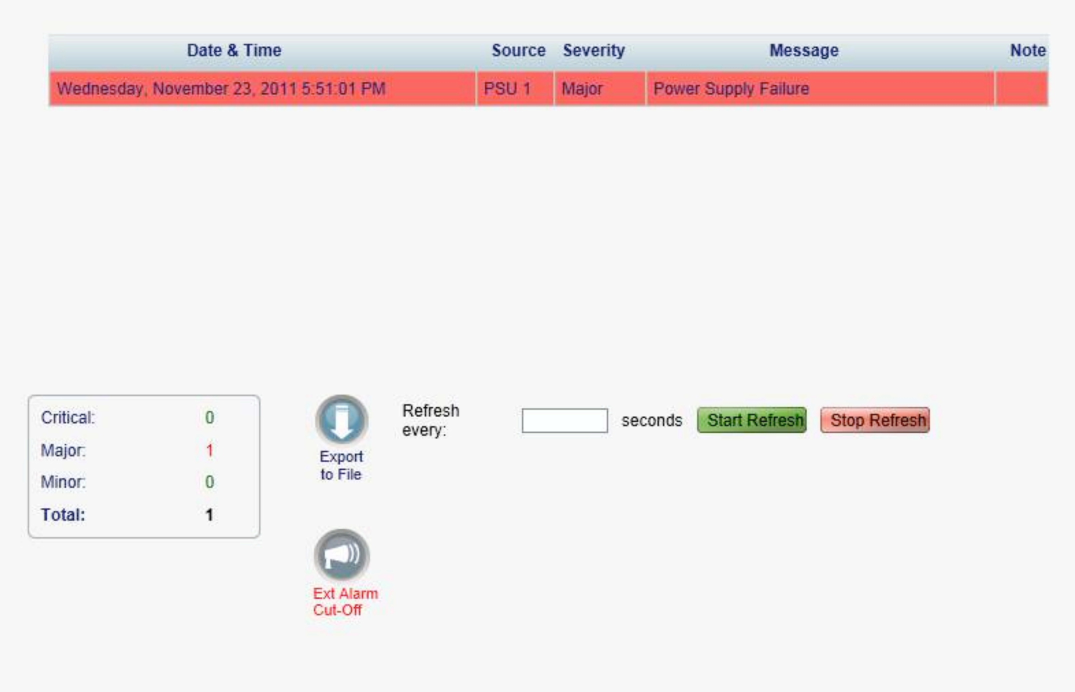
- **Event Log tab**: View the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display
- **Configuration Changes tab**: View the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display

To open the PSU Fault window:

1. Click **Fault**.
2. Click a **PSU** button to select the PSU.

   The appropriate PSU Fault window opens.

5.9.1 Alarms Tab



Date & Time	Source	Severity	Message	Note
Wednesday, November 23, 2011 5:51:01 PM	PSU 1	Major	Power Supply Failure	

Critical:	0
Major:	1
Minor:	0
Total:	**1**

Refresh every: seconds

Figure 53: Alarms Tab

Use the Alarms tab to view the current alarms, turn off the external alarm, export the list of alarms to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view current alarms:

1. Click the **Alarms** tab.

   The Alarms tab opens displaying the list of current alarms along with the problems in the node. The fields are read only and explained in the following table.

   The color of the alarm background indicates the severity of the alarm:

   - **Red**: Critical or Major alarm

- **Yellow**: Minor alarm

  Note: The LED display reflects the actual LED indications on the unit. For the list of LEDs and their functions, see Technical Specifications.

2. To export the list of alarms to a file:
   1. Click **Export to File** .

      The Opening table.csv dialog box appears.
   2. Click **Save File**.
   3. Click **OK**.
3. To set the refresh rate of the Fault display:
   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.
   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.
4. To refresh the Fault display manually, click **Refresh** .

   The information is updated immediately.
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.
6. To turn off the external alarm, click **Ext Alarm Cut-Off** .

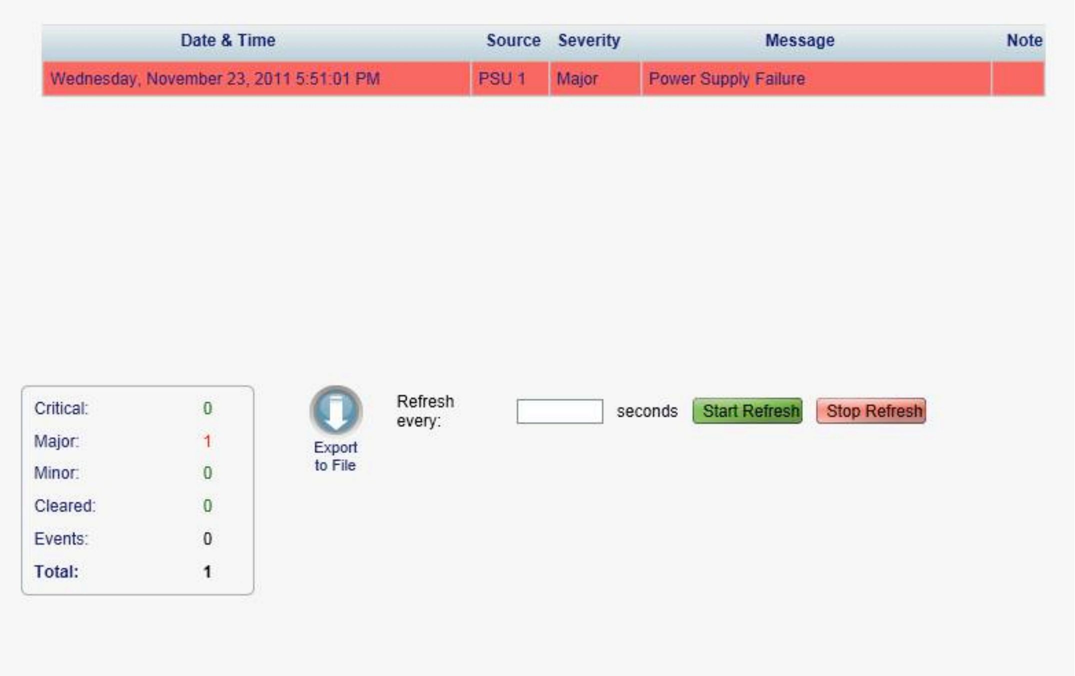
   The external alarm caused by the current faults turns off; new faults will activate the external alarm again.

   Note: This action does not clear any alarms.

Table 32: Alarms Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the alarm was detected.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the alarm.	
Severity	The severity of the alarm.	Critical, Major, Minor
Message	The type of alarm.	
Note	Whether or not the alarm is service affecting.	• **S.A.**: The alarm is service affecting. • **Blank**: The alarm is not service affecting.

5.9.2 Events Tab



Date & Time	Source	Severity	Message	Note
Wednesday, November 23, 2011 5:51:01 PM	PSU 1	Major	Power Supply Failure	

Critical:	0
Major:	1
Minor:	0
Cleared:	0
Events:	0
Total:	1

Figure 54: Events Tab

Use the Events tab to view the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Event Log:

1. Click the **Events** tab.

   The Events tab opens displaying the list of events and history of the node's fault notifications. The fields are read only and explained in the following table.

   The color of the event background indicates the severity of the event:

   - **Red**: Indicates the occurrence of a Critical or Major alarm
   - **Yellow**: Indicates the occurrence of a Minor alarm
   - **Green**: Indicates that the corresponding alarm is cleared
   - **White**: Indicates informational messages

2. To export the Event Log to a file:

   1. Click **Export File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File.**
   3. Click **OK.**

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** 🔄.

   The information is updated immediately.

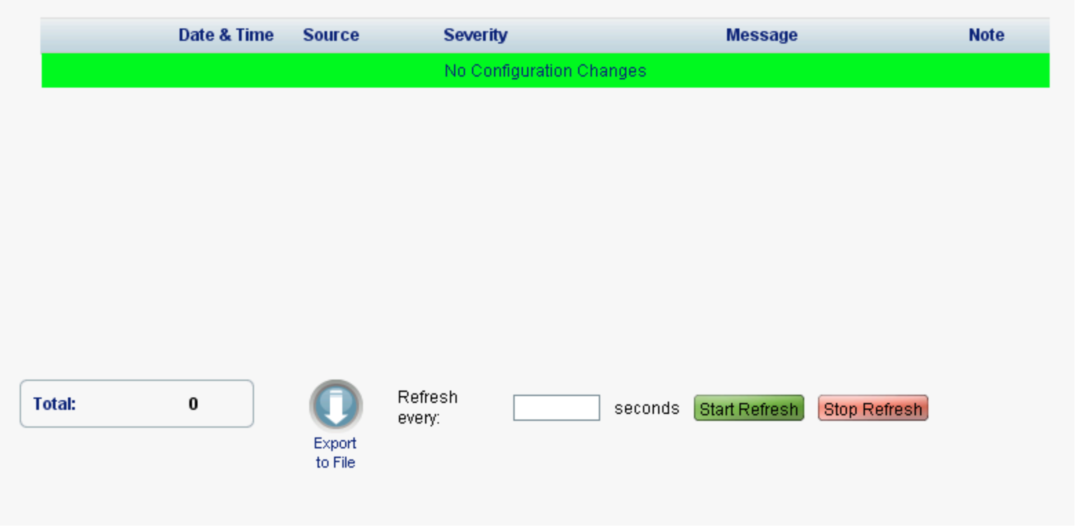
5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 33: Events Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the event occurred.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the event.	
Severity	The severity of the event.	Critical, Major, Minor, Cleared, Event
Message	The type of event.	
Note	Information related to the event.	• **S.A.**: The event is service affecting. • **Blank**: The event is not service affecting. • **Other**: Information related to the event.

5.9.3 Configuration Changes Tab



Date & Time	Source	Severity	Message	Note
No Configuration Changes				

Total: 0

Refresh every: seconds

Figure 55: Configuration Changes Tab

Use the Configuration Changes tab to view the Configuration Changes Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display.

To view the Configuration Changes Log:

1. Click the **Configuration Changes** tab.

   The Configuration Changes tab opens displaying the list of Configuration events and history of the node's fault notifications. The fields are read only and explained in the following table.

2. To export the Configuration Changes Log to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

3. To set the refresh rate of the Fault display:

   1. In the **Refresh every** field, type the number of seconds that the window should refresh.

      The minimum refresh rate is 2 seconds.

   2. Click **Start Refresh**.

      The information is automatically updated after the specified number of seconds.

4. To refresh the Fault display manually, click **Refresh** .

   The information is updated immediately.

5. To stop the automatic refresh of the Fault display, click **Stop Refresh**.

   The automatic refresh is stopped and the **Refresh every** field is cleared.

Table 34: Configuration Changes Tab Parameters

Parameter	Description	Format/Values
Date & Time	The date and time when the change was made.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the change.	
Severity	The severity of the change.	Critical, Major, Minor, Cleared, Event
Message	The type of change.	
Note	Information related to the change.	

6 Configuration Management

This chapter provides instructions for configuring the FIREamp™.

For initial configuration of the FIREamp™ via a local terminal, and instructions for logging in and out of the Web application, see Operation and Preliminary Configuration (p. 27).

In this Chapter

6.1 Configuration Operations

Use the following configuration operations to manage the FIREamp™:

- **System**
  - View general system information, such as hardware version and system uptime
  - View system inventory
  - Configure Simple Network Time Protocol (SNTP) parameters
  - Configure IP addresses, default gateway, and static routing
  - Configure SNMP parameters and traps
  - Define to which Syslog server you want the node to send the events
- **LINK Port**
  - View port status
  - Configure port parameters
  - Enable or disable a port
  - Configure the XFP module, including dithering and wavelength tuning
  - Configure ALS parameters
  - Configure APS parameters
  - Configure OTN parameters
- **MNG Port**

  - View port status
  - Configure port parameters
  - Enable or disable a port
  - View SFP information
  - Configure ALS parameters
- **Ethernet Port**
  - View port status
  - Configure port parameters
- **MUX/DEMUX Module**
  - View channel wavelength configuration
- **COM Port**
  - Configure port parameters
  - Enable or disable a port
  - Configure APS parameters
- **EDFA Module**
  - View module status
  - Configure module parameters
  - Enable or disable a module
- **Power Supply Unit (PSU)**
  - View PSU parameters
- **FAN Unit**
  - View FAN parameters

6.2 General Configuration Procedure

The following is the general procedure for viewing and configuring the FIREamp™ configuration. The specific procedures for each item are provided in the following sections.

To view and configure the FIREamp™ configuration:

1. Click **Configuration**.
2. Click the desired button in the upper portion of the window to select the item to view and/or configure:
   - **System** (see System Configuration (p. 91))
   - **MNG** (see Management Port Configuration (p. 102))
   - **Ethernet** (see Ethernet Port Configuration (p. 108))

- **MUX** (if exists) (see MUX/DEMUX Module Configuration)
- **EDFA** (if exists) (see EDFA Configuration (p. 115))
- **COM** (if exists) (see COM Port Configuration (p. 110))
- **PSU** (see PSU Information (p. 118))
- **FAN** (see FAN Unit Information (p. 120))

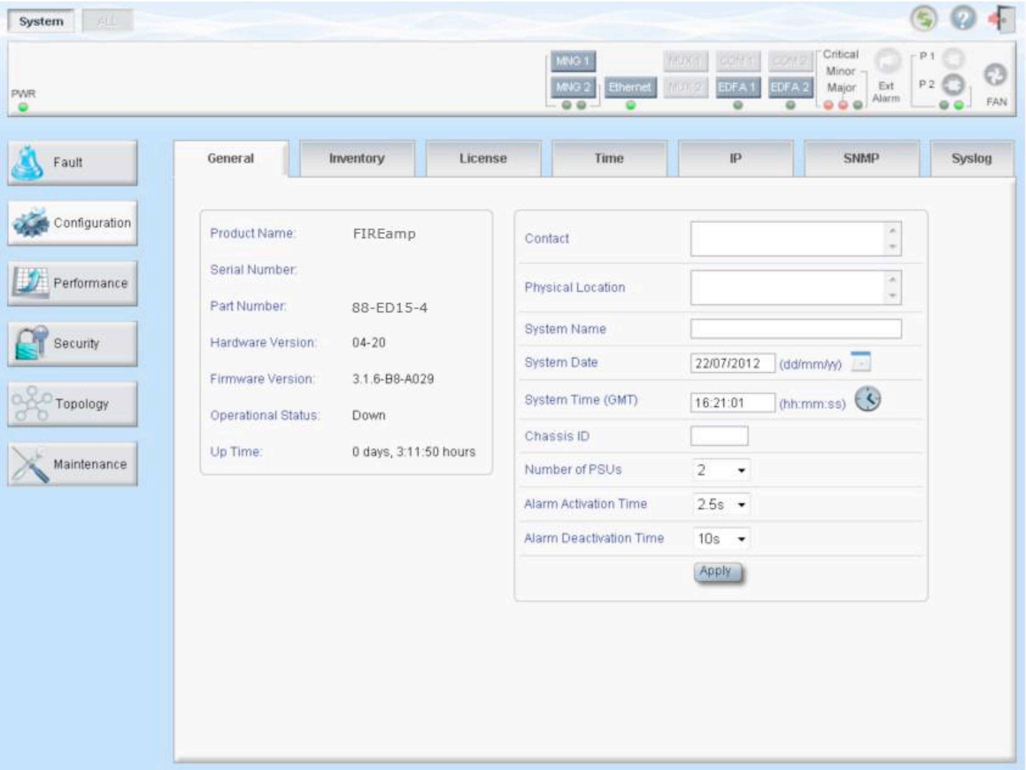
The appropriate Configuration window opens.

3. Click a tab.

   The appropriate tab opens.

4. Fill in the fields as explained in the appropriate table. Note that some or all of the fields may be read only.
5. When all of the information is provided, click **Apply**.

6.3 System Configuration



Product Name: FIREamp
Serial Number:
Part Number: 88-ED15-4
Hardware Version: 04-20
Firmware Version: 3.1.6-B8-A029
Operational Status: Down
Up Time: 0 days, 3:11:50 hours

Contact
Physical Location
System Name
System Date 22/07/2012 (dd/mm/yy)
System Time (GMT) 16:21:01 (hh:mm:ss)
Chassis ID
Number of PSUs 2
Alarm Activation Time 2.5s
Alarm Deactivation Time 10s

Figure 56: System Configuration Window

Use the System Configuration window to do the following:

- **General tab**: Configure general system parameters
- **Inventory tab**: View system inventory
- **License tab**: Not relevant for FIREamp™
- **Time tab**: Configure SNTP parameters

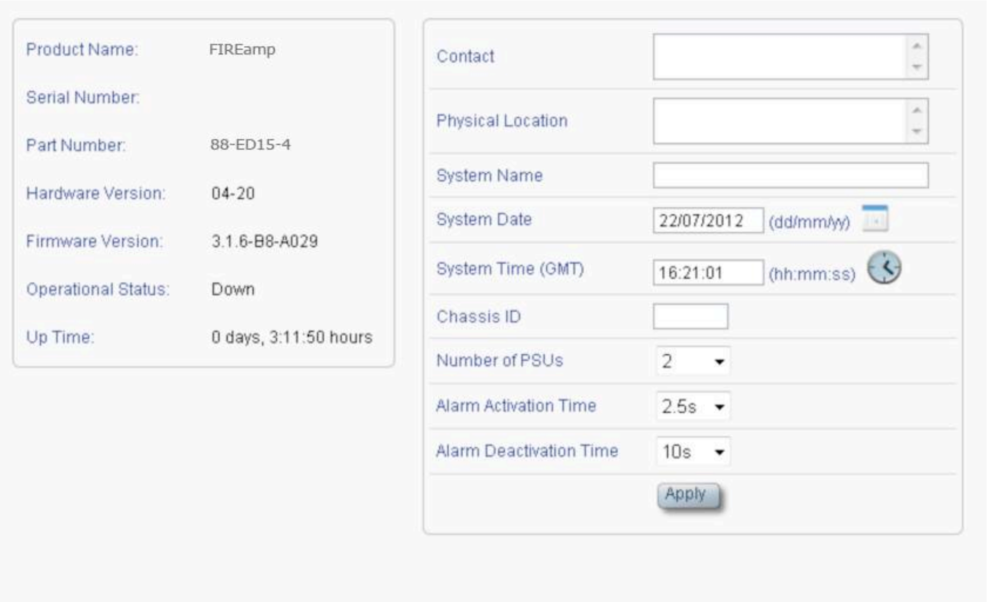
- **IP tab**: Configure IP addresses and static routing
- **SNMP tab**: Configure SNMP parameters and traps
- **Syslog tab**: Configure Syslog servers

To open the System Configuration window:

1. Click **Configuration**.
2. Click **System**.

   The System Configuration window opens.

6.3.1 General Tab



Product Name: FIREamp

Serial Number:

Part Number: 88-ED15-4

Hardware Version: 04-20

Firmware Version: 3.1.6-B8-A029

Operational Status: Down

Up Time: 0 days, 3:11:50 hours

Contact

Physical Location

System Name

System Date 22/07/2012 (dd/mm/yy)

System Time (GMT) 16:21:01 (hh:mm:ss)

Chassis ID

Number of PSUs 2

Alarm Activation Time 2.5s

Alarm Deactivation Time 10s

Figure 57: General Tab

Use the General tab to configure general system parameters.

To configure general system parameters:

1. Click the **General** tab.

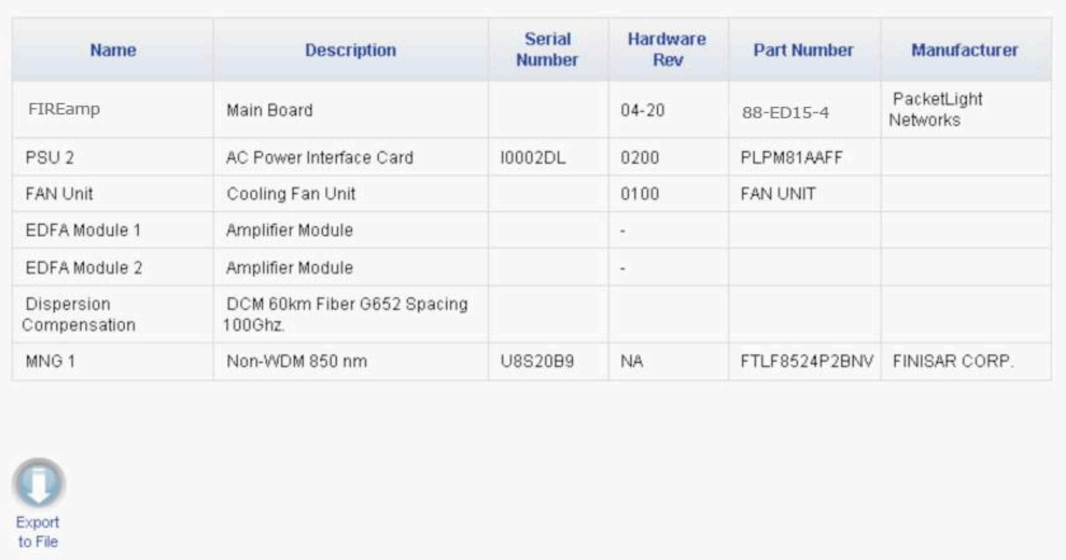
   The General tab opens displaying the general system configuration.
2. Fill in the fields as explained in the following table.
3. Click **Apply**.

Table 35: General Tab

Parameter	Description	Format/Values
Product Name	The name of the product.	FIREamp™
Serial Number	The serial number of the entity.	Serial number
Part Number	The part number of the node.	Part number
Hardware Version	The hardware version of the system.	dd-dd (Major-Minor)

Parameter	Description	Format/Values
Firmware Version	The firmware version of the system.	Firmware version
Operational Status	The operational status of the system. This indicates if there is a failure in the system.	• **Up**: Normal operation • **Down**: Alarm is detected
Up Time	The system uptime. This shows how much time passed since last reset.	Elapsed time
System Temperature	The measured temperature of the system.	Celsius
Contact	The contact information for Wave2Wave Technical Support.	Free text
Physical Location	The address of the site.	Free text
System Name	The logical name given to the FIREamp™.	Free text
System Date	Sets the current system date. This is the date used for time stamps.	• Set dd/mm/yy *or* • Select the date using the calendar 📅 *or* • Will be set automatically by SNTP (if enabled)
System Time (GMT)	Sets the current system time of day. This is the time used for time stamps.	• Select hh:mm:ss *or* • Set the time using the clock 🕒 • *or* • Will be set automatically by SNTP (if enabled)
Chassis ID	The chassis number. This is used for the optimization of the topology display.	1,2, and so on **Note:** If several nodes are in the same location, they should have the same number (see Defining Multiple Nodes as Multi-Chassis (p. 143)).
Number of PSUs	The number of power supply units installed in the FIREamp™.	1, 2
Alarm Activation Time	The time from defect detection till report, if defect is still constantly detected.	2.5-10 seconds Default: 2.5 seconds **Note:** Recommended to use the default time.
Alarm Deactivation Time	The time from no defect detection till report, if defect is still constantly not detected.	2.5-10 seconds Default: 10 seconds **Note:** Recommended to use the default time.

6.3.2 Inventory Tab



Name	Description	Serial Number	Hardware Rev	Part Number	Manufacturer
FIREamp	Main Board		04-20	88-ED15-4	PacketLight Networks
PSU 2	AC Power Interface Card	I0002DL	0200	PLPM81AAFF	
FAN Unit	Cooling Fan Unit		0100	FAN UNIT	
EDFA Module 1	Amplifier Module		-		
EDFA Module 2	Amplifier Module		-		
Dispersion Compensation	DCM 60km Fiber G652 Spacing 100Ghz.				
MNG 1	Non-WDM 850 nm	U8S20B9	NA	FTLF8524P2BNV	FINISAR CORP.

Figure 58: Inventory Tab

Use the Inventory tab to display information about the components currently installed in the system.

Note: Not all parameters are applicable for all type of components.

To view system inventory:

1. Click the **Inventory** tab.

   The Inventory tab opens displaying the system inventory. The fields are read only and explained in the following table.

2. To export the inventory list to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

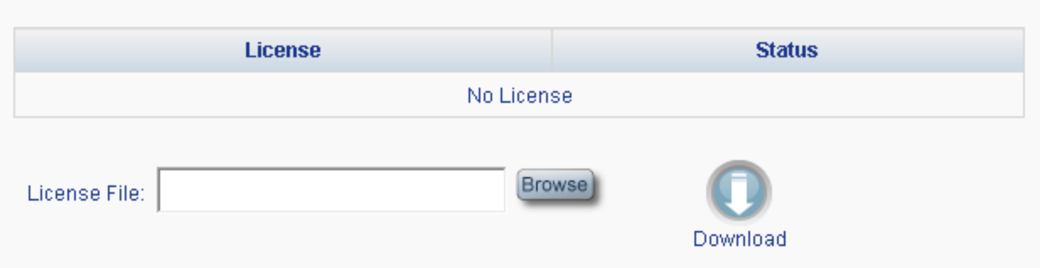
   2. Click **Save File**.

   3. Click **OK**.

Table 36: Inventory Tab Parameters

Parameter	Description
Name	The logical component name.
Description	The type of component.
Serial Number	The serial number of the component.
Hardware Rev	The hardware revision of the component.
Part Number	The part number of the component.
Manufacturer	The manufacturer of the component.

6.3.3 License Tab



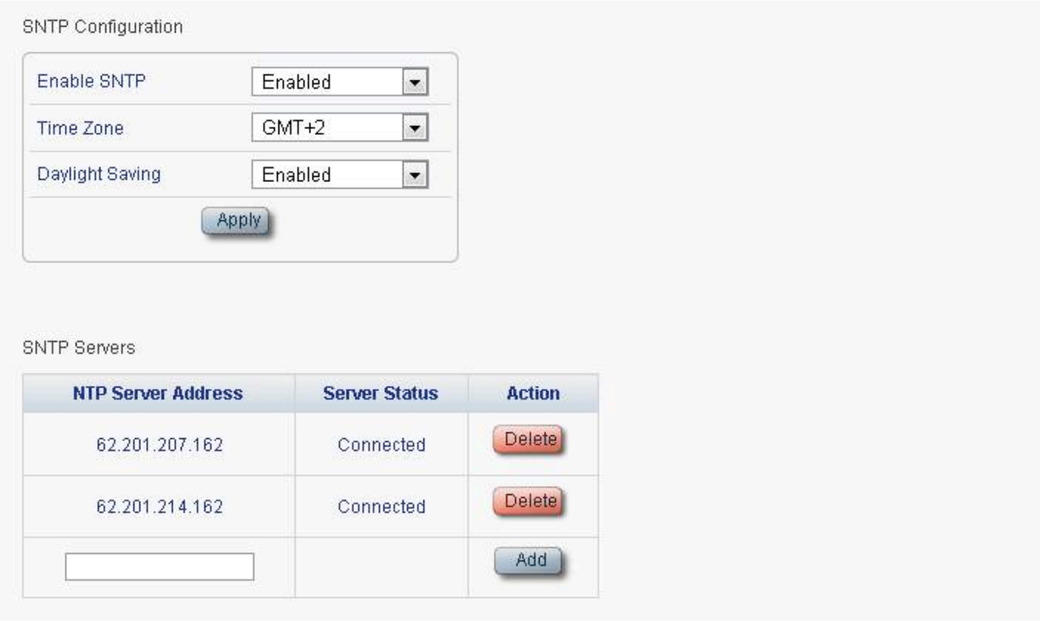
License	Status
No License	

License File:

Figure 59: License Tab

Note: The License tab is only applicable for products requiring a license and is not relevant for FIREamp™.

6.3.4 Time Tab



SNTP Configuration

Enable SNTP	Enabled
Time Zone	GMT+2
Daylight Saving	Enabled

SNTP Servers

NTP Server Address	Server Status	Action
62.201.207.162	Connected	Delete
62.201.214.162	Connected	Delete
		Add

Figure 60: Time Tab

Use the Time tab to configure the FIREamp™ to use the standard protocol SNTP to synchronize its calendar time with an external accurate time server.

The FIREamp™ polls the list of defined servers every 10 minutes and takes the time from the first connected server.

Note:

- Update the **Daylight Saving** parameter twice a year.
- In order to communicate with the Time Server, the FIREamp™ must have an IP route to the defined server. Therefore, you may want to add the Time Server address to the Static Routing table (see IP Tab (p. 97)).

To configure SNTP:

1. Click the **Time** tab.

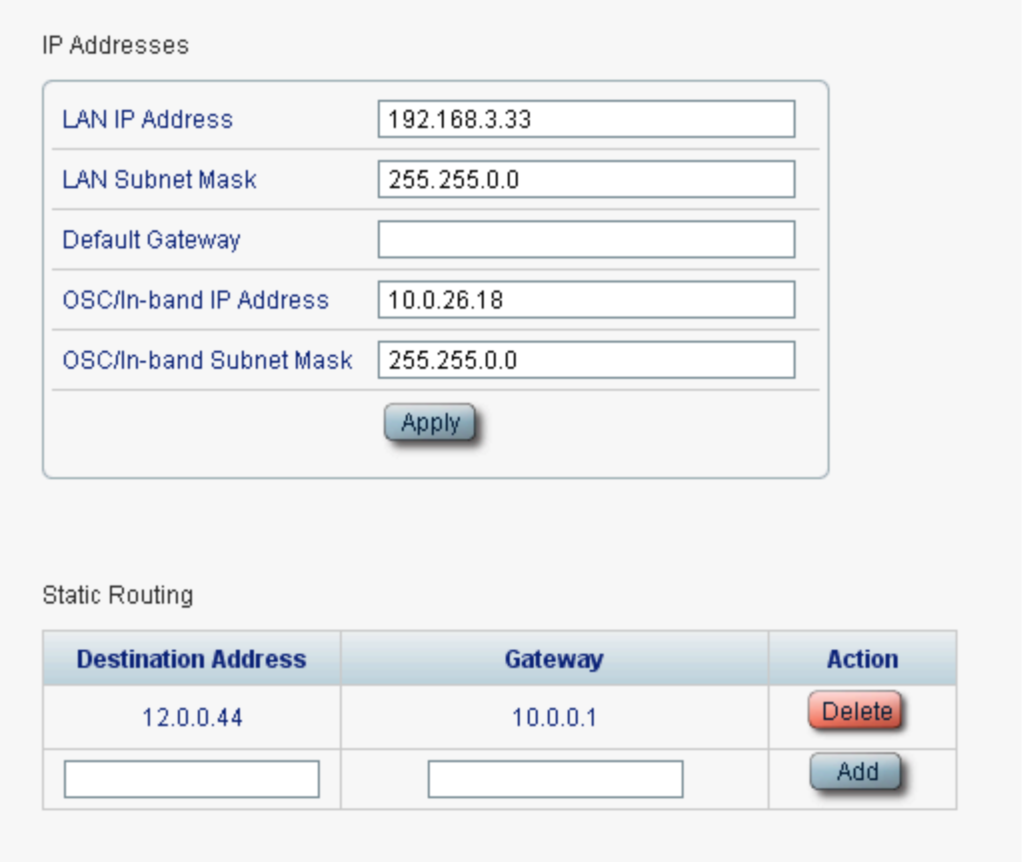
The Time tab opens displaying the Time and Time Server parameters. The fields are explained in the following table.

2. To configure the **Time** parameters:
   1. Fill in the following fields:
      - **Enable SNTP**
      - **Time Zone**
      - **Daylight Saving**
   2. Click **Apply.**
3. To add a server:
   1. In the **NTP Server Address,** type the IP address.
   2. Click **Add**.
4. To remove a server, click **Delete** in the corresponding line.

Table 37: Time Tab Parameters

Parameter	Description	Format/Values
Time Parameters		
Enable SNTP	Enables or disables the time synchronization process.	• **Enabled**: Operate the protocol • **Disabled**: Stop the protocol
Time Zone	Sets the time zone of the node that defines the conversion from Coordinated Universal Time (UTC) to local time.	GMT±n Select a time zone according to your geographical location. **Note:** The local time is shown.
Daylight Saving	Sets whether or not the clock will advance one hour due to summer time saving.	• **Enabled**: Advance the clock • **Disabled**: Do not advance the clock
Time Server Parameters		
NTP Server Address	The IP address of an SNTP time server.	IP address
Server Status	The status of the connection with the server.	• **Unknown**: No attempt has yet been made to connect to the server. • **Connected**: The link to the server has been established. • **Disconnected**: No link to the server. **Note:** This field is read only.

6.3.5 IP Tab



IP Addresses

LAN IP Address	192.168.3.33
LAN Subnet Mask	255.255.0.0
Default Gateway	
OSC/In-band IP Address	10.0.26.18
OSC/In-band Subnet Mask	255.255.0.0

Static Routing

Destination Address	Gateway	Action
12.0.0.44	10.0.0.1	Delete
		Add

Figure 61: IP Tab

Use the IP tab to configure the IP addresses, default gateway of the node, and static routing.

Each node has two IP addresses:

- LAN (Ethernet) address used for local management access
- OSC/In-band address used for remote management access

Warning:

- Changing the IP address configuration may immediately stop management communication to the node.
- When configuring IP addresses, make sure that the IP address of the OSC/In-band is not in the same subnet as the LAN port, otherwise the routing of the management traffic will fail.

To configure IP addresses, default gateway, and static routing:

1. Click the **IP** tab.

   The IP tab opens displaying the IP Address and Static Routing configuration.

2. In the **LAN IP Address** section, fill in the fields as explained in the following table.

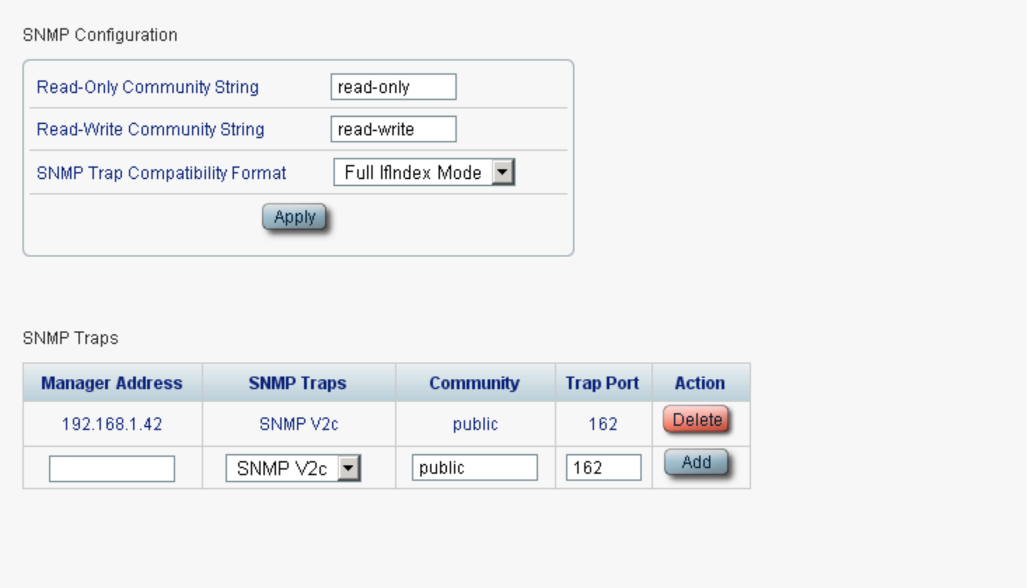
3. To add a new static route:
    1. In the **Static Routing** section, fill in the following fields as explained in the following table.
    2. Click **Add**.

       The static routes are added with the subnet **`255.255.255.255`**.
4. To remove a configured static route, click **Delete** in the corresponding line.

Table 38: IP Tab Parameters

Parameter	Description	Format/Values
IP Addresses		
LAN IP Address	The IP address of the Ethernet port.	IP address For example: `192.168.3.231`
LAN Subnet Mask	The subnet mask of the Ethernet port.	Dot notation For example: `255.255.248.0`
Default Gateway	The default gateway of the node.	Dot notation For example: `192.168.0.254`
OSC/In-band IP Address	The IP address of the OSC management channels.	Dot notation For example: `10.0.11.34` **Note:** The same IP address applies to both MNG ports.
OSC/In-band Subnet Mask	The subnet mask of the OSC.	Dot notation For example: `255.0.0.0`
Static Routing		
Destination Address	The address of the destination.	IP address For example: `11.0.3.24`
Gateway	The address of the gateway for this destination.	IP address For example: `192.168.0.150`

6.3.6 SNMP Tab



SNMP Configuration

Read-Only Community String	read-only
Read-Write Community String	read-write
SNMP Trap Compatibility Format	Full IfIndex Mode

SNMP Traps

Manager Address	SNMP Traps	Community	Trap Port	Action
192.168.1.42	SNMP V2c	public	162	Delete
	SNMP V2c	public	162	Add

Figure 62: SNMP Tab

Use the SNMP tab to configure the SNMP configuration and traps.

Warning:

- Changing the community strings may immediately affect the access of the current SNMP session.
- In order to send traps to the management system, the FIREamp™ must have a specific IP route. Therefore, if needed, add the management system address to the Static Routing table (see IP Tab (p. 97)).

To configure the SNMP configuration and traps:

1. Click the **SNMP** tab.

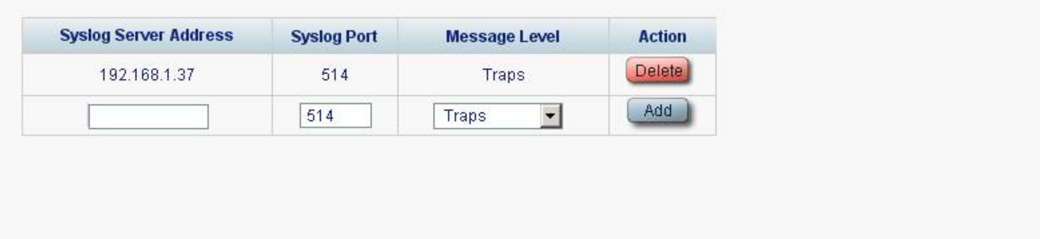
   The SNMP tab opens displaying the SNMP configuration and traps.
2. In the **SNMP Configuration** section, fill in the following fields as explained in the following table.
3. Click **Apply**.
4. To send SNMP traps to a given management system:
   1. In the **SNMP Traps** section, fill in the following fields as explained in the following table.
   2. Click **Add**.
5. To stop SNMP traps from being sent to a given management system, click **Delete** in the corresponding line.

Table 39: SNMP Tab Parameters

Parameter	Description	Format/Values
SNMP Configuration		

Parameter	Description	Format/Values
Read-Only Community String	The community string of the SNMP to be used for read operations.	A string of alphanumeric characters without spaces. Default: read-only
Write-Only Community String	The community string of the SNMP to be used for write operations.	A string of alphanumeric characters without spaces. Default: read-write
SNMP Trap Compatibility Format	Determines the format of the IfIndex that is sent with the SNMP traps.	• **Port IfIndex Mode**: Used with the legacy Network Management System (NMS) • **Full IfIndex Mode**: Used with any other NMS.
SNMP Traps		
Manager Address	The address of the management system.	IP address For example: `192.168.1.50`
SNMP Traps	The SNMP trap format.	SNMPV2c, SNMPV1 Default: SNMPV2c
Community	The community string of the traps.	public (default)
Trap Port	The UDP port number.	162 (default)

6.3.7 Syslog Tab



Syslog Server Address	Syslog Port	Message Level	Action
192.168.1.37	514	Traps	Delete
	514	Traps	Add

Figure 63: Syslog Tab

Use the Syslog tab to define the Syslog servers you want the node to send the log of events.

A system log of the last 512 events is kept by the node and may be retrieved using the Event Log (see Event Log).

For keeping a longer history of the events, you may choose to use a Syslog server running the Syslog protocol as defined by RFC 5424, to receive the node events and save them on an external Syslog system.

To configure Syslog servers:

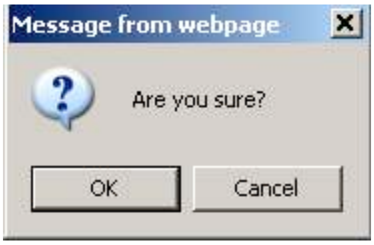
1. Click the **Syslog** tab.

   The Syslog tab opens displaying the Syslog configuration.

2. To send events to a given Syslog server:

1. In the **Syslog Servers** section, fill in the following fields as explained in the following table.
2. Click **Add**.

   The following confirmation message appears.



Message from webpage

Are you sure?

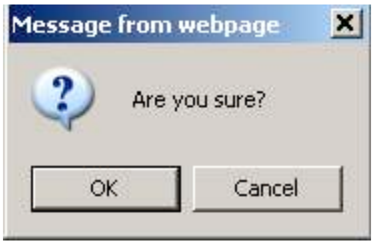
Figure 64: Confirm Configuration

3. Click **OK**.

3. To remove a configured Syslog server:

1. Click **Delete** in the corresponding line.

   The following confirmation message appears.



Message from webpage

Are you sure?

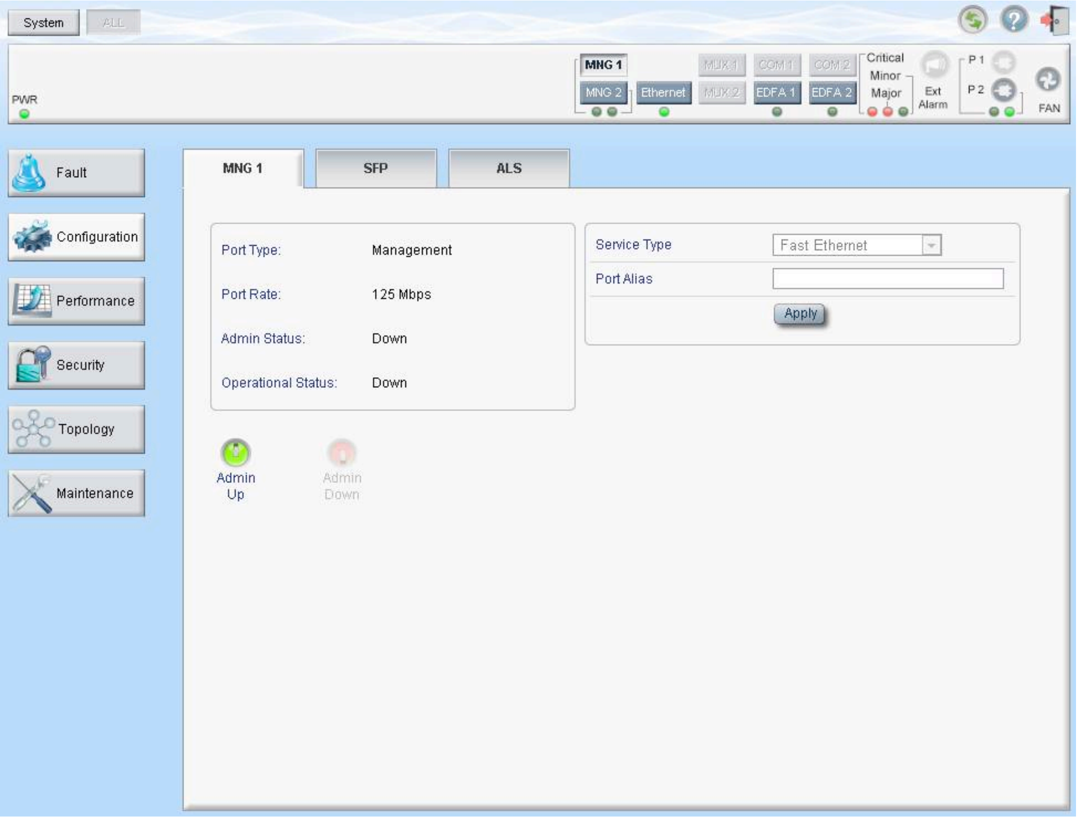
Figure 65: Confirm Configuration

2. Click **OK**.

Table 40: Syslog Tab Parameters

Parameter	Description	Format/Values
Syslog Server Address	The address of the Syslog system.	IP address For example: `192.168.1.37`
Syslog port	The UDP port number.	Port number Default: 514
Message Level	The supported message filter level.	• **Traps**: Traps only • **Log**: Log messages • **Debug**: Log and debug messages Default: Traps

6.4 Management Port Configuration



Port Type: Management

Port Rate: 125 Mbps

Admin Status: Down

Operational Status: Down

Service Type: Fast Ethernet

Port Alias:

Figure 66: Management Port Configuration Window

Use the Management Port Configuration window to do the following:

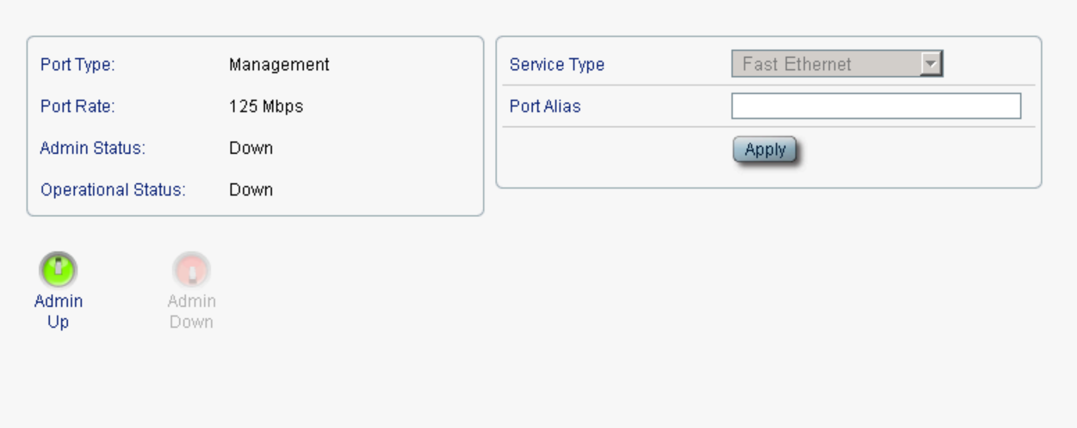
- **MNG tab**: Configure an MNG port and enable/disable the port
- **SFP tab**: Configure the SFP module
- **ALS tab**: Configure ALS for an MNG port

To open the Management Port Configuration window:

1. Click **Configuration**.
2. Click an **MNG** button to select the management port.

   The appropriate Management Port Configuration window opens.

6.4.1 MNG Tab



Port Type: Management
Port Rate: 125 Mbps
Admin Status: Down
Operational Status: Down

Service Type: Fast Ethernet
Port Alias:

Figure 67: MNG Tab

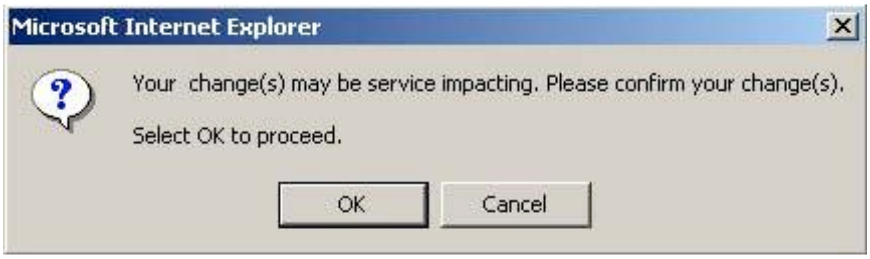
Use the MNG tab to configure a management port and enable/disable the port.

To configure a management port:

1. Click the **MNG** tab.

   The MNG tab opens displaying the management port configuration.
2. Fill in the fields as explained in the following table.
3. Click **Apply**.
4. To enable the port:
   1. Click **Admin Up** ● .

      The following confirmation message appears.



Microsoft Internet Explorer

Your change(s) may be service impacting. Please confirm your change(s).

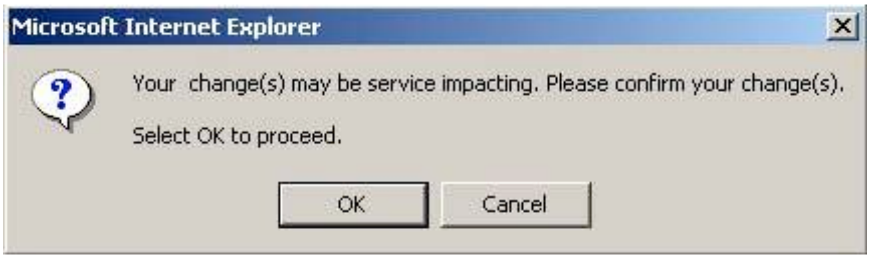
Select OK to proceed.

Figure 68: Confirm Changes

   2. Click **OK**.

      The selected port is enabled, the **Admin Up** button is disabled, and the **Admin Down** button is enabled.
5. To disable the port:
   1. Click **Admin Down** ● .

The following confirmation message appears.



Microsoft Internet Explorer

Your change(s) may be service impacting. Please confirm your change(s).

Select OK to proceed.

Figure 69: Confirm Changes

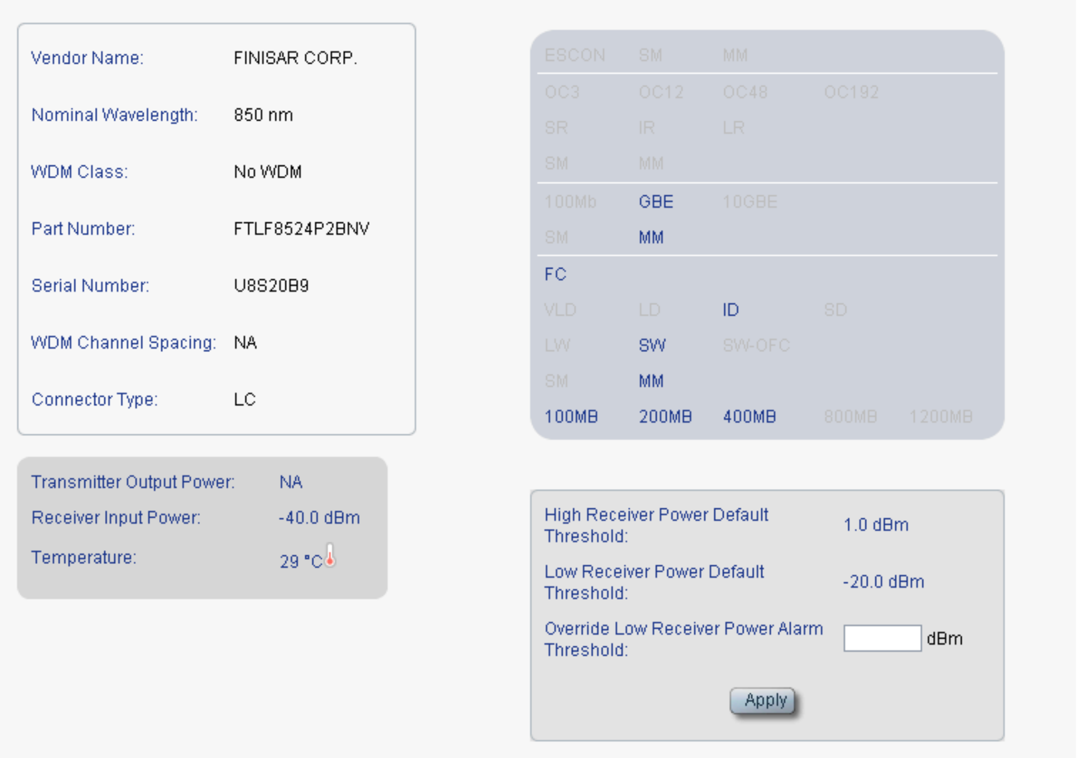
2. Click **OK**.

   The selected port is disabled, the **Admin Up** button is enabled, and the **Admin Down** button is disabled.

Table 41: Management Tab Parameters

Parameter	Description	Format/Values
Port Type	The type of port.	Management
Port Rate	The bit rate of the OSC management port.	125 Mbps
Admin Status	The administrative status of the port.	Up, Down To change the value, click **Admin Up** or **Admin Down**.
Operational Status	The operational status of the port. This indicates if there is a failure in the port.	• **Up**: Normal operation • **Down**: Alarm is detected or **Admin Down**
Service Type	The management type.	Fast Ethernet (default)
Port Alias	The logical name given to the port for identification purposes.	Free text

6.4.2 SFP Tab



Vendor Name: FINISAR CORP.

Nominal Wavelength: 850 nm

WDM Class: No WDM

Part Number: FTLF8524P2BNV

Serial Number: U8S20B9

WDM Channel Spacing: NA

Connector Type: LC

Transmitter Output Power: NA

Receiver Input Power: -40.0 dBm

Temperature: 29 °C

ESCON	SM	MM		
OC3	OC12	OC48	OC192	
SR	IR	LR		
SM	MM			
100Mb	GBE	10GBE		
SM	MM			
FC				
VLD	LD	ID	SD	
LW	SW	SW-OFC		
SM	MM			
100MB	200MB	400MB	800MB	1200MB

High Receiver Power Default Threshold: 1.0 dBm

Low Receiver Power Default Threshold: -20.0 dBm

Override Low Receiver Power Alarm Threshold: ____ dBm

Figure 70: SFP Tab

Use the SFP tab to display information about the type and status of the optical transceiver inserted in the selected port and configure the override low receiver power alarm threshold.

To configure the SFP module:

1. Click the **SFP** tab.

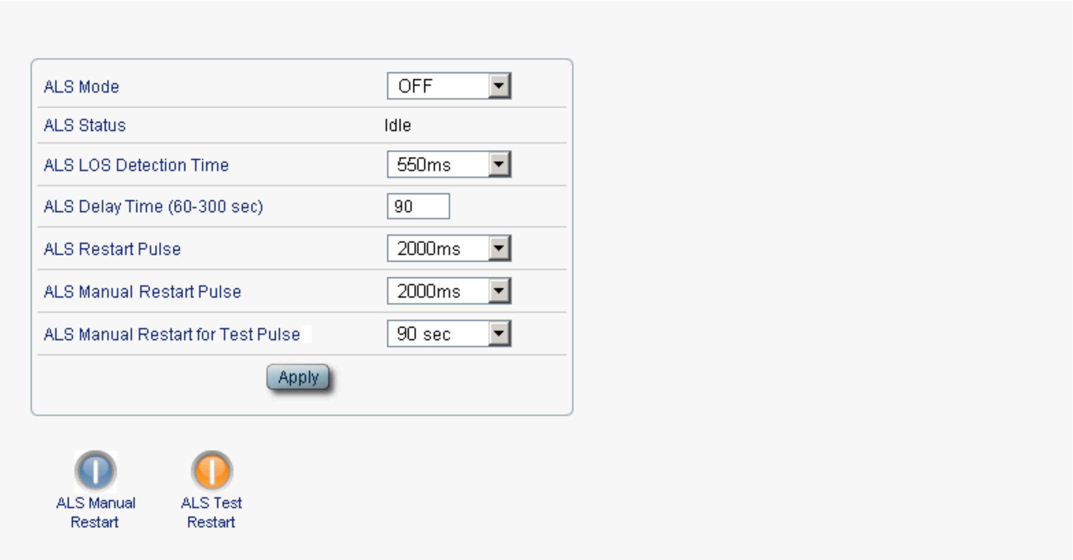
   The SFP tab opens displaying the SFP module configuration.
2. Fill in the fields as explained in the following table.
3. Click **Apply**.

Table 42: SFP Tab Parameters

Parameter	Description	Format/Values
Vendor Name	The name of the SFP vendor.	String
Nominal Wavelength	The defined wavelength of the SFP.	nm
WDM Class	The type of SFP.	No WDM, CWDM, DWDM
Part Number	The part number of the SFP.	String
Serial Number	The serial number of the SFP.	String
WDM Channel Spacing	The channel spacing of the SFP.	• **CWDM**: nm • **DWDM**: GHz

Parameter	Description	Format/Values
Connector Type	The type of SFP connector.	• **Optical**: LC • **Electrical**: RJ45
Transmitter Output Power	The measured output power of the SFP.	dBm
Receiver Input Power	The measured input power of the SFP.	dBm
Temperature	The measured temperature of the SFP.	Celsius
ESCON capabilities	The SP capabilities of the ESCON services are marked.	
SONET/SDH capabilities	The SFP capabilities of the OC-3, OC-12, OC-48, and OC-192 services are marked.	
Ethernet capabilities	The SFP capabilities of the 100Mb, 1GbE, and 10GbE Ethernet services are marked.	
FC capabilities	The SFP capabilities of the FC services are marked.	
High Receiver Power Default Threshold	The default threshold for the High Receiver Power alarm.	dBm
Low Receiver Power Default Threshold	The default threshold for Low Receiver Power alarm.	dBm
Override Low Receiver Power Alarm Threshold	The configured threshold for the Low Receiver Power alarm.	dBm

6.4.3 ALS Tab



ALS Mode	OFF
ALS Status	Idle
ALS LOS Detection Time	550ms
ALS Delay Time (60-300 sec)	90
ALS Restart Pulse	2000ms
ALS Manual Restart Pulse	2000ms
ALS Manual Restart for Test Pulse	90 sec

Figure 71: ALS Tab

Use the ALS tab to configure ALS for a selected port.

The ALS is designed for eye safety considerations. It provides the capability of automatically reducing the optical power when there is loss of optical power.

The loss of optical power can be caused by cable break, equipment failure, connector unplugging, and so on.

The FIREamp™ implements the ALS optical safety procedure as defined by the ITU-T Recommendation G.664.

A laser restart operation (automatic and manual) is also provided to facilitate an easy restoration of the system after reconnection of the link.

To configure ALS:

1. Click the **ALS** tab.

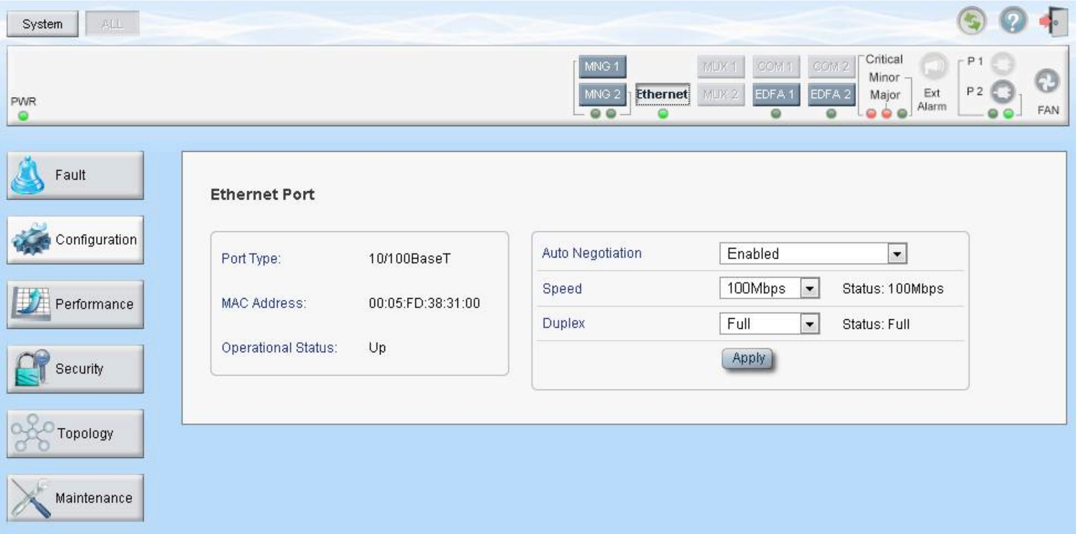
   The ALS tab opens displaying the ALS configuration for the selected port.

2. Fill in the fields as explained in the following table.
3. Click **Apply**.
4. To initiate a manual restart pulse, click **ALS Manual Restart** ⏻.
5. To initiate a manual restart for test pulse, click **ALS Test Restart** ⏻.

Table 43: ALS Tab Parameters

Parameter	Description	Format/Values
ALS Mode	Enable or disable ALS for this port.	OFF, ON Default: OFF
ALS Status	The current status of the ALS.	Idle, Active
ALS LOS Detection Time	The time to declare optical LOS present or clear (in milliseconds).	550 ± 50 ms Default: 550 ms
ALS Delay Time (60-300 sec)	The duration between two laser reactivations (in seconds).	60 to 300 sec Default: 90 sec
ALS Restart Pulse	The automatic restart pulse width (in milliseconds).	2000 ± 250 ms Default: 2000 ms **Note:** Automatic mode only.
ALS Manual Restart Pulse	Manual restart pulse width (in milliseconds).	2000 ± 250 ms Default: 2000 ms **Note:** Manual mode only.
ALS Manual Restart for Test Pulse	Manual restart for test pulse width (in seconds).	90 ± 10 sec Default: 90 sec **Note:** Manual restart only.

6.5 Ethernet Port Configuration



Ethernet Port

Port Type: 10/100BaseT
MAC Address: 00:05:FD:38:31:00
Operational Status: Up

Auto Negotiation: Enabled
Speed: 100Mbps Status: 100Mbps
Duplex: Full Status: Full

Figure 72: Ethernet Port Configuration Window

Use the Ethernet Port Configuration window to configure the Ethernet port status and parameters.

⚠ **Warning:** Changing the link parameters of the Ethernet port may cause a loss of connection to the node.

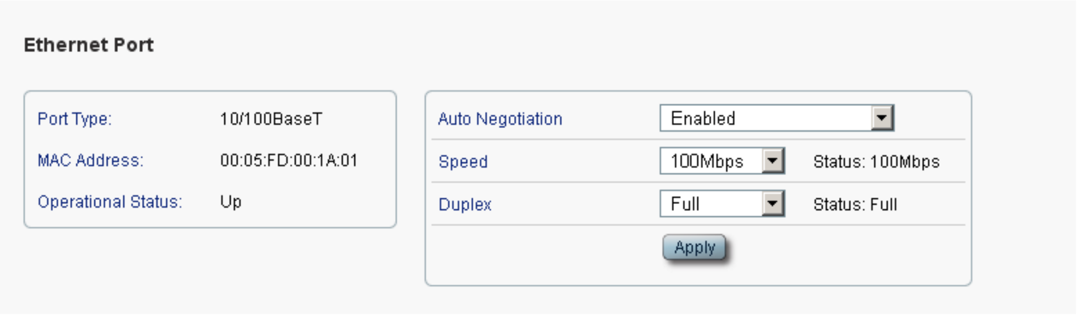
Note: The auto negotiation protocol is defined by IEEE 802.3 as the standard method by which two connected Ethernet devices choose common transmission parameters, such as speed and duplex mode.

To open the Ethernet Port Configuration window:

1. Click **Configuration**.
2. Click **Ethernet** to select the Ethernet port.

   The Ethernet Port Configuration window opens.

6.5.1 Ethernet Tab



Ethernet Port

Port Type: 10/100BaseT
MAC Address: 00:05:FD:00:1A:01
Operational Status: Up

Auto Negotiation: Enabled
Speed: 100Mbps Status: 100Mbps
Duplex: Full Status: Full

Figure 73: Ethernet Tab

Use the Ethernet tab to configure the Ethernet port.

To configure the Ethernet port:

1. Click **Ethernet** to select the Ethernet port.

   The Ethernet tab opens displaying the Ethernet port configuration.

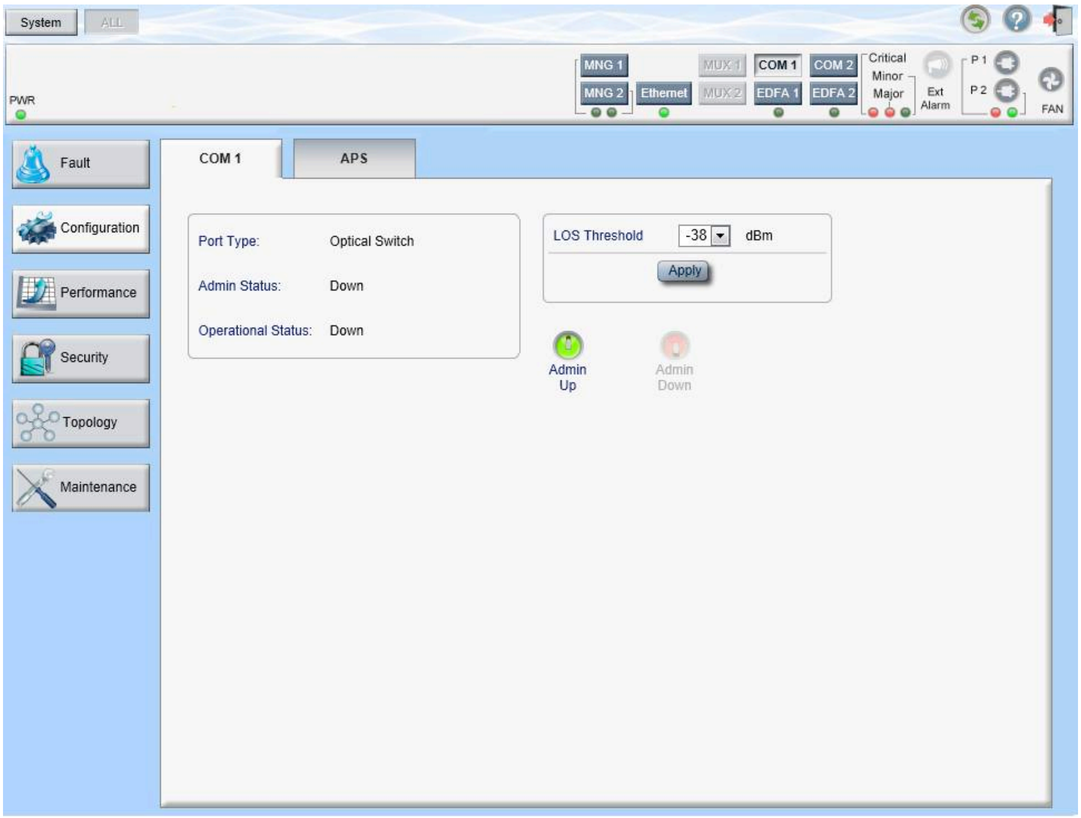
2. Fill in the fields as explained in the following table.

3. Click **Apply**.

Table 44: Ethernet Tab Parameters

Parameter	Description	Format/Values
Port Type	The type of port.	10/100 Base-T
MAC Address	The MAC address of the Ethernet port.	XX:XX:XX:XX:XX:XX
Operational Status	The operational status of the port. This indicates if there is a failure in the port.	• **Up**: Normal operation • **Down**: Alarm is detected or **Admin Down**
Auto Negotiation	Whether or not the auto negotiation of the Ethernet link parameters should be performed.	• **Enabled**: Auto negotiation is performed during Ethernet link establishment. • **Disabled**: The Ethernet link parameters are manually determined by the settings of the **Speed** and **Duplex** fields. Default: Enabled **Note:** The advertised capabilities of the Ethernet port are: ▪ **Speed**: 10 Mbps, 100 Mbps ▪ **Duplex**: Full, Half ▪ **Flow Control**: Disabled
Speed	The actual speed of the port.	10 Mbps, 100 Mbps **Note:** This field is applicable only if **Auto Negotiation** is enabled.
Speed (Manual)	The manual value of the speed of the Ethernet port.	10 Mbps, 100 Mbps **Note:** This field is applicable only when **Auto Negotiation** is disabled.
Status (Speed)	The actual speed of the Ethernet port.	10 Mbps, 100 Mbps
Duplex (Manual)	The manual value of the duplex mode of the Ethernet port.	Full, Half Default: Full **Note:** This field is applicable only if **Auto Negotiation** is disabled.
Status (Duplex)	The actual duplex of the Ethernet port.	Full, Half

6.6 COM Port Configuration



Port Type: Optical Switch

Admin Status: Down

Operational Status: Down

LOS Threshold -38 dBm

Figure 74: COM Port Configuration Window

Use the LINK Port Configuration window to do the following:

- **Com tab**: Configure a COM port and enable/disable the port
- **APS tab**: Configure APS for a COM port

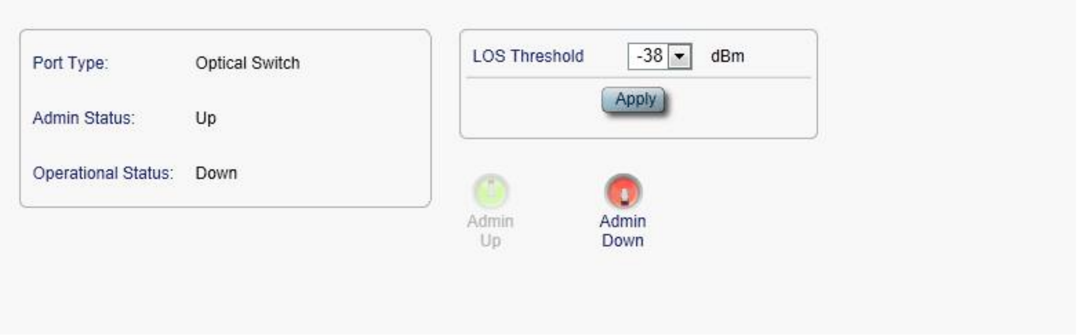
Note: The COM port buttons are enabled only if an Optical Switch module is installed.

To open the COM Port Configuration window:

1. Click **Configuration**.
2. Click a COM button to select the COM port.

   The appropriate COM Port Configuration window opens.

6.6.1 COM Tab



Port Type: Optical Switch

Admin Status: Up

Operational Status: Down

LOS Threshold -38 dBm

Figure 75: COM Tab

Use the COM tab to configure a COM port and enable/disable the port.

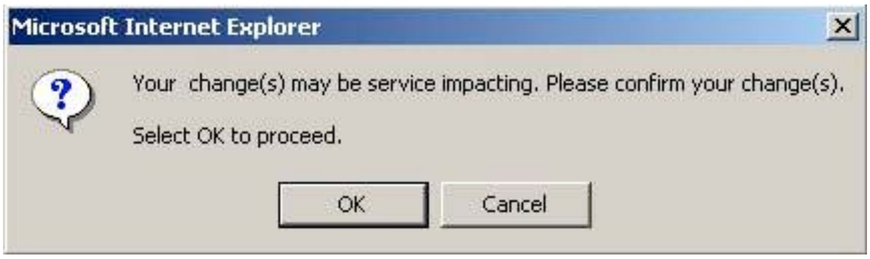
Note: Setting or changing the parameters of one COM port automatically changes the settings of the other COM port.

To configure a COM port:

1. Click the **COM** tab.

   The COM tab opens displaying the COM port configuration.
2. Fill in the fields as explained in the following table.
3. Click **Apply**.
4. To enable the port:
   1. Click **Admin Up** 🟢.

      The following confirmation message appears.

      Microsoft Internet Explorer

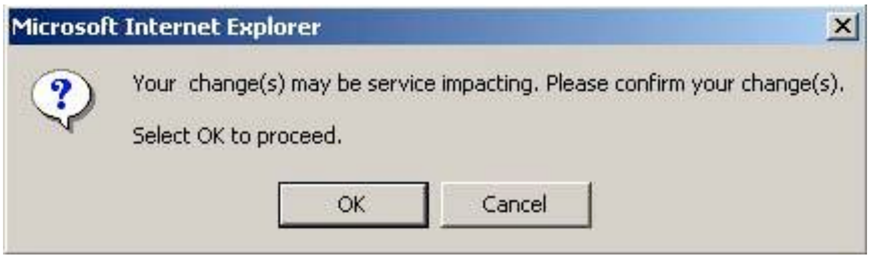
      Your change(s) may be service impacting. Please confirm your change(s).

      Select OK to proceed.

      Figure 76: Confirm Changes
   2. Click **OK**.

      The selected port is enabled, the **Admin Up** button is disabled, and the **Admin Down** button is enabled.
5. To disable the port:
   1. Click **Admin Down** 🔴.

The following confirmation message appears.



Microsoft Internet Explorer

Your change(s) may be service impacting. Please confirm your change(s).

Select OK to proceed.

Figure 77: Confirm Changes

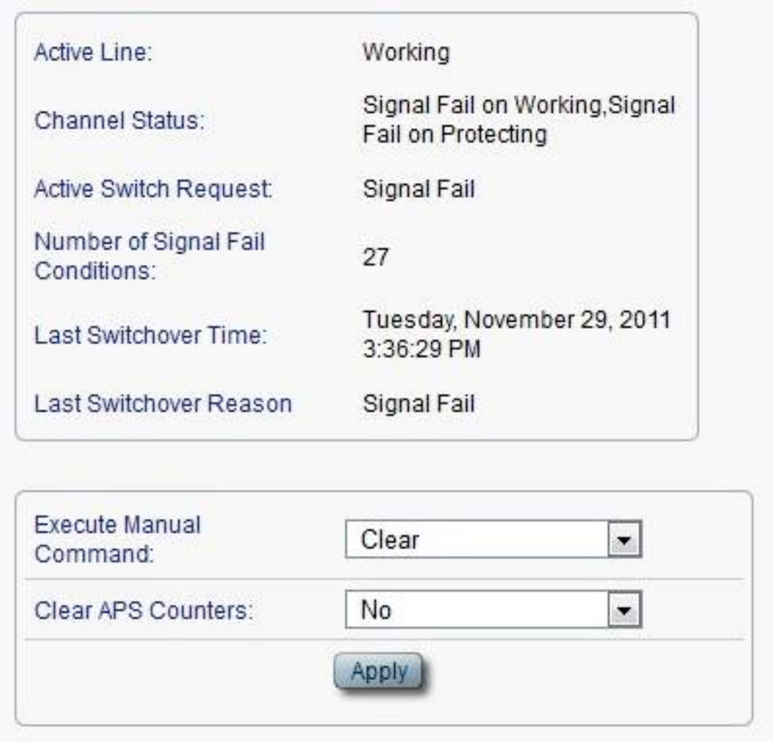
2. Click **OK**.

   The selected port is disabled, the **Admin Up** button is enabled, and the **Admin Down** button is disabled.

Table 45: COM Tab Parameters

Parameter	Description	Format/Values
Port Type	The type of port.	Optical Switch
Admin Status	The administrative status of the port.	Up, Down To change the value, click **Admin Up** or **Admin Down**.
Operational Status	The operational status of the port. This indicates if there is a failure in the port.	• **Up**: Normal operation • **Down**: Alarm is detected or **Admin Down**
LOS Threshold	The LOS detection threshold used for optical switching.	-40 to -25 dBM Default: -38 dBm

6.6.2 APS Tab



Active Line: Working

Channel Status: Signal Fail on Working,Signal Fail on Protecting

Active Switch Request: Signal Fail

Number of Signal Fail Conditions: 27

Last Switchover Time: Tuesday, November 29, 2011 3:36:29 PM

Last Switchover Reason: Signal Fail

Execute Manual Command: Clear

Clear APS Counters: No

Figure 78: APS Tab

Use the APS tab to view and configure the APS parameters for a COM port.

To configure APS parameters:

1. Click the **APS** tab.

   The APS tab opens.

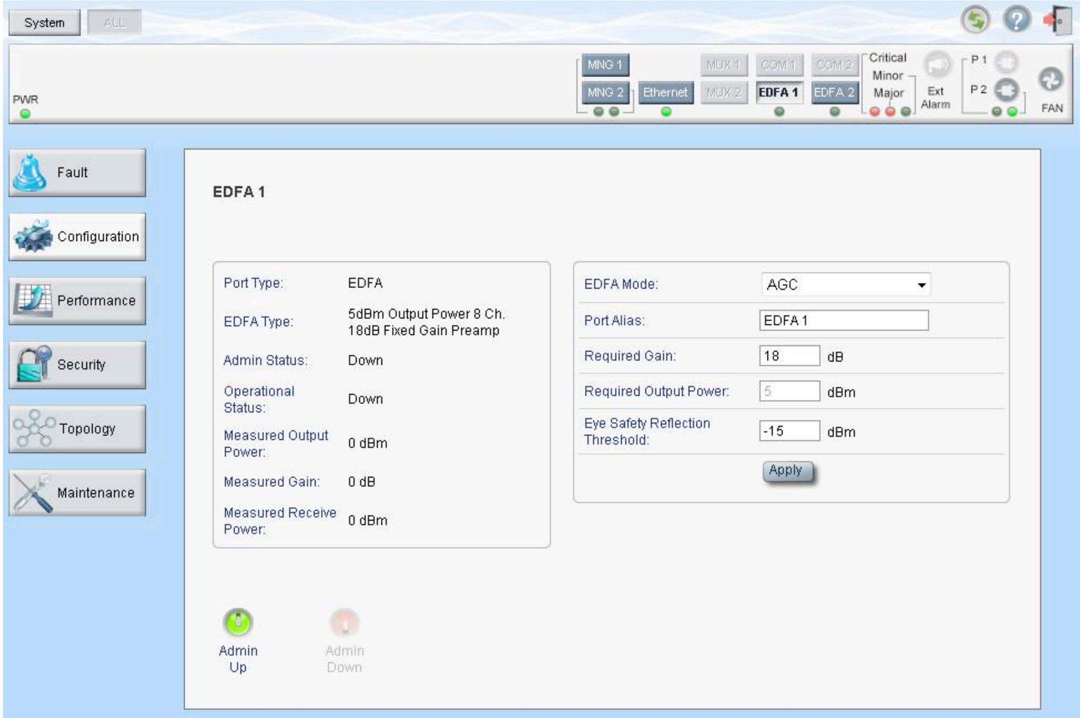
2. Fill in the fields as explained in the following table.
3. Click **Apply**.

Table 46: APS Tab Parameters

Parameter	Description	Format/Values
Active Line	The current active uplink.	Working, Protecting
Channel Status	The current APS channel status.	Any combination of the following values: • Signal Fail on Working • Signal Fail on Protecting • Switched (to Protection)
Active Switch Request	The switch request currently in effect.	• Manual Command • Signal Fail • Force Switch • Other
Number of Signal Fail Conditions	The number of times the **Signal Fail** condition occurred.	Integer

Parameter	Description	Format/Values
Last Switchover Time	The time of the last switchover event.	Date and time
Last Switchover Reason	The reason for the last switchover.	• Manual Command • Signal Fail • Force Switch • Other
Execute Manual Command	The manual APS commands.	• **Clear**: Clears the last APS switch command. • **Force Switch to Protecting**: Forces switch to Protecting in any condition. • **Force Switch to Working**: Forces switch to Working in any condition. • **Manual Switch to Protecting**: Switches to Protecting only if the protecting uplink is functioning properly. • **Manual Switch to Working**: Switches to Working only if the working uplink is functioning properly. Default: Clear
Clear APS Counters	Whether or not to clear the APS counters.	• **No**: Does not clear the APS counters. • **Yes**: Clears the APS counters. Default: No

6.7 EDFA Configuration



EDFA 1

Port Type:	EDFA
EDFA Type:	5dBm Output Power 8 Ch. 18dB Fixed Gain Preamp
Admin Status:	Down
Operational Status:	Down
Measured Output Power:	0 dBm
Measured Gain:	0 dB
Measured Receive Power:	0 dBm

EDFA Mode:	AGC
Port Alias:	EDFA 1
Required Gain:	18 dB
Required Output Power:	5 dBm
Eye Safety Reflection Threshold:	-15 dBm

Figure 79: EDFA Configuration Tab

Note: The EDFA port buttons are enabled only if EDFA modules are installed.

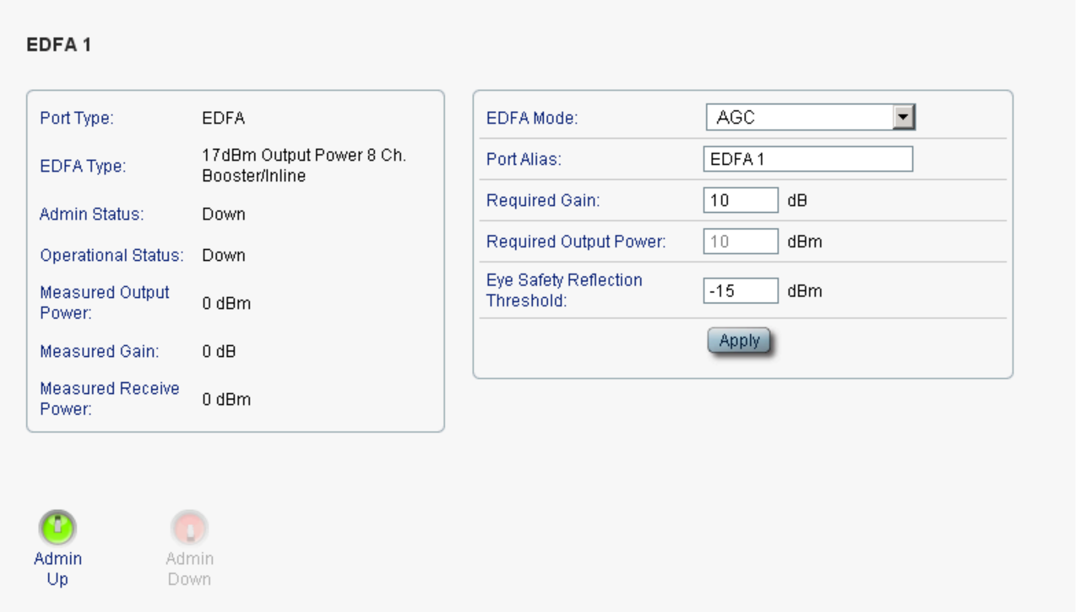
Use the EDFA Configuration window to configure the EDFA module and enable/disable the module.

To open the EDFA Configuration window:

1. Click **Configuration**.
2. Click an **EDFA** button to select the EDFA module.

   The appropriate EDFA Module Configuration window opens.

6.7.1 EDFA Tab



EDFA 1

Port Type:	EDFA
EDFA Type:	17dBm Output Power 8 Ch. Booster/Inline
Admin Status:	Down
Operational Status:	Down
Measured Output Power:	0 dBm
Measured Gain:	0 dB
Measured Receive Power:	0 dBm

EDFA Mode:	AGC
Port Alias:	EDFA 1
Required Gain:	10 dB
Required Output Power:	10 dBm
Eye Safety Reflection Threshold:	-15 dBm

Figure 80: EDFA Tab

Use the EDFA tab to configure the EDFA module and enable/disable the module.

To configure the EDFA module:

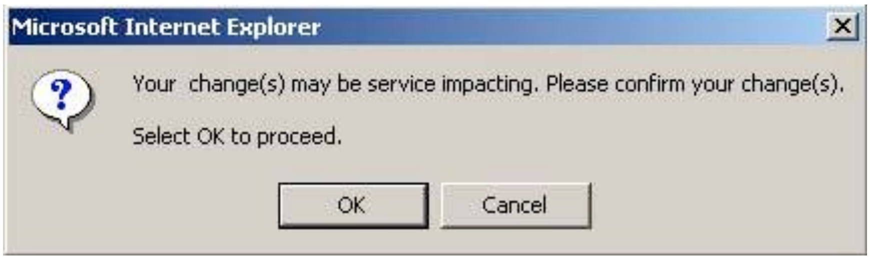
1. Click **EDFA** to select the EDFA module.

   The EDFA tab opens displaying the EDFA module configuration.

2. Fill in the fields as explained in the following table.
3. Click **Apply**.
4. To enable the module:

   1. Click **Admin Up** .

      The following confirmation message appears.



Microsoft Internet Explorer

Your change(s) may be service impacting. Please confirm your change(s).

Select OK to proceed.

Figure 81: Confirm Changes

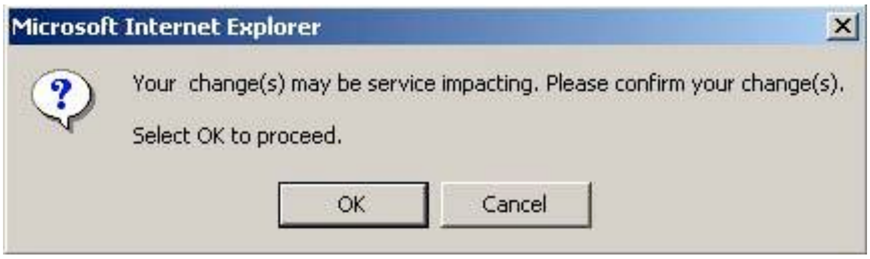
   2. Click **OK**.

      The selected module is enabled, the **Admin Up** button is disabled, and the **Admin Down** button is enabled.

5. To disable the module:

1. Click **Admin Down** 🔴.

   The following confirmation message appears.



Microsoft Internet Explorer

Your change(s) may be service impacting. Please confirm your change(s).

Select OK to proceed.

Figure 82: Confirm Changes

2. Click **OK**.

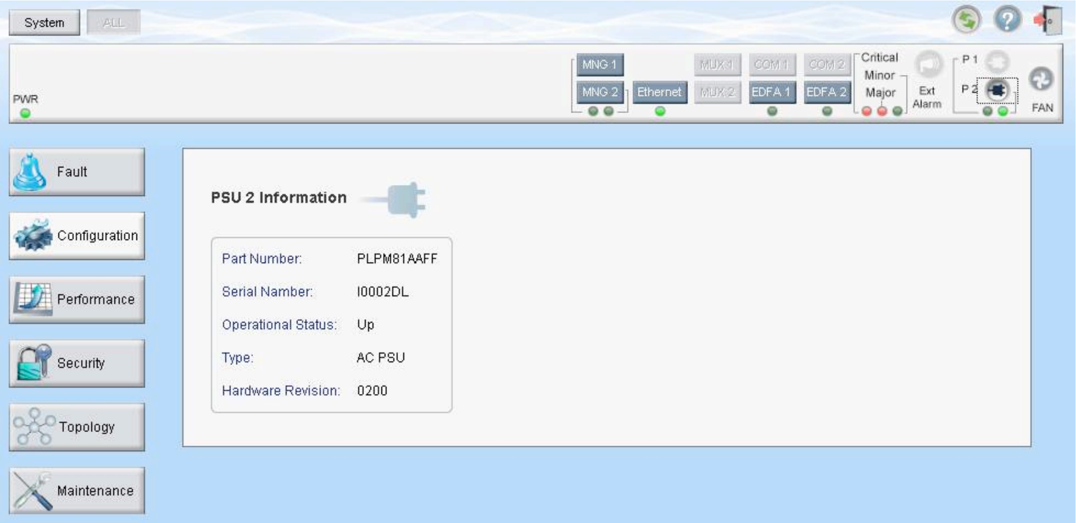
   The selected module is disabled, the **Admin Up** button is enabled, and the **Admin Down** button is disabled.

Table 47: EDFA Tab Parameters

Parameter	Description	Format/Values
Port Type	The type of port.	EDFA
EDFA Type	The type of installed EDFA module as determined by maximum output power, maximum number of optical channels, and Booster/Inline or Pre-Amp.	EDFA types and input power ranges: • **14 dBm**: -24 dBm to +10 dBm • **17 dBm**: -24 dBm to +10 dBm • **20 dBm**: -24 dBm to +10 dBm • **23 dBm**: -5 dBm to +16 dBm
Admin Status	The administrative status of the EDFA module.	Up, Down To change the value, click **Admin Up** or **Admin Down**.
Operational Status	The operational status of the EDFA module. This indicates if there is a failure in the EDFA module.	• **Up**: Normal operation • **Down**: Alarm is detected or **Admin Down**
Measured Output Power	The current measured optical power of the EDFA.	dBm
Measured Gain	The current measured gain of the EDFA.	dB
Measured Receive Power	The current measured receive power of the EDFA.	dBm
EDFA Mode	Selected amplification mode.	• **AGC**: Gain remains constant. • **APC**: Output power remains constant. **Note:** ▪ AGC is recommended. ▪ The other available fields vary depending on which EDFA mode is selected.

Parameter	Description	Format/Values
Port Alias	The logical name given to the module for identification purposes.	Free text
Required Gain	Specifies the required constant gain.	• **Booster**: +10 to +22 dB • **Pre-Amp**: +18 dB **Note:** Available only if **EDFA mode** is **AGC**.
Required Output Power	Specifies the required constant power.	• **Booster**: 14 dBm, 17 dBm, 20 dBm, 23 dBm • **Pre-Amp**: +5 dBm **Note:** Available only if **EDFA mode** is **APC**.
Eye Safety Reflection Threshold	The reflection threshold for eye safety.	dBm

6.8 PSU Information



PSU 2 Information

Part Number: PLPM81AAFF

Serial Namber: I0002DL

Operational Status: Up

Type: AC PSU

Hardware Revision: 0200

Figure 83: PSU Information Window

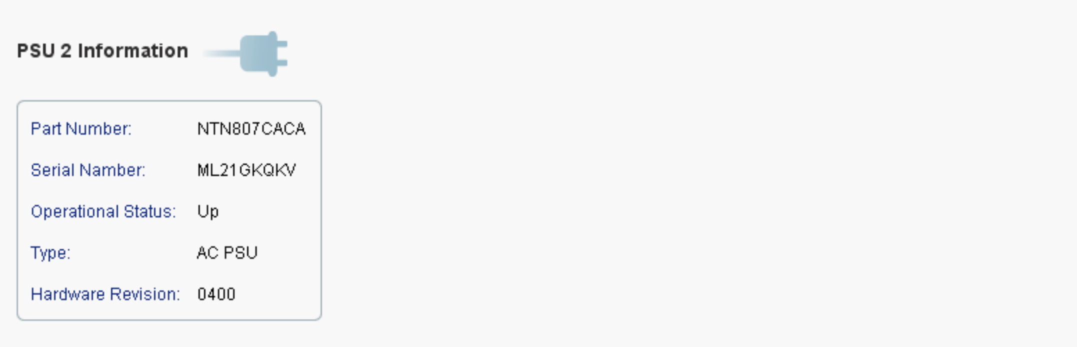
Use the PSU Information Window to view information about the power supply units currently installed in the system.

To open the PSU Information window:

1. Click **Configuration**.
2. Click a **PSU** button to select the power supply unit.

   The appropriate PSU Information window opens.

6.8.1 PSU Tab



PSU 2 Information

Part Number:	NTN807CACA
Serial Namber:	ML21GKQKV
Operational Status:	Up
Type:	AC PSU
Hardware Revision:	0400

Figure 84: PSU Tab

Use the PSU Information tab to view information about the power supply units currently installed in the system.

To view PSU information:

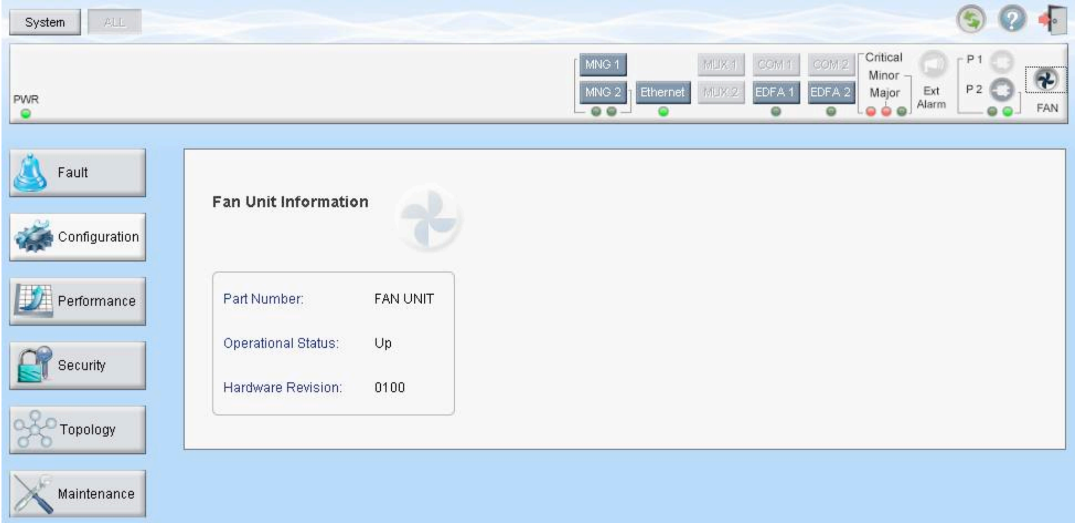
- Click a **PSU** button ⚙ to select the power supply unit.

  The PSU tab opens displaying the PSU information. The fields are read only and explained in the following table.

Table 48: PSU Tab Parameters

Parameter	Description	Format/Values
Part Number	The part number of the power supply unit.	Part number
Serial Number	The serial number of the power supply unit.	Serial number
Operational Status	The operational status of the power supply unit. This indicates if there is a failure in the PSU.	• **Up**: Normal operation • **Down**: Alarm is detected
Type	The type of PSU.	AC PSU, DC PSU
Hardware Revision	The hardware version of the power supply unit.	dddd

6.9 FAN Unit Information



Fan Unit Information

Part Number: FAN UNIT

Operational Status: Up

Hardware Revision: 0100

Figure 85: FAN Unit Information Window

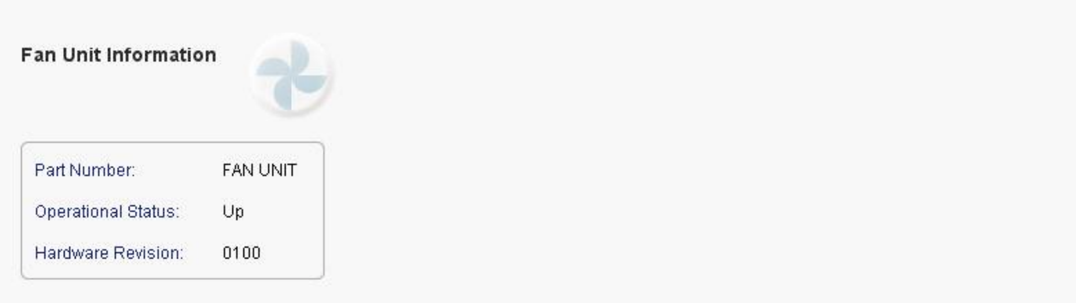
Use the FAN Unit Information window to view information about the FAN unit currently installed in the system.

To open the FAN Unit Information window:

1. Click **Configuration**.
2. Click **FAN** to select the FAN unit.

   The FAN Unit Information window opens.

6.9.1 FAN Tab



Fan Unit Information

Part Number: FAN UNIT

Operational Status: Up

Hardware Revision: 0100

Figure 86: FAN Tab

Use the FAN tab to display information about the FAN unit currently installed in the system.

To view FAN unit information:

- Click **FAN** to select the FAN unit.

  The FAN tab opens displaying the FAN information. The fields are read only and explained in the following table.

Table 49: FAN Tab Parameters

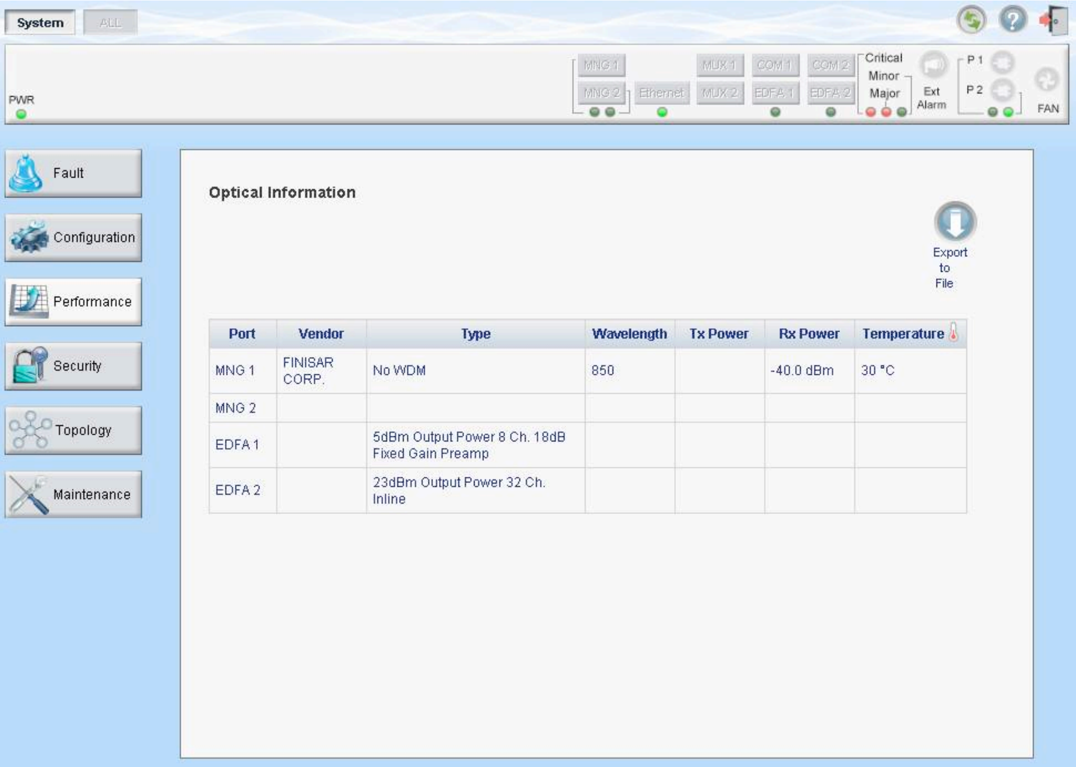
Parameters	**Description**	**Format/Values**
Part Number	The part number of the FAN unit	FAN UNIT
Operational Status	The operational status of the FAN unit. This indicates if there is a failure in the FAN unit.	• **Up**: Normal operation • **Down**: Alarm is detected
Hardware Revision	The hardware version of the FAN unit.	dddd

7 Performance and Parameters Monitoring

This chapter describes the FIREamp™ optical performance monitoring.

In this Chapter

7.1 Optical Information



Optical Information

Port	Vendor	Type	Wavelength	Tx Power	Rx Power	Temperature
MNG 1	FINISAR CORP.	No WDM	850		-40.0 dBm	30 °C
MNG 2						
EDFA 1		5dBm Output Power 8 Ch. 18dB Fixed Gain Preamp				
EDFA 2		23dBm Output Power 32 Ch. Inline				

Figure 87: Optical Information Window

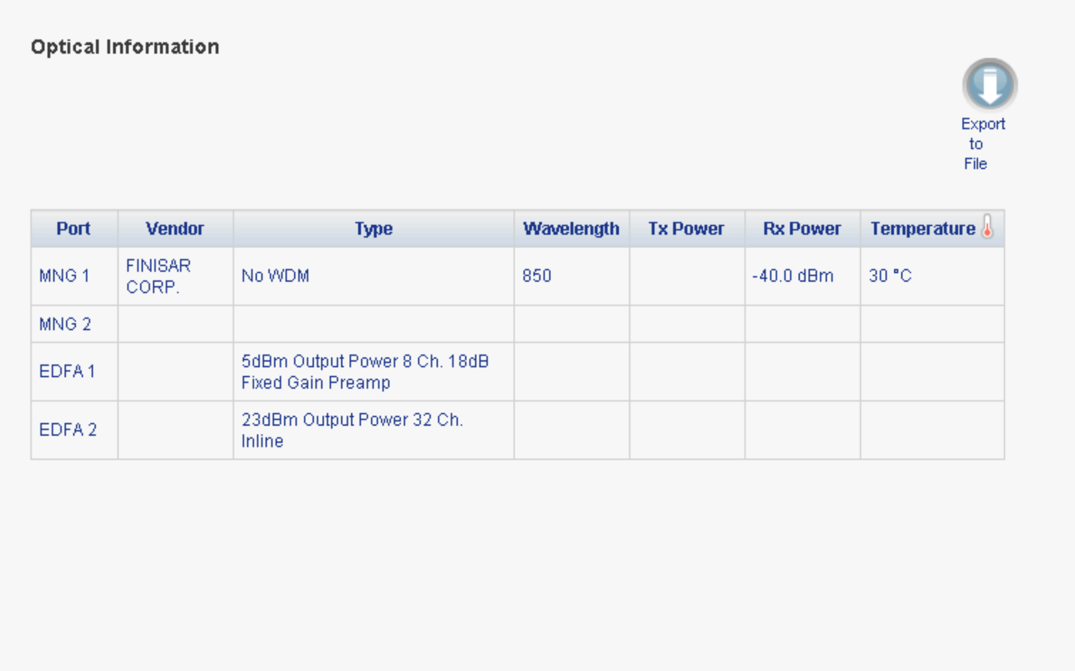
Use the Optical Information window to view Layer 0 optical parameters of all optical modules installed in the system.

To open the Optical Information window:

1. Click **Performance**.
2. Click **System**.

   The Optical Information window opens.

7.1.1 Optical Information Tab



Optical Information

Port	Vendor	Type	Wavelength	Tx Power	Rx Power	Temperature
MNG 1	FINISAR CORP.	No WDM	850		-40.0 dBm	30 °C
MNG 2						
EDFA 1		5dBm Output Power 8 Ch. 18dB Fixed Gain Preamp				
EDFA 2		23dBm Output Power 32 Ch. Inline				

Figure 88: Optical Information Tab

Use the Optical Information tab to view optical information.

To view optical information:

1. Click **System**.

   The Optical Information tab opens displaying the optical information. The fields are read only and explained in the following table.

2. To export the optical information to a file:

   1. Click **Export to File** ⇩.

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

3. To refresh the optical information, click **Refresh** ⟳.

   The information is updated immediately.

Table 50: Optical Information Tab Parameters

Parameter	Description
Port	The name of the port or module in which the optical module is installed. **Note:** This parameter may or may not be marked: ▪ **Red**: This indicates that there is a standing alarm against this optical module. ▪ **Green**: This indicates that the **Admin Status** and **Operational Status** of the port are **Up**. ▪ **Not marked**: This indicates that the optical module does not exist.
Vendor	The manufacturer of the optical module.
Type	The type of optical module.
Wavelength	The Tx wavelength (nm).
Tx Power	The current measured Tx power.
Rx Power	The current measured Rx power.
Temperature	The current measured temperature of the optical module.

8 Maintenance

This chapter describes how to perform maintenance tasks for the FIREamp™.

In this Chapter

8.1 System Maintenance

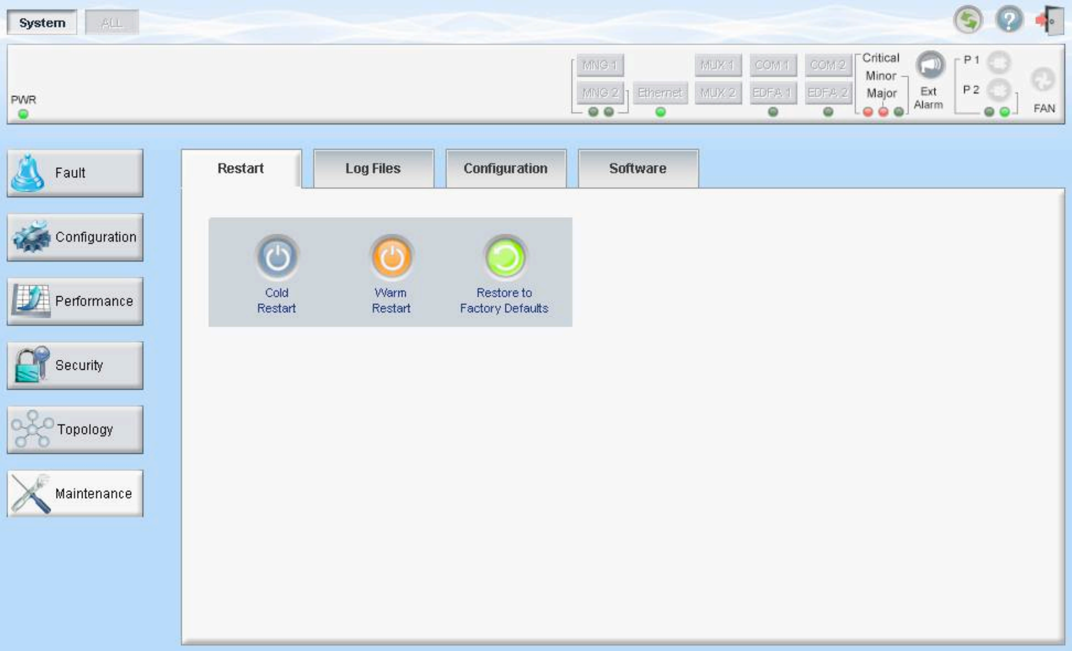


Figure 89: System Maintenance Window

Use the System Maintenance window to perform maintenance operations on the system:

To open the System Maintenance window:

1. Click **Maintenance**.
2. Click **System**.

   The System Maintenance window opens.

The following table describes the System Maintenance tabs.

Table 51: System Maintenance Tabs

Tab	Operation
Restart	Restart the FIREamp™ unit
Log Files	View and save the System Log files

Tab	Operation
Configuration	• **Download Configuration File**: Update system configuration, by downloading to the node a previously saved system configuration file • **Upload Configuration File**: Upload system configuration and save it to the local file system
Software	Download and activate a new software version

8.1.1 Restart Tab

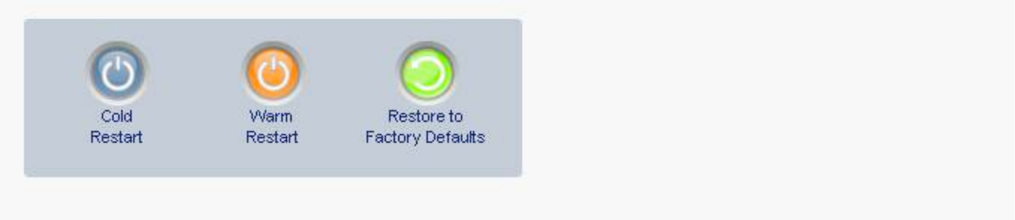


Figure 90: Restart Tab

Use the Restart tab to do the following:

- **Cold Restart**: Service-affecting operation that is required for major upgrade to the device software
- **Warm Restart**: Non-service-affecting operation that is required for minor upgrade of the device software
- **Restore to Factory Defaults**: Service-affecting operation that restores the device to factory defaults

To restart the FIREamp™ unit:

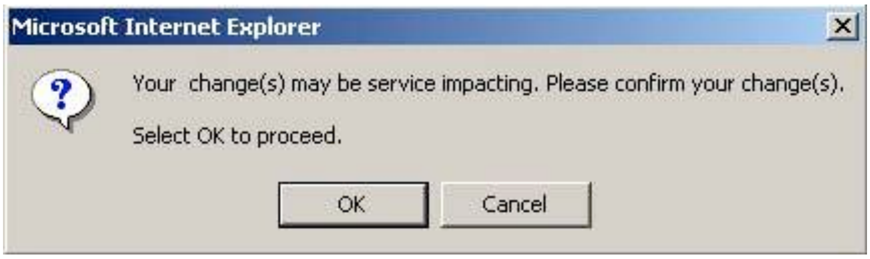
1. Click the **Restart** tab.

   The Restart tab opens.

2. To perform a cold restart:

   1. Click **Cold Restart** .

      The following confirmation message appears.

      
      Microsoft Internet Explorer

      Your change(s) may be service impacting. Please confirm your change(s).

      Select OK to proceed.

      Figure 91: Confirm Changes

   2. Click **OK**.

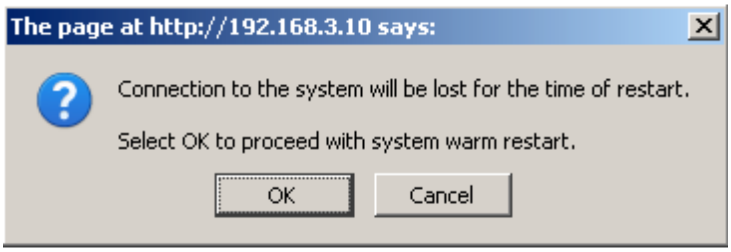
      The software and hardware are reloaded and the system restarts.

Traffic goes down for a short period of time.

3. To perform a warm restart:

    1. Click **Warm Restart** ⏻.

    The following confirmation message appears.



The page at http://192.168.3.10 says:

Connection to the system will be lost for the time of restart.

Select OK to proceed with system warm restart.

Figure 92: Confirm Changes

    2. Click **OK**.

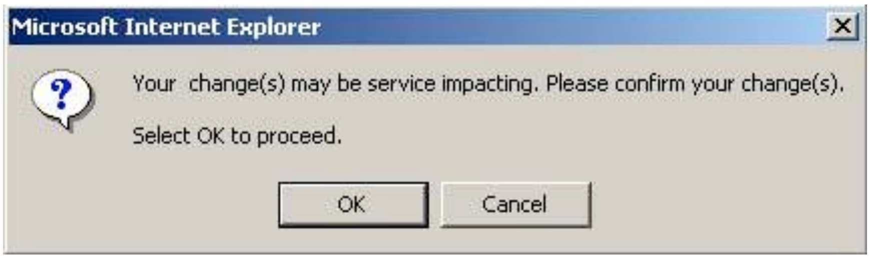
    The software is reloaded and the system restarts.

    Traffic is not affected.

4. To restore to the factory default configuration:

    1. Click **Restore to Factory Defaults** ↻.

    The following confirmation message appears.



Microsoft Internet Explorer

Your change(s) may be service impacting. Please confirm your change(s).

Select OK to proceed.

Figure 93: Confirm Changes

    2. Click **OK**.

    All system default configuration parameter values, except for IP information, are restored and the system restarts.

    Traffic is affected.

Note: If you restore to the factory default configuration:

- All licensing information is removed from the node. Therefore, to continue using a licensed feature after a **Restore to Factory Default**s is performed, you must reinstall the license.
- All previous configurations applied to the node will be lost, except for the IP information. Therefore, you should reapply the desired configuration.

8.1.2 Log Files Tab

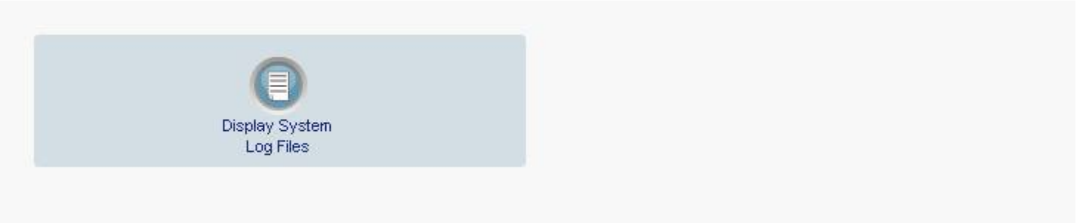


Figure 94: Log Files Tab

Use the Log Files tab to view and save System Log files.

To view and save System Log files:

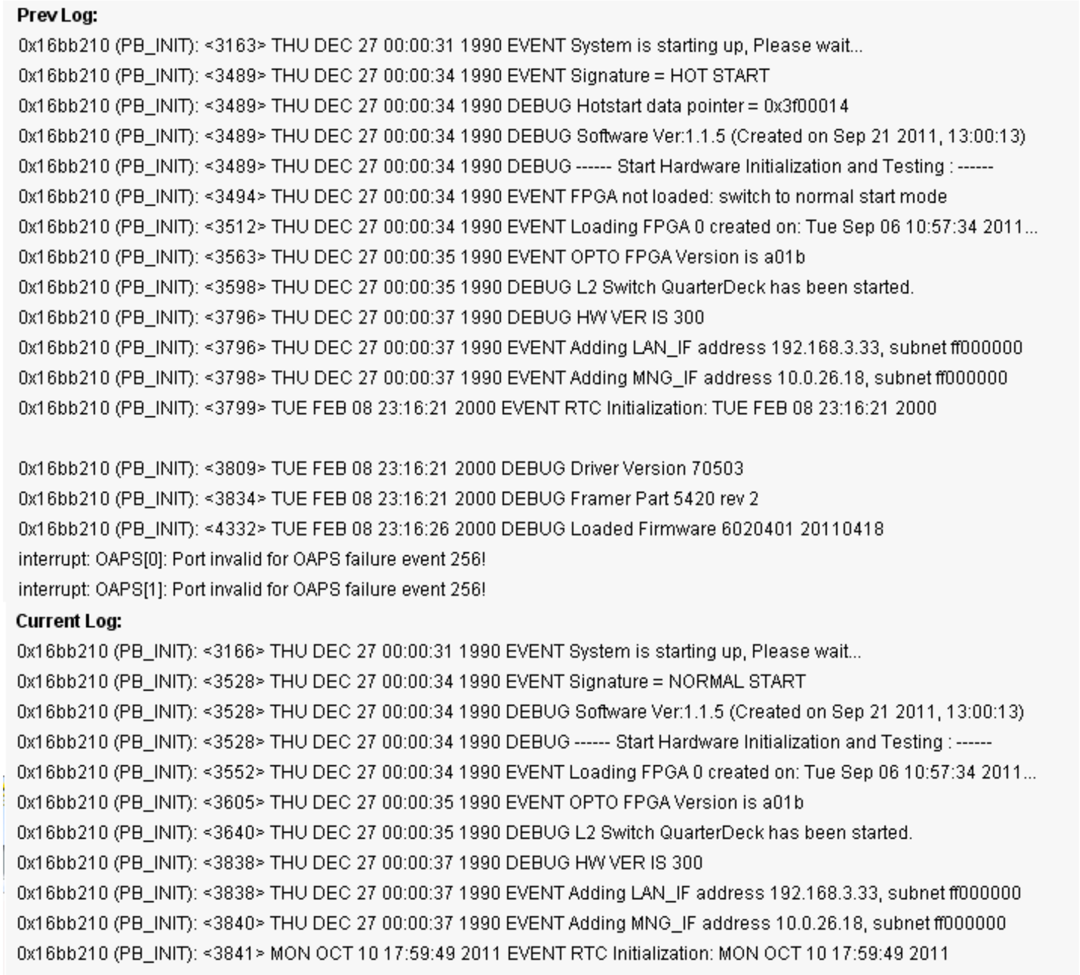
1. Click **Log Files**.

   The Log Files tab opens.

2. Click **Display System Log Files** 🗎.

   The System Log files are displayed.

3. To save the log data, copy the displayed text from the browser window, paste it into a file, and then save the file.



```
Prev Log:
0x16bb210 (PB_INIT): <3163> THU DEC 27 00:00:31 1990 EVENT System is starting up, Please wait...
0x16bb210 (PB_INIT): <3489> THU DEC 27 00:00:34 1990 EVENT Signature = HOT START
0x16bb210 (PB_INIT): <3489> THU DEC 27 00:00:34 1990 DEBUG Hotstart data pointer = 0x3f00014
0x16bb210 (PB_INIT): <3489> THU DEC 27 00:00:34 1990 DEBUG Software Ver:1.1.5 (Created on Sep 21 2011, 13:00:13)
0x16bb210 (PB_INIT): <3489> THU DEC 27 00:00:34 1990 DEBUG ------ Start Hardware Initialization and Testing : ------
0x16bb210 (PB_INIT): <3494> THU DEC 27 00:00:34 1990 EVENT FPGA not loaded: switch to normal start mode
0x16bb210 (PB_INIT): <3512> THU DEC 27 00:00:34 1990 EVENT Loading FPGA 0 created on: Tue Sep 06 10:57:34 2011...
0x16bb210 (PB_INIT): <3563> THU DEC 27 00:00:35 1990 EVENT OPTO FPGA Version is a01b
0x16bb210 (PB_INIT): <3598> THU DEC 27 00:00:35 1990 DEBUG L2 Switch QuarterDeck has been started.
0x16bb210 (PB_INIT): <3796> THU DEC 27 00:00:37 1990 DEBUG HW VER IS 300
0x16bb210 (PB_INIT): <3796> THU DEC 27 00:00:37 1990 EVENT Adding LAN_IF address 192.168.3.33, subnet ff000000
0x16bb210 (PB_INIT): <3798> THU DEC 27 00:00:37 1990 EVENT Adding MNG_IF address 10.0.26.18, subnet ff000000
0x16bb210 (PB_INIT): <3799> TUE FEB 08 23:16:21 2000 EVENT RTC Initialization: TUE FEB 08 23:16:21 2000

0x16bb210 (PB_INIT): <3809> TUE FEB 08 23:16:21 2000 DEBUG Driver Version 70503
0x16bb210 (PB_INIT): <3834> TUE FEB 08 23:16:21 2000 DEBUG Framer Part 5420 rev 2
0x16bb210 (PB_INIT): <4332> TUE FEB 08 23:16:26 2000 DEBUG Loaded Firmware 6020401 20110418
interrupt: OAPS[0]: Port invalid for OAPS failure event 256!
interrupt: OAPS[1]: Port invalid for OAPS failure event 256!
Current Log:
0x16bb210 (PB_INIT): <3166> THU DEC 27 00:00:31 1990 EVENT System is starting up, Please wait...
0x16bb210 (PB_INIT): <3528> THU DEC 27 00:00:34 1990 EVENT Signature = NORMAL START
0x16bb210 (PB_INIT): <3528> THU DEC 27 00:00:34 1990 DEBUG Software Ver:1.1.5 (Created on Sep 21 2011, 13:00:13)
0x16bb210 (PB_INIT): <3528> THU DEC 27 00:00:34 1990 DEBUG ------ Start Hardware Initialization and Testing : ------
0x16bb210 (PB_INIT): <3552> THU DEC 27 00:00:34 1990 EVENT Loading FPGA 0 created on: Tue Sep 06 10:57:34 2011...
0x16bb210 (PB_INIT): <3605> THU DEC 27 00:00:35 1990 EVENT OPTO FPGA Version is a01b
0x16bb210 (PB_INIT): <3640> THU DEC 27 00:00:35 1990 DEBUG L2 Switch QuarterDeck has been started.
0x16bb210 (PB_INIT): <3838> THU DEC 27 00:00:37 1990 DEBUG HW VER IS 300
0x16bb210 (PB_INIT): <3838> THU DEC 27 00:00:37 1990 EVENT Adding LAN_IF address 192.168.3.33, subnet ff000000
0x16bb210 (PB_INIT): <3840> THU DEC 27 00:00:37 1990 EVENT Adding MNG_IF address 10.0.26.18, subnet ff000000
0x16bb210 (PB_INIT): <3841> MON OCT 10 17:59:49 2011 EVENT RTC Initialization: MON OCT 10 17:59:49 2011
```

Figure 95: System Log Files (Example)

8.1.3 Configuration Tab

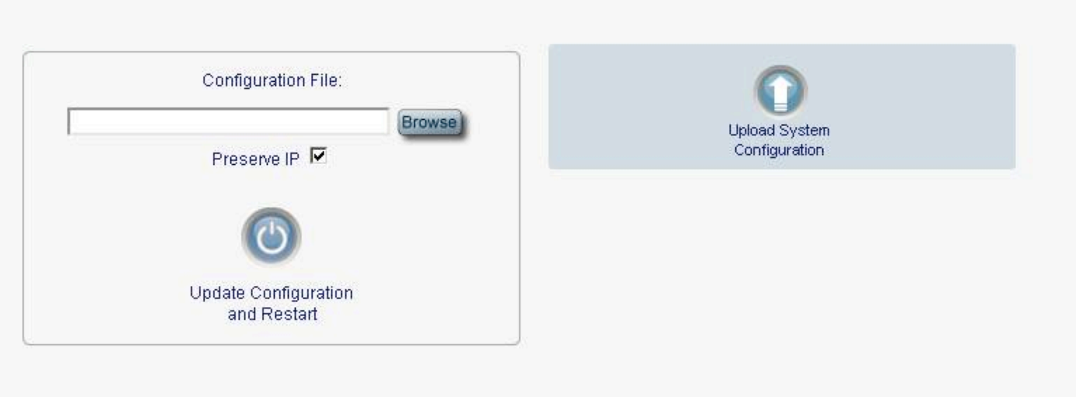


Figure 96: Configuration Tab

Use the Configuration tab to do the following:

- Update the system configuration with a previously saved file of system configuration, while preserving or replacing the IP addresses, and cold restart the FIREamp™ unit
- Upload the current system configuration of the FIREamp™ unit and save it to the local file system

8.1.3.1 Updating System Configuration and Restarting the FIREamp™ Unit

Use the Configuration tab to update the system configuration, while preserving or replacing the IP addresses, and restart the FIREamp™ unit.

⚠ **Warning:** When uploading a system configuration file which was retrieved from another node, make sure to select the **Preserve IP** check box; otherwise, the new node will receive the same IP as the old node, and both nodes will have the same IP address.

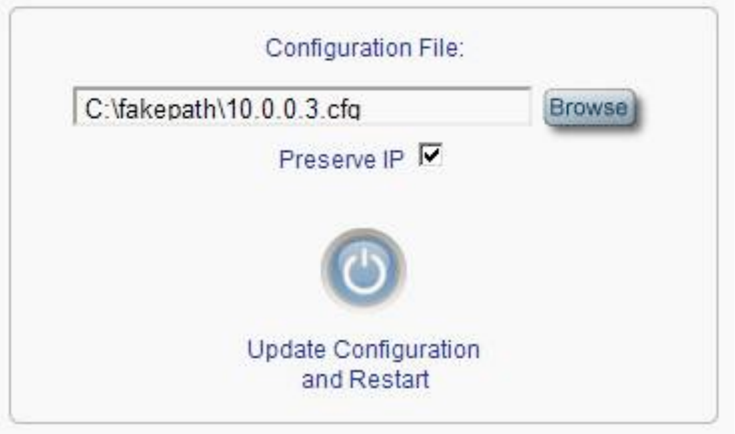
To update system configuration and restart the FIREamp™ unit:

1. Click the **Configuration** tab.

   The Configuration tab opens

2. In the **Configuration File** field, type the full path of the file or click **Browse** and browse to the file location.

   For example: **`C:\fakepath\10.0.0.3.cfg`**.



Configuration File: C:\fakepath\10.0.0.3.cfg

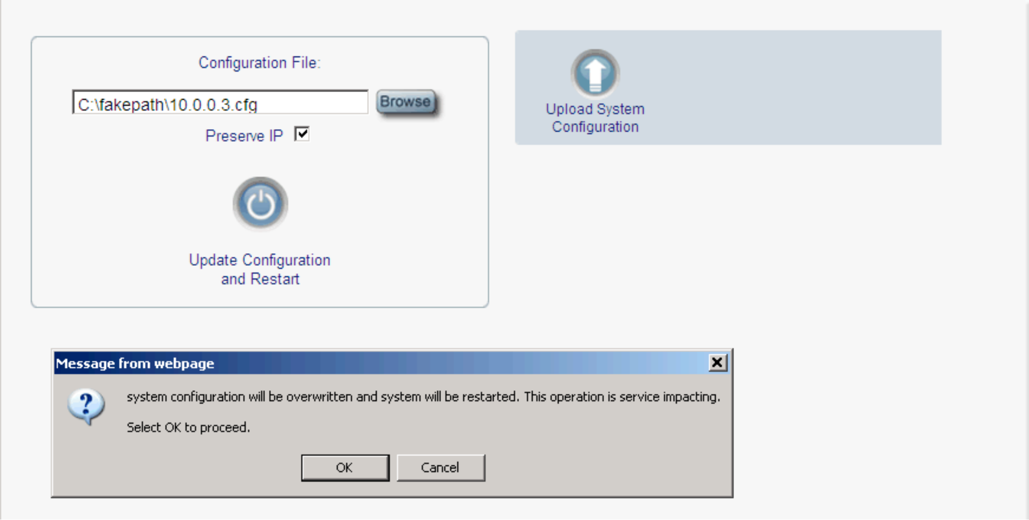
Preserve IP ☑

Figure 97: Update System Configuration: Configuration File

3. To preserve the IP addresses, select the Preserve IP check box.

4. Click **Update Configuration and Restart** ⏻.

The following confirmation message appears.



Configuration File: C:\fakepath\10.0.0.3.cfg

Preserve IP ☑

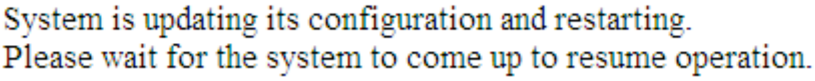
system configuration will be overwritten and system will be restarted. This operation is service impacting.

Select OK to proceed.

Figure 98: Confirm System Overwrite

5. Click **OK**.

   The following update message appears and the node is rebooted.



System is updating its configuration and restarting.
Please wait for the system to come up to resume operation.

Figure 99: System Updating and Restarting Message

8.1.3.2 Uploading System Configuration

Note:

- You can upload the node configuration to the local computer and save it to file. You can then use the saved file to reapply node configuration.
- You can replace a box with a new box by uploading and storing the configuration of the old box and then updating the new box with the stored configuration. In this case, you may want to clear the **Preserve IP** check box so that the new node will get the same IP address as the old node.
- The format of the saved configuration is a text file. However, changing the content of this file manually is not allowed.

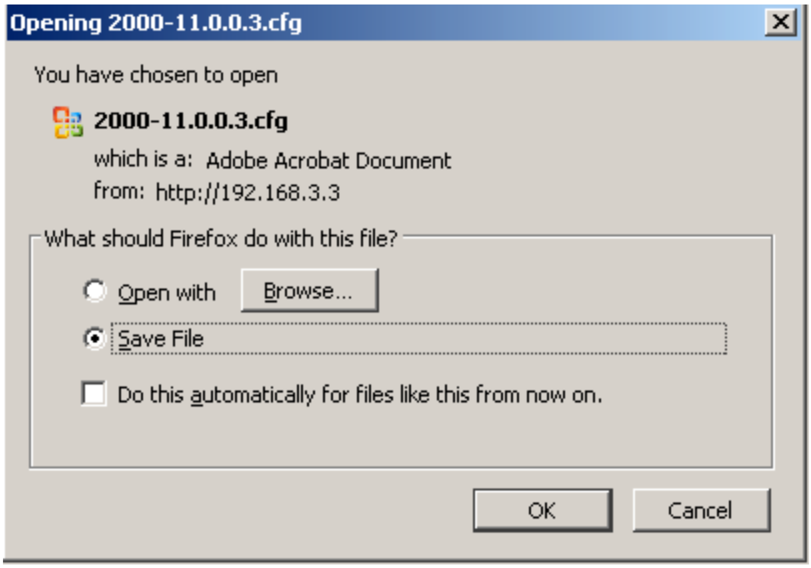
To upload system configuration:

1. Click the **Configuration** tab.

   The Configuration tab opens.

2. Click **Upload System Configuration** .

The Opening .cfg dialog box appears.



Opening 2000-11.0.0.3.cfg

You have chosen to open

2000-11.0.0.3.cfg

which is a: Adobe Acrobat Document

from: http://192.168.3.3

What should Firefox do with this file?

○ Open with

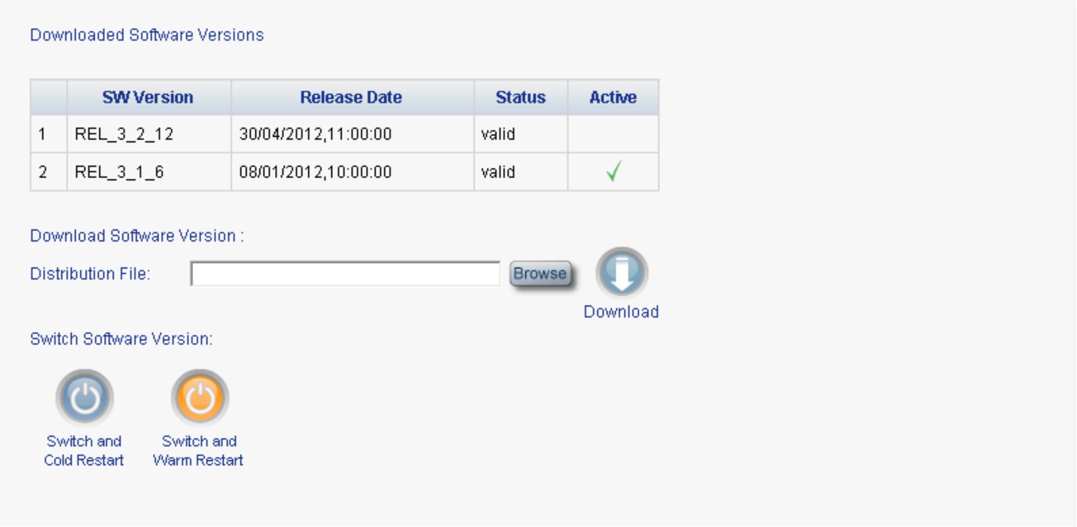
● Save File

□ Do this automatically for files like this from now on.

Figure 100: Opening .cfg Dialog Box

3. Click **Save File**.
4. Click **OK**.

8.1.4 Software Tab



Downloaded Software Versions

	SW Version	Release Date	Status	Active
1	REL_3_2_12	30/04/2012,11:00:00	valid	
2	REL_3_1_6	08/01/2012,10:00:00	valid	✓

Download Software Version :

Distribution File:

Switch Software Version:

Figure 101: Software Tab

Use the Software tab to do the following:

- Download software
- Switch and activate a new software version

8.1.4.1 Downloading Software

⚠ **Warning:** Do not perform operations from another open browser during download.

To download software:

1. Click the **Software** tab.

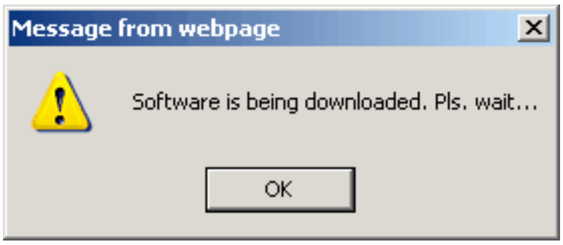
   The Software tab opens displaying the downloaded software versions. If a new version has been uploaded, two versions appear in the listing; the active version is indicated by a check mark ✓.

2. In the **Distribution Directory** field, type the full path of the file or click **Browse** and browse to the file location.

   For example: **`pl.vx`**

3. Click **Download** ⬇.

   The following message appears.



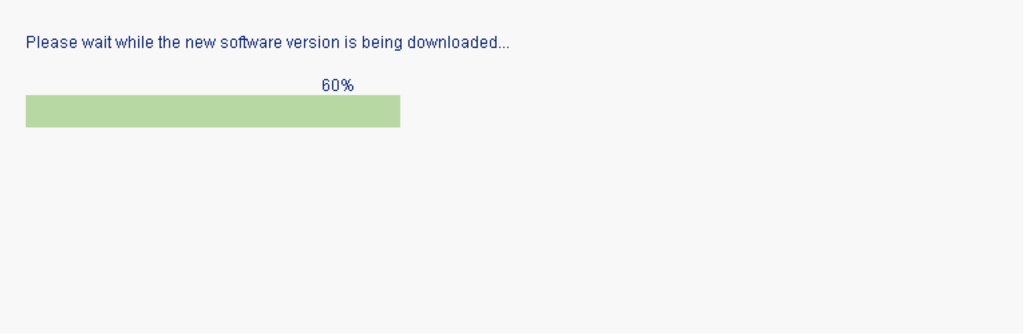
Message from webpage

Software is being downloaded. Pls. wait...

Figure 102: Software Download Message

4. Click **OK**.

   The Software Download Status window is displayed.



Please wait while the new software version is being downloaded...

60%

Figure 103: Software Download Status Window

The files are downloaded and the version displayed in the Downloaded Software Versions table. The new version is always idle (not active).

8.1.4.2 Switching Software Versions

After the new software version is downloaded, you can activate the new software version.

To switch software versions:

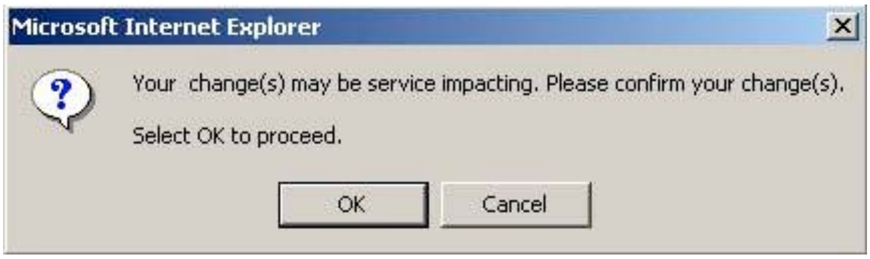
1. Click the **Software** tab.

   The Software tab open displaying the downloaded software versions. If a new version has been uploaded, two versions appear in the listing; the active version is indicated by a ✓.

2. To perform a switch and cold restart:

   1. Click **Switch & Cold Restart** ⏻.

      The following confirmation message appears.

      Microsoft Internet Explorer

      Your change(s) may be service impacting. Please confirm your change(s).

      Select OK to proceed.

      Figure 104: Confirm Changes

   2. Click **OK**.

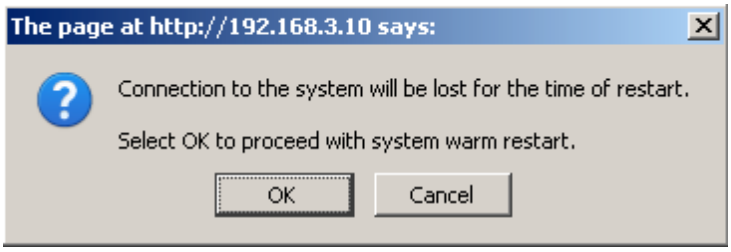
      The software version is switched, the software and firmware are reloaded, and the new version is activated.

      Traffic goes down for a short period of time.

3. To perform a warm restart:

   1. Click **Switch & Warm Restart** ⏻.

      The following confirmation message appears.

      The page at http://192.168.3.10 says:

      Connection to the system will be lost for the time of restart.

      Select OK to proceed with system warm restart.

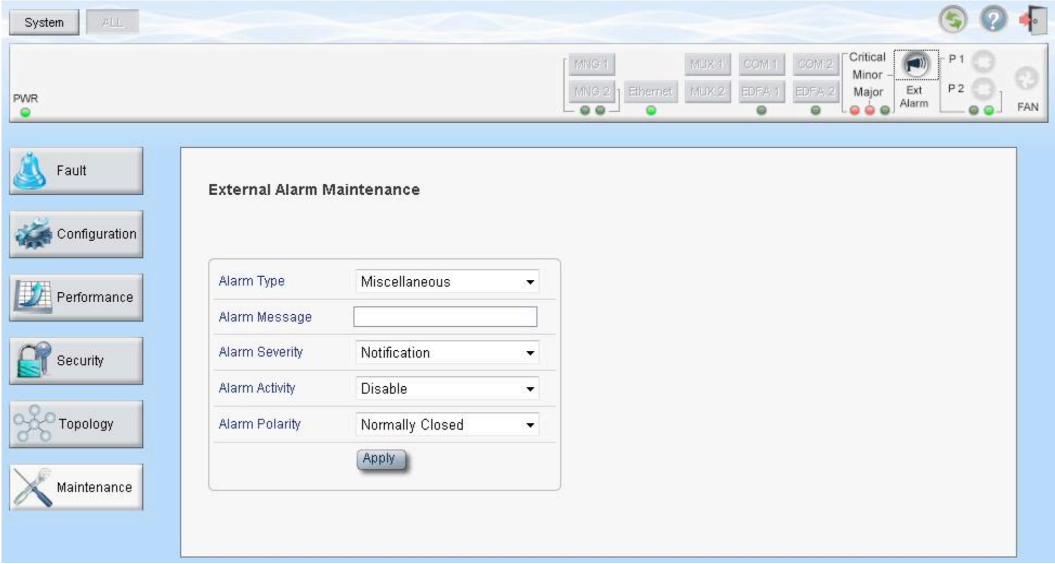
      Figure 105: Confirm Changes

   2. Click **OK**.

      The software version is switched, the software is reloaded and restarted, and the new version is activated.

      Traffic is not affected.

8.2 External Alarm Maintenance



External Alarm Maintenance

Alarm Type	Miscellaneous
Alarm Message	
Alarm Severity	Notification
Alarm Activity	Disable
Alarm Polarity	Normally Closed

Figure 106: External Alarm Maintenance Window

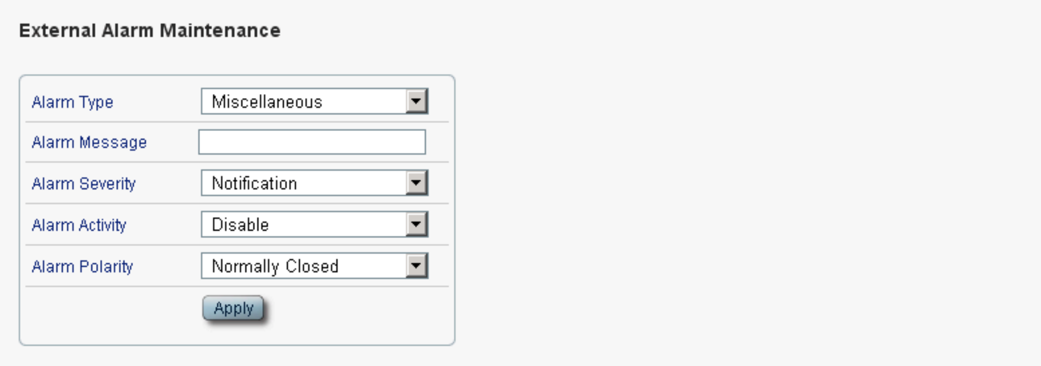
Use the External Alarm Maintenance window to configure the external alarm.

To open the External Alarm Maintenance window:

1. Click **Maintenance**.
2. Click **Ext Alarm** .

   The External Alarm Maintenance window opens.

8.2.1 External Alarm Maintenance Tab



External Alarm Maintenance

Alarm Type	Miscellaneous
Alarm Message	
Alarm Severity	Notification
Alarm Activity	Disable
Alarm Polarity	Normally Closed

Figure 107: External Alarm Tab

Use the External Alarm tab to configure the external alarm.

To configure the external alarm:

1. Click **Ext Alarm** .

   The External Alarm Maintenance tab is displayed.
2. Fill in the fields as explained in the following table.

3. Click **Apply**.

Table 52: External Alarm Maintenance Tab Parameters

Parameter	Description	Format/Values
Alarm Type	A predefined list of standard external alarm types.	The type of configuration determines the values.
Alarm Message	The alarm text that is used when **Alarm Type** is set to **Miscellaneous**.	Free text
Alarm Severity	The severity of the External Input Alarm.	Critical, Major, Minor, Notification
Alarm Activity	Used to disable the Input External Alarm.	Disable, Enable
Alarm Polarity	Determines the polarity of the Input Dry Contact.	Normally Close, Normally Open

9 Topology Management

This chapter describes how manage the topology of FIREamp™ nodes.

In this Chapter

9.1 Network Topology

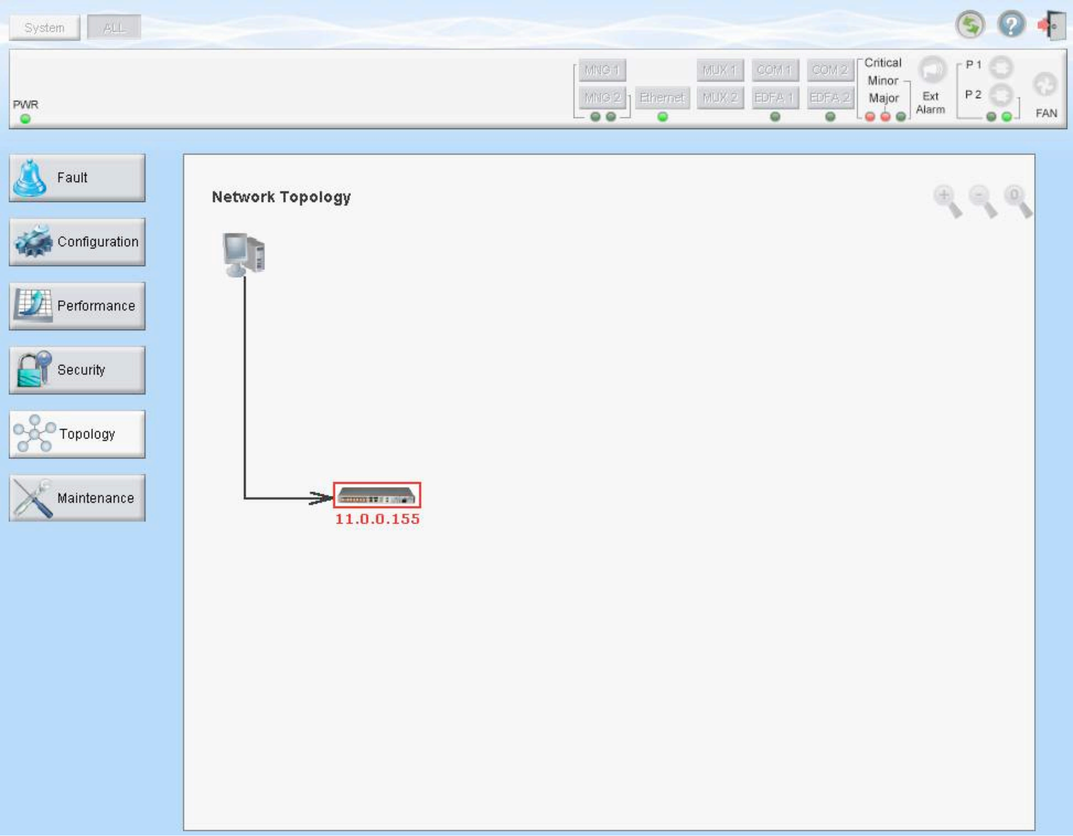


Figure 108: Network Topology Window

Use the Network Topology window to view the network topology and define multiple nodes as multi-chassis.

To open the Network Topology window:

- Click **Topology**.

  The Network Topology window opens.

9.1.1 Network Topology Tab

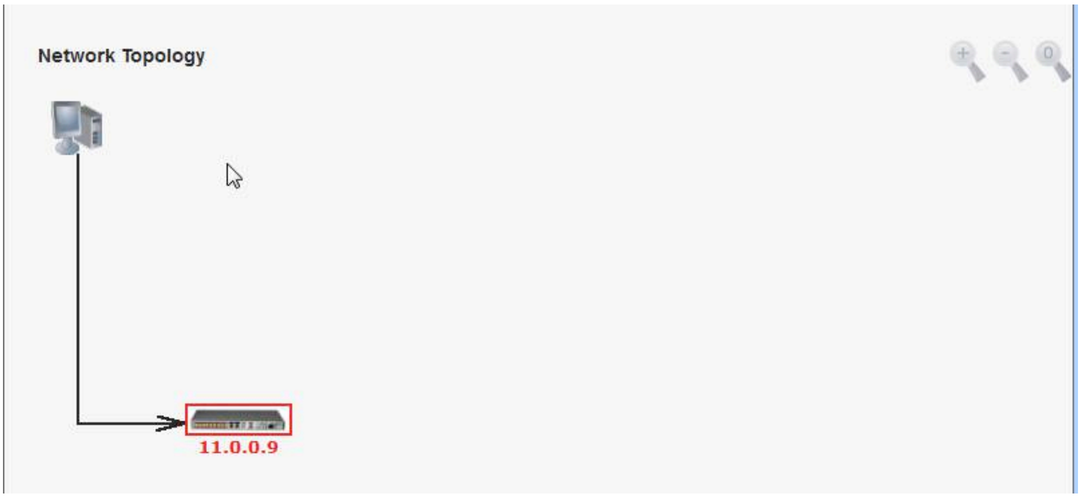


Figure 109: Network Topology Tab

Use the Network Topology tab to view the topology.

To view the network topology:

- Click the **Network Topology** tab.

  The Network Topology tab opens displaying the FIREamp™ nodes connected together with the OSC channel.

9.1.1.1 Network Linear Topology

The following figure is an example of a linear topology.

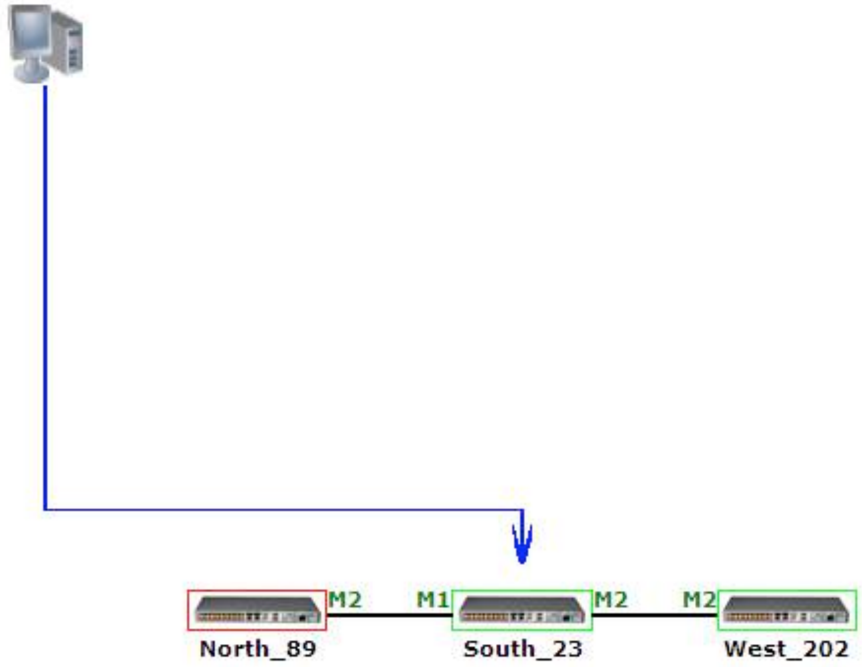


Figure 110: Linear Topology (Example)

9.1.1.2 Ring Topology

The following figure is an example of a network ring topology.

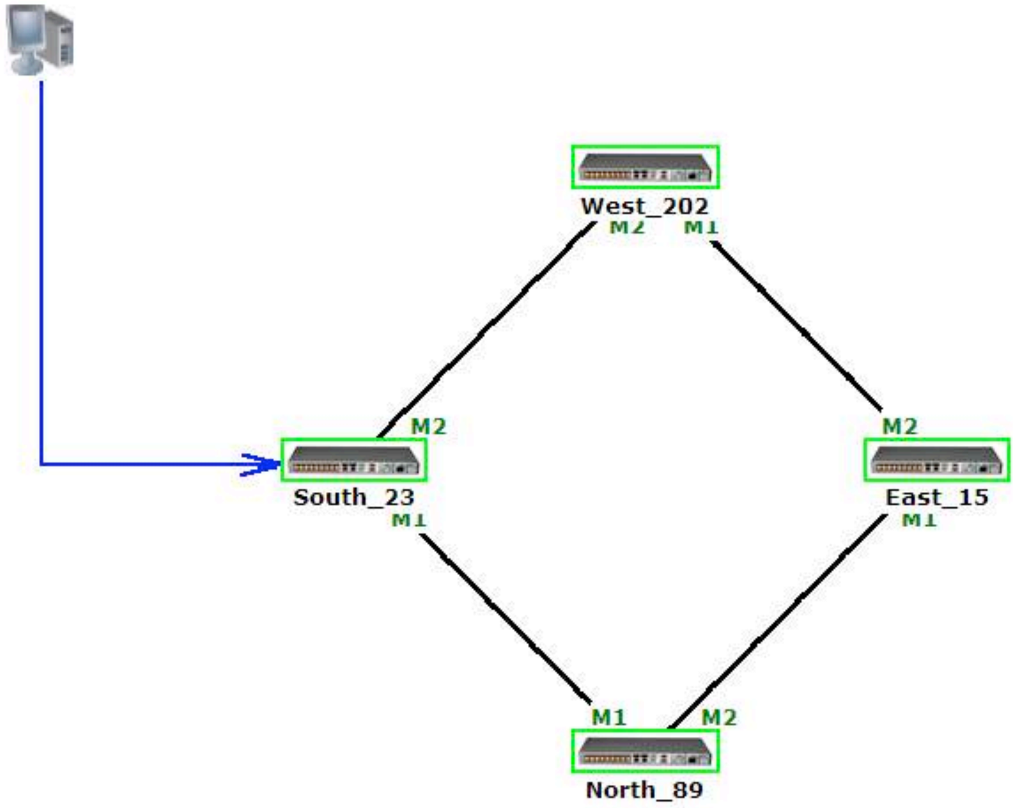


Figure 111: Ring Topology (Example)

9.1.1.3 Management Arc

The blue arrow starting at the management system and ending at a node points to the node that is currently being browsed via the HTTP/HTTPS session.

9.1.1.4 Node Title

The system name of the node is displayed below the node. If there is no configured name, the OSC/In-band IP address of the node is displayed.

9.1.1.5 Alarm Status of the Node

The alarm status of each node is marked by the color of the box around the node:

- **Green**: No Major alarms on the node
- **Red**: Major alarms on the node

9.1.1.6 MNG Port Labels

The labels attached to the arc ends represent the identity of the management port connected to that arc.

- **M1**: Stands for MNG 1 port.
- **M2**: Stands for MNG 2 port.

9.1.2 Zooming In and Out of the Topology Display

In complex networks, some details of the displayed topology may be hidden or unclear and a zoom may be required. Therefore, for non-linear topologies, you can zoom in and out of the topology display.

To zoom in and out of the topology display:

1. Click the **Network Topology** tab.

   The Network Topology tab opens displaying the FIREamp™ nodes connected together with the OSC channel.

2. To increase magnification of the topology display, click **Zoom In** .
3. To decrease magnification of the topology display, click **Zoom Out** .
4. To return to the original view of the topology display, click **Restore To Default** .

9.1.3 Browsing Other Nodes

You can use the topology view to browse other nodes displayed in the network topology.

To browse other nodes:

1. Click the **Network Topology** tab.

   The Network Topology tab opens displaying the FIREamp™ nodes connected together with the OSC channel.

2. Click a node .

   A new Web browser opens enabling you to view the selected node.

   Note: You should have the IP access of the node you want to browse. Therefore, you may have to define one of the nodes as the gateway to the other node, and if needed, add the IP address of the management system to the **Static Routing** table of the node (see IP Tab (p. 97).)

9.1.4 Defining Multiple Nodes as Multi-Chassis

When multiple FIREamp™ nodes are located at the same site, you can define them as *multi-chassis*.

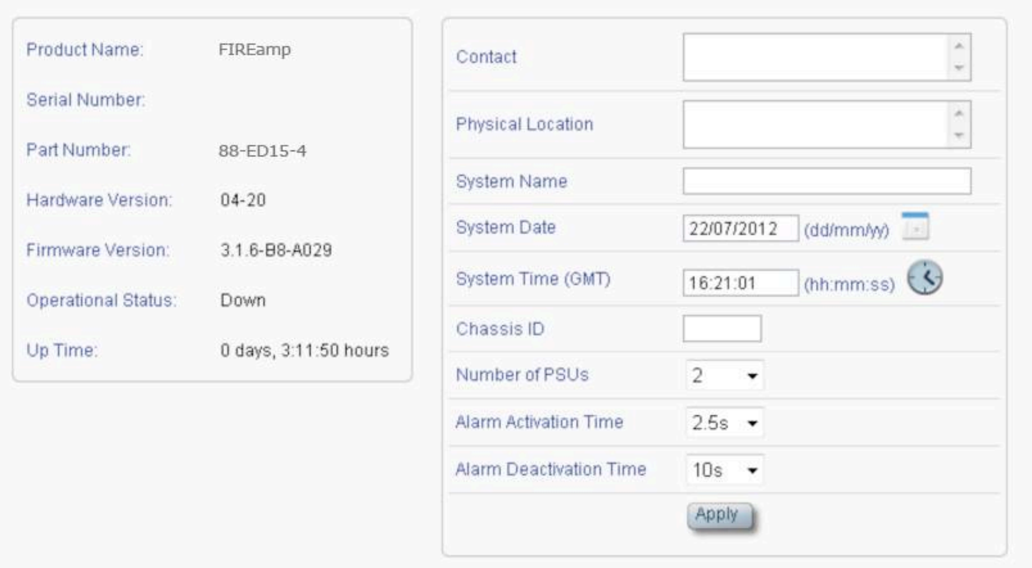
Note: The Chassis ID number must be the same for each node.

To define multiple nodes as multi-chassis:

1. Log in to the FIREamp™ node (see Logging In to the Web Application (p. 30)).
2. Click **Configuration**.
3. Click **System**.

   The System Configuration window is displayed.
4. Click the **General** tab.

   The General tab opens.



Product Name:	FIREamp
Serial Number:	
Part Number:	88-ED15-4
Hardware Version:	04-20
Firmware Version:	3.1.6-B8-A029
Operational Status:	Down
Up Time:	0 days, 3:11:50 hours

Contact	
Physical Location	
System Name	
System Date	22/07/2012 (dd/mm/yy)
System Time (GMT)	16:21:01 (hh:mm:ss)
Chassis ID	
Number of PSUs	2
Alarm Activation Time	2.5s
Alarm Deactivation Time	10s

Figure 112: General Tab

5. In the **Chassis ID** field, type the number.
6. Click **Apply**.
7. Repeat these steps for each node.

The following figure shows two nodes, in a ring of four, defined as multi-chassis.

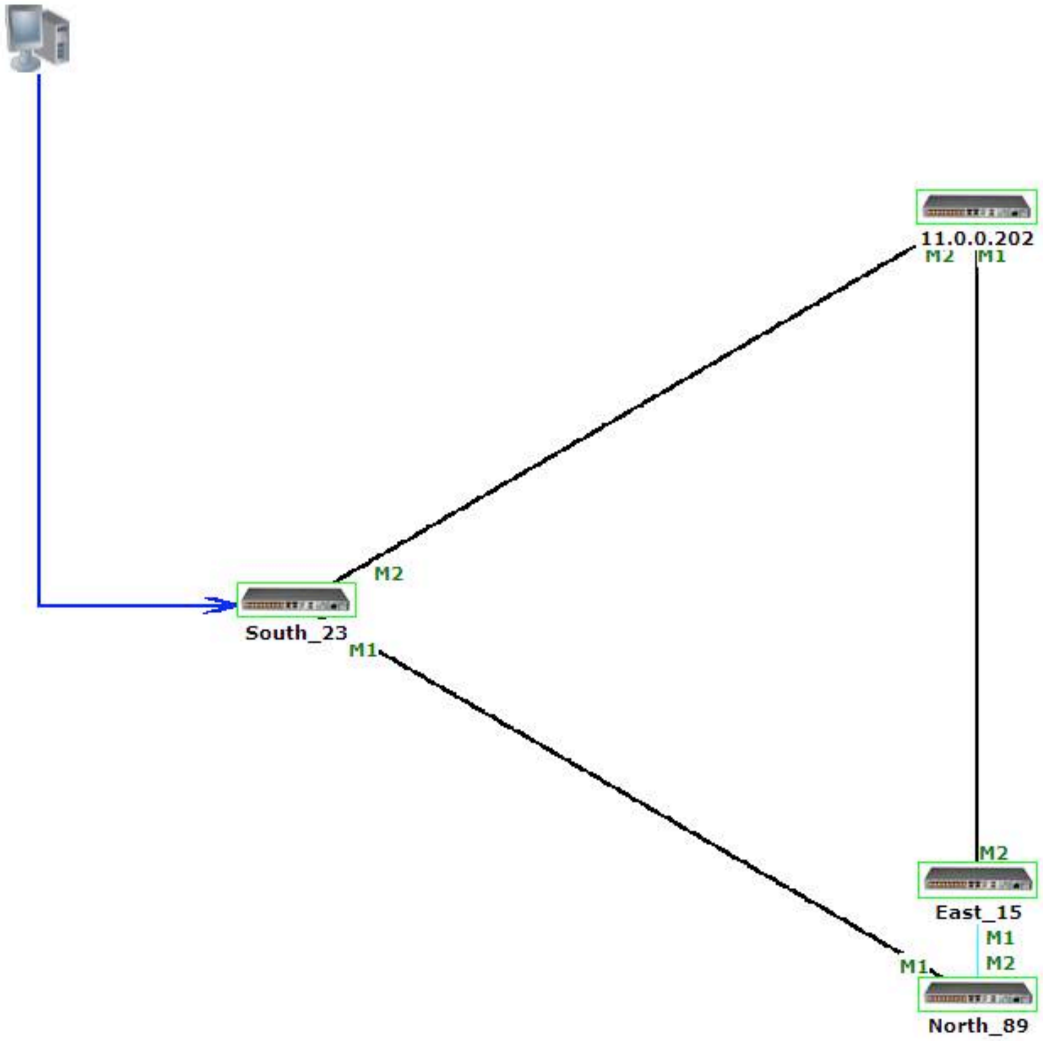


Figure 113: Multi-Chassis Nodes

10 Typical Application Configuration

This chapter provides instructions for configuring FIREamp™ for a typical application.

In this Chapter

10.1 Prerequisites for Accessing the Web Application

The following are the prerequisites for accessing the Web application:

- The FIREamp™ is properly installed.
- The FIREamp™ is connected to a Web browser.
- Any pop-up blocking software is disabled.
- JavaScript should be enabled in the browser.

10.2 Configuring a Typical Application

Note: Many parameters have suitable default values and may not have to be changed.

To configure a typical application:

1. Access the Web application (see Accessing the Web Application (p. 29)).
2. Configure the system parameters (see Configuring System Parameters (p. 147)).
3. Configure the data path (see Configuring the Data Path).

10.2.1 Configuring System Parameters

Configure the following system parameters:

- General system parameters
- IP parameters
- Management parameters
- APS

10.2.1.1 Configuring General System Parameters

To configure general system parameters:

1. Click **Configuration**.
2. Click **System**.

   The System Configuration window opens.
3. Click the **General** tab.

   The General tab opens displaying the general system configuration.
4. Fill in the fields as explained in General Tab (p. 92).
5. Click **Apply**.

10.2.1.2 Configuring IP Parameters

To configure IP parameters:

1. Acquire the Ethernet IP address using CLI if needed (see Configure Interface Ethernet IP Command (p. 166)).
2. Click **Configuration**.
3. Click **System**.

   The System Configuration window opens.
4. Click the **IP** tab.

   The IP tab opens displaying the IP Address and Static Routing configuration.
5. Fill in the following fields as explained in IP Tab (p. 97):
   - **LAN IP Address**
   - **OSC/In-band IP Address**
   - **Default Gateway**
   - **Static Routing**

10.2.1.3 Configuring Management Parameters

To configure management parameters:

1. Click **Configuration**.
2. Click **System**.

   The System Configuration window opens.
3. Click the **SNMP** tab.

   The SNMP tab opens displaying the SNMP configuration and traps.
4. Fill in the fields as explained in see SNMP Tab (p. 99).

10.2.1.4 Configure SNTP for Automatic Time Setting

To configure SNTP for automatic time setting:

1. Click **Configuration**.
2. Click **System**.

   The System Configuration window opens.
3. Click **Time**.

   The Time Configuration window is displayed.
4. Fill in the fields as explained in Time Tab (p. 95).

10.2.2 Configuring the Data Path

Configure and enable the following:

- MNG port
- EDFA modules (if present)

10.2.2.1 Configuring and Enabling the MNG Port

Setting or changing the parameters of one MNG port automatically changes the settings of the other MNG port.

To configure and enable the MNG port:

1. Click **Configuration**.
2. Click an **MNG** button to select the management port.

   The appropriate Management Port Configuration window opens.
3. Click the **MNG** tab.

   The MNG tab opens displaying the management port configuration (see MNG Tab (p. 103)).
4. In the **Port Alias** field, type a logical name for the MNG port.
5. Click **Apply**.
6. Click **Admin Up**.

   The port is enabled.

10.2.2.2 Configuring and Enabling EDFA Modules

To configure and enable EDFA modules:

Click **Configuration**.

1. Click an **EDFA** button to select the EDFA module.

   The appropriate EDFA tab is displayed.
2. Fill in the following fields as explained in EDFA Module Configuration (p. 115):

   - **EDFA Mode** (AGC or APC)

- **Required Output Power** (if EDFA mode is APC)
- **Required Gain** (if EDFA mode is AGC)

3. Click **Apply.**
4. Click **Admin Up.**

   The EDFA module is enabled.
5. If there are two EDFA modules installed, repeat these steps for the other EDFA module.

10.3 Example of Remote Management Configuration

A remote FIREamp™ can be managed through the OSC.

The following figure shows an example of how to configure the remote management for the point-to-point setup. In this setup, there are two management systems: **A** and **B**. These systems can manage the FIREamp™ nodes A and B via the OSC.

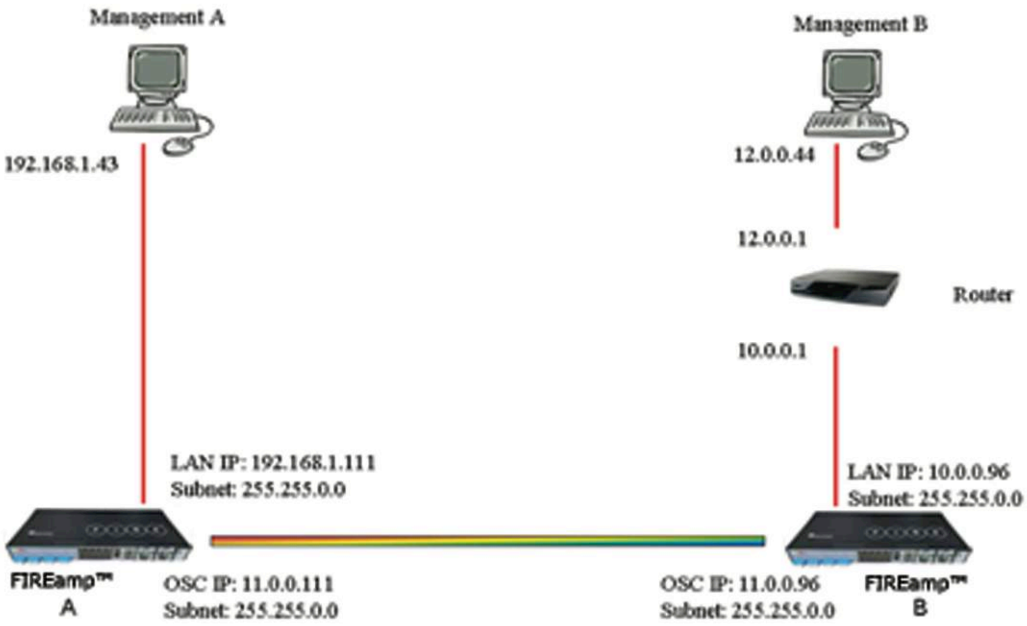


Figure 114: Example of Remote Management Configuration

10.3.1 Setting Up Point-to-Point Management

To set up point-to-point management:

1. Make sure that you have local Web access to both FIREamp™ nodes (see Accessing the Web Application (p. 29)).
2. Configure management for FIREamp™ A.
3. Configure management for FIREamp™ B.

4. Access the Web application from Management A to FIREamp™ A.
5. Access the Web application from Management A to FIREamp™ B.
6. Access the Web application from Management B to FIREamp™ B.
7. Access the Web application from Management B to FIREamp™ A.

10.3.2 Configuring Management for FIREamp™ A

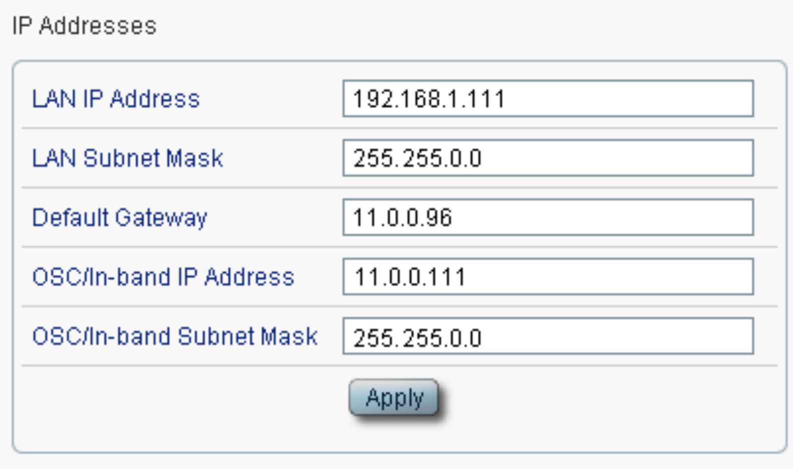
To configure management for FIREamp™ A:

1. Click **Configuration**.
2. Click **System**.

   The System Configuration window opens.
3. Click the **IP** tab.

   The IP tab opens displaying the IP Address and Static Routing configuration (see IP Tab (p. 97)).
4. In the **IP Addresses** section, fill in the fields as follows:
   - **LAN IP Address**: 192.168.1.111
   - **LAN Subnet Mask**: 255.255.0.0
   - **Default Gateway**: 11.0.0.96
   - **OSC/In-band IP Address**: 11.0.0.111
   - **OSC/In-band Subnet Mask**: 255.255.0.0
5. Click **Apply**.

   The IP Addresses section should appear as follows.



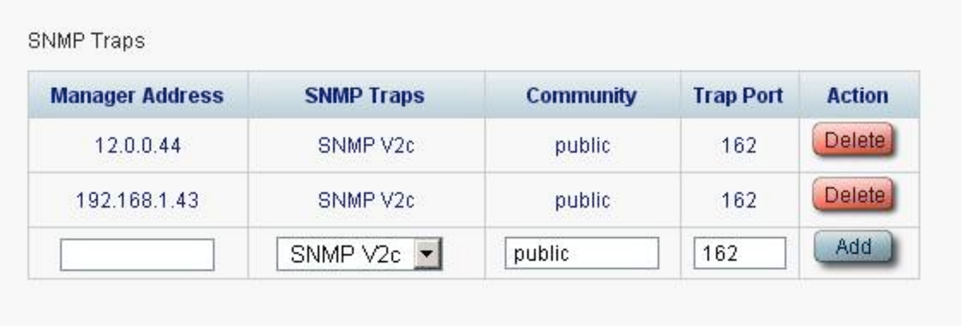
IP Addresses

LAN IP Address	192.168.1.111
LAN Subnet Mask	255.255.0.0
Default Gateway	11.0.0.96
OSC/In-band IP Address	11.0.0.111
OSC/In-band Subnet Mask	255.255.0.0

Figure 115: IP Addresses: FIREamp™ A (Example)

6. (Required only if using an SNMP management system) Configure the **SNMP Traps** table to send SNMP traps to the two management systems: **A** and **B** (see SNMP Tab (p. 99)).

The SNMP Traps table should appear as follows.



SNMP Traps

Manager Address	SNMP Traps	Community	Trap Port	Action
12.0.0.44	SNMP V2c	public	162	Delete
192.168.1.43	SNMP V2c	public	162	Delete
	SNMP V2c	public	162	Add

Figure 116: SNMP Traps Table (Example)

10.3.3 Configuring Management for FIREamp™ B

When configuring the management for FIREamp™ B, make sure that:

- Different IP addresses are assigned to each MNG port in the remote and local nodes.
- The MNG ports of the remote and local FIREamp™ nodes should be in same subnet.

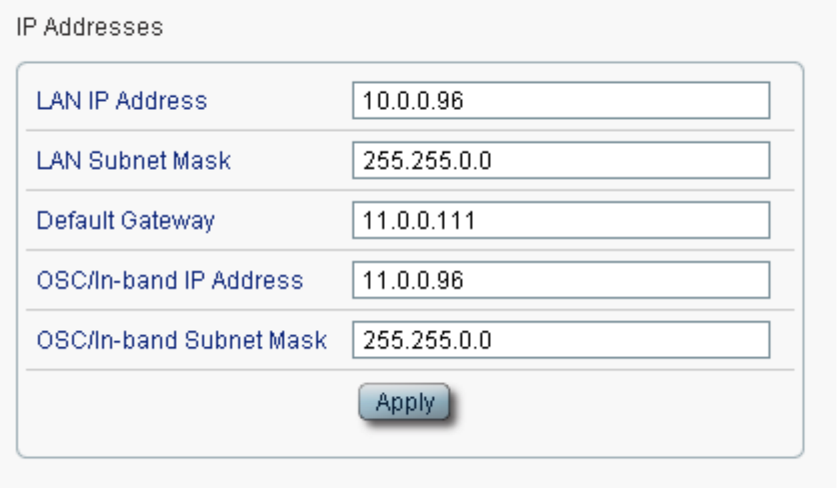
To configure management for FIREamp™ B:

1. Click **Configuration**.
2. Click **System**.

   The System Configuration window opens.
3. Click the **IP** tab.

   The IP tab opens displaying the IP Address and Static Routing configuration (see IP Tab (p. 97)).
4. In the **IP Addresses** section, fill in the fields as follows:
   - **LAN IP Address**: 10.0.0.96
   - **LAN Subnet Mask**: 255.255.0.0
   - **Default Gateway**: 11.0.0.111
   - **OSC/In-band IP Address**: 11.0.0.96
   - **OSC/In-band Subnet Mask**: 255.255.0.0
5. Click **Apply**.

The IP Addresses section should appear as follows.



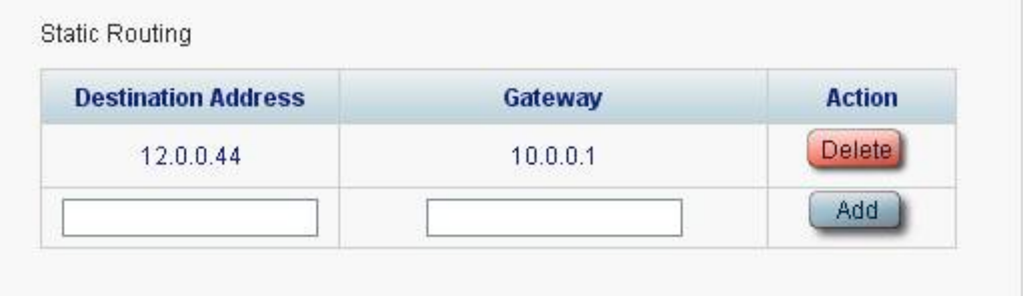
IP Addresses

LAN IP Address	10.0.0.96
LAN Subnet Mask	255.255.0.0
Default Gateway	11.0.0.111
OSC/In-band IP Address	11.0.0.96
OSC/In-band Subnet Mask	255.255.0.0

Figure 117: IP Addresses: FIREamp™ B (Example)

6. Configure the **Static Routing** table to enable the route to Management B as follows:
   - **Destination Address**: 12.0.0.44
   - **Gateway**: 10.0.0.1
7. Click **Add**.

   The Static Routing table should appear as follows.



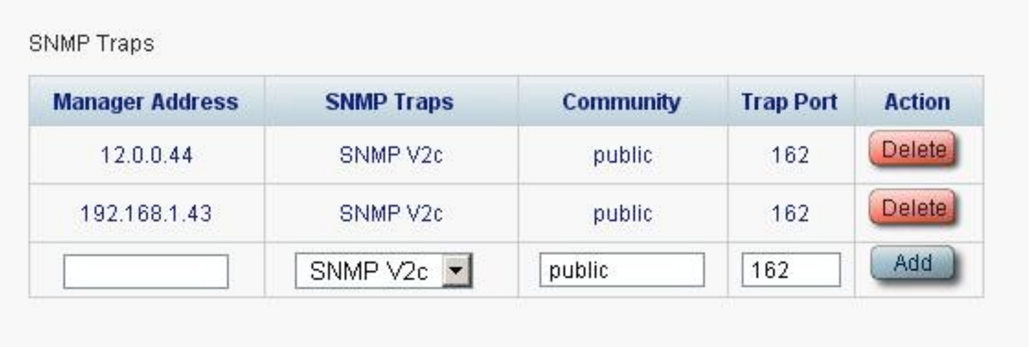
Static Routing

Destination Address	Gateway	Action
12.0.0.44	10.0.0.1	Delete
		Add

Figure 118: Static Routing: FIREamp™ B (Example)

8. (Required only if using an SNMP management system) Configure the **SNMP Traps** table to send SNMP traps to the two management systems: **A** and **B** (see SNMP Tab (p. 99)).

The SNMP Traps table should appear as follows.



SNMP Traps

Manager Address	SNMP Traps	Community	Trap Port	Action
12.0.0.44	SNMP V2c	public	162	Delete
192.168.1.43	SNMP V2c	public	162	Delete
	SNMP V2c	public	162	Add

Figure 119: SNMP Traps Table (Example)

10.3.4 Accessing the Web Application from Management A to FIREamp™ A

To access the Web application from Management A to FIREamp™ A:

1. Open the Web browser.
2. In the address field of the browser, type the **IP address** of the LAN port of FIREamp™ A as follows:

   `http://192.168.1.111` (for HTTP access)

   or

   `https://192.168.1.111` (for HTTPS secure access) (as illustrated in Example of Remote Management Configuration (p. 150))
3. Press **Enter**.

   The Login window opens.
4. Log in to the Web application (see Logging In to the Web Application (p. 30)).

10.3.5 Accessing the Web Application from Management A to FIREamp™ B

To access the Web application from Management A to FIREamp™ B:

1. Add a new route to Management A as follows:

   ```
   > ROUTE ADD 11.0.0.0 MASK 255.255.0.0 192.168.1.111
   ```
2. Open the Web browser.
3. In the address field of the browser, type the **IP address** of the management port of the remote FIREamp™ as follows:

   `http://11.0.0.96` (for HTTP access)

   or

`https://11.0.0.96` (for HTTP secure access) (as illustrated in Example of Remote Management Configuration (p. 150))

4. Press **Enter**.

   The Login window opens.

5. Log in to the Web Application (see Logging In to the Web Application (p. 30)).

10.3.6 Accessing the Web Application from Management B to FIREamp™ B

To access the Web application from Management B to FIREamp™ B:

1. Add a new route to Management B as follows:

   ```
   > ROUTE ADD 10.0.0.0 MASK 255.255.0.0 12.0.0.1
   ```

2. Open the Web browser.
3. In the address field of the browser, type the **IP address** of the LAN port of FIREamp™ B as follows:

   `http://10.0.0.96` (for HTTP access)

   or

   `https://10.0.0.96` (for HTTP secure access) (as illustrated in Example of Remote Management Configuration (p. 150))

4. Press **Enter**.

   The Login window opens.

5. Log in to the Web Application (see Logging In to the Web Application (p. 30)).

10.3.7 Accessing the Web Application from Management B to FIREamp™ A

To access the Web application from Management B to FIREamp™ A:

1. Add a new route to Management B as follows:

   ```
   > ROUTE ADD 11.0.0.0 MASK 255.255.0.0 12.0.0.1
   ```

2. Configure the router between Management B and FIREamp™ A so that the IP address of the FIREamp™ B LAN port (**`10.0.0.96`** as illustrated in Example of Remote Management Configuration (p. 150)) is the gateway for subnet **`11.0.0.0`**.
3. In the address field of the browser, type the **IP address** of the MNG port of FIREamp™ A as follows:

   `http://11.0.0.111` (for HTTP access)

   or

   `https://11.0.0.111` (for HTTP secure access) (as illustrated in Example of Remote Management Configuration (p. 150))

4. Press **Enter**.

   The Login window opens.

5. Log in to the Web application (see Logging In to the Web Application (p. 30)).

11 CLI

This chapter describes the CLI for FIREamp™.

The CLI provides commands for status monitoring and basic configuration of the FIREamp™.

In this Chapter

11.1 General Features

The following are the general features of the CLI:

- The CLI uses the user and password authentication inherited from the Web application. The same user and password that is used for the Web application is accepted by the CLI.
- The CLI checks the user permission properties (Administrator, Read/Write, Read-Only) during command execution. These properties are inherited from the Web application.
- The CLI commands are ordered in a hierarchical tree structure. To move between tree nodes, you specify the name of the next node. The current hierarchy is specified by the prompt.
- Help is available for each command.
- The commands are case sensitive.
- The CLI allows command abbreviation. This means that a unique command prefix can be used instead of writing the full command name.

  Note: No abbreviation is allowed for the parameters of the command.

11.2 Accessing the CLI

There are two ways to access the CLI interface:

- **Using a Serial Port**: This method uses the CONTROL port of the FIREamp™ to connect locally to a PC with a terminal emulation application.
- **Using Telnet or SSH**: These methods can be used with an IP connection via the local LAN port or remotely via the OSC channel.

11.2.1 Using a Serial Port

To use a serial port to access the CLI:

1. Connect the COM port of the PC to the CONTROL port of the node using a DB-9 RS-232 connector.
2. On the PC, open a terminal emulation application that uses the COM port.
3. Configure the COM port as follows:
   - **Baud rate**: 9600 bps
   - **Data**: 8 bits
   - **Parity**: None
   - **Start**: 1 bit
   - **Stop**: 1 bit
   - **Flow Control**: None
4. Press **ENTER**.

   The CLI prompt appears as follows:

   ```
   FIREamp™>>
   ```
5. Log in to the node using the predefined user and password.

   Note: For security reasons, the password is not echoed to the terminal.

   For example:

   ```
   FIREamp™>>login
   User: admin
   Password:
   FIREamp™>>
   ```
6. Run the desired CLI commands as described in Running CLI Commands.

11.2.2 Using Telnet

To use a Telnet session to access the CLI:

1. Make sure that there is an IP connection to the node by opening the CMD window and typing the following command:

   $ ping <node-ip-address>

   If the IP connection exists, the ping command should respond with output similar to the following:

   ```
   Pinging 192.168.3.201 with 32 bytes of data:
   Reply from 192.168.3.201: bytes=32 time<1ms TTL=64
   Reply from 192.168.3.201: bytes=32 time<1ms TTL=64
   Reply from 192.168.3.201: bytes=32 time<1ms TTL=64
   Reply from 192.168.3.201: bytes=32 time<1ms TTL=64
   Ping statistics for 192.168.3.201:
       Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
   Approximate round trip times in milli-seconds:
       Minimum = 0ms, Maximum = 0ms, Average = 0ms
   ```

2. After the successful ping, invoke the following command:

   $ telnet <node-ip-address>

   As a result, the Telnet session starts and the CLI prompt of the node is displayed:

```
FIREamp™>>
```

3. Log in to the node using the predefined user and password.

   For example:

```
FIREamp™>>login
User: admin
Password:
FIREamp™>>
```

4. Run the desired CLI commands as described in Running CLI Commands.
5. Terminate the Telnet session by pressing **<CTRL+]>**.

   The following prompt is displayed:

```
Welcome to Microsoft Telnet Client
Escape Character is 'CTRL+]'
Microsoft Telnet>
```

6. To exit the Telnet session, type the following command: **quit**

11.2.3 Using SSH

To use SSH, you should have an installed SSH client on your machine.

To use an SSH session to access the CLI:

1. Make sure that there is an IP connection to the node by opening the CMD window and typing the following command:

   $ ping <node-ip-address>

   If the IP connection exists, the ping command should respond with output similar to the following:

```
Pinging 192.168.3.201 with 32 bytes of data:
Reply from 192.168.3.201: bytes=32 time<1ms TTL=64
Reply from 192.168.3.201: bytes=32 time<1ms TTL=64
Reply from 192.168.3.201: bytes=32 time<1ms TTL=64
Reply from 192.168.3.201: bytes=32 time<1ms TTL=64
Ping statistics for 192.168.3.201:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

2. After the successful ping, invoke the SSH client. You should specify to the client the IP of the node to which you want to connect.

   If this is the first time you connect to the node, you will probably see a message similar to the following:

```
The server's host key is not cached in the registry.
You have no guarantee that the server is the computer you think it is.
The server's rsa2 key fingerprint is:
ssh-rsa 1024 7b:e5:6f:a7:f4:f9:81:62:5c:e3:1f:bf:8b:57:6c:5a
If you trust this host, hit Yes to add the key to PuTTY's cache and
```

```
carry on connecting.
If you want to carry on connecting just once, without adding the key
to the cache, hit No.
If you do not trust this host, hit Cancel to abandon the connection.
```

3. If such a message appears, hit **Yes** to approve the connection.
4. Complete the log in to the node by using the predefined user and password.

   For example:

```
login as: admin
Sent username "admin"
admin@192.168.3.3's password:
FIREamp™>>
```

5. Run the desired CLI commands as described in Running CLI Commands.
6. Terminate the SSH session by pressing **'CTRL+D'**.

11.3 CLI Command Types

The following types of CLI commands are supported:

- General commands: These commands can be invoked from anywhere in the command tree.
- Ping command
- Interface commands
- IP Setting commands
- Log commands
- Show commands
- System Restart command

The following figure shows the hierarchy of the commands.

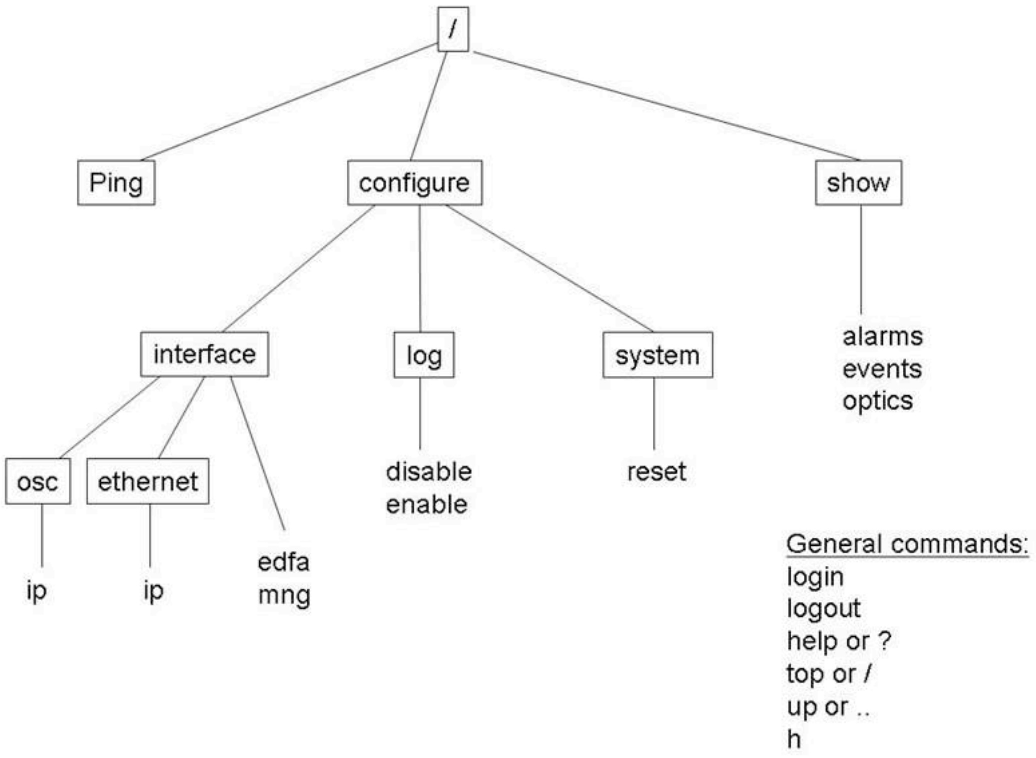


Figure 120: CLI Command Tree

11.4 Running CLI Commands

You can run the following CLI commands:

- General commands
  - Login (p. 162)
  - Logout (p. 163)
  - Help (p. 163)
  - History (p. 163)
  - Top (p. 164)
  - Up (p. 164)
- Ping Command (p. 164)
- Interface commands
  - Configure Interface MNG
  - Configure Interface EDFA
- IP Setting commands
  - Configure Interface Ethernet IP (p. 166)

  - Configure Interface OSC IP (p. 166)
- Log commands
  - Configure Log Enable (p. 167)
  - Configure Log Disable (p. 167)
- Show commands
  - Show Alarms (p. 167)
  - Show Events (p. 168)
  - Show Optics (p. 168)
- System Restart command
  - Configure System Restart (p. 169)

11.4.1 General Commands

The following are general commands that can be invoked from anywhere in the command tree:

- Login (p. 162)
- Logout (p. 163)
- Help (p. 163)
- History (p. 163)
- Top (p. 164)
- Up (p. 164)

11.4.1.1 Login Command

Command:

login

Description:

This command is required before any other command can be issued.

The CLI uses the user and password authentication inherited from the Web application. The same user and password that is used for the Web application is accepted by the CLI.

In addition, the CLI checks the user permission properties (Administrator, Read Only, Read-Write) during command execution. These properties are inherited from the Web application.

Example:

```
FIREamp™>>login
User: admin
```

```
Password:
FIREamp™>>
```

Note: For security reasons, the password is not echoed to the terminal.

11.4.1.2 Logout Command

Command:

`logout`

Description:

This command terminates the user session.

To run further CLI commands, you must log in again.

Example:

```
FIREamp™>>logout
FIREamp™>>
```

11.4.1.3 Help Command

Command:

`help [<command>]`

or

`? [<command>]`

Description:

This command displays the syntax of the specified command.

Example:

```
FIREamp™>>help con int eth ip
config interface ethernet ip [<addr> [-n <netmask>] [-g <gateway>]]
FIREamp™>>
```

11.4.1.4 History Command

Command:

`h`

Description:

This command displays the last 20 commands.

Example:

```
FIREamp™>show>>h
 15  ?
 16  ..
 17  xp
 18  ?
 19  ..
 20  ?
 21  log
 22  ?
 23  ..
```

```
  24  ?
  25  sys
  26  ?
  27  ..
  28  ?
  29  ..
  30  ?
  31  sh
  32  ?
  33  !
  34  h
FIREamp™>show>>
```

11.4.1.5 Top Command

Command:

top

or

/

Description:

This command takes you to the root of the command tree.

Example:

```
FIREamp™>configure>interface>>top
FIREamp™>>
```

11.4.1.6 Up Command

Command:

up

or

..

Description:

This command takes you up one level in the command tree.

Example:

```
FIREamp™>configure>interface>ethernet>>up
FIREamp™>configure>interface>>
```

11.4.2 Ping Command

Command:

ping <ip-address>

Description:

This command sends a ping request to the specified IP address.

Example:

```
FIREamp™>>ping 11.0.0.36
Pinging 11.0.0.36 (11.0.0.36) with 64 bytes of data:
Reply from 11.0.0.36 bytes=64 ttl=64 seq=0 time=0ms
--- 11.0.0.36 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0 ms
rtt min/avg/max = 0/0/0 ms
FIREamp™>>
```

11.4.3 Interface Commands

The following are the Interface commands:

- Configure Interface MNG
- Configure Interface EDFA

Note: The commands **Configure Interface Uplink** and **Configure Interface Port** are not applicable for the FIREamp™.

11.4.3.1 Configure Interface MNG Command

Command:

`configure interface mng <num> [up | down]`

Description:

This command sets the **Admin Status** of the MNG port to the required value.

If the **Admin Status** is not specified, the administrative status of the MNG port is displayed.

Example:

```
FIREamp™>configure>interface>>mng 1 down
FIREamp™>configure>interface>>mng 1
Port MNG 1 is DOWN
FIREamp™>configure>interface>>
```

11.4.3.2 Configure Interface EDFA Command

Command:

`configure interface edfa <num> [up | down]`

Description:

This command sets the **Admin Status** of the EDFA to the required value.

If the **Admin Status** is not specified, the administrative status of the EDFA is displayed.

Example:

```
FIREamp™>configure>interface>>edfa 1 up
FIREamp™>configure>interface>>
```

11.4.4 IP Setting Commands

The following are the IP Setting commands:

11.4.4.1 Configure Interface Ethernet IP Command

Command:

`configure interface ethernet ip [<addr> [-n <netmask>] [-g <gateway>]]`

Description:

This command sets the IP parameters of the LAN port.

- **`<addr>`**: IP address of the LAN port.
- **`<netmask>`**: Subnet mask of the port.
- **`<gateway>`**: IP address of the default gateway.

If no parameters are specified, the current IP parameter values are displayed.

Example:

```
FIREamp™>configure>interface>ethernet>>ip 10.0.3.200 –n 255.255.0.0 –g
10.0.44.44
FIREamp™>configure>interface>ethernet>>ip
Addr is 10.0.3.200, Subnet mask is 255.255.0.0
Gateway is 10.0.44.44
FIREamp™>configure>interface>ethernet>>
```

11.4.4.2 Configure Interface OSC IP Command

Command:

`configure interface osc ip [<addr> [-n <netmask>] [-g <gateway>]]`

Description:

This command sets the IP parameters of the MNG ports.

- **`<addr>`**: IP address of the MNG ports.
- **`<netmask>`**: Subnet mask of the MNG ports.
- **`<gateway>`**: IP address of the default gateway.

If no parameter is specified, the current IP parameter values of the MNG ports are displayed.

Note: When working via Telnet, changing the IP parameters of the OSC may prevent further access to the node.

Example:

```
FIREamp™>configure>interface>osc>>ip 11.0.3.200 –n 255.255.0.0 –g
11.0.3.201
FIREamp™>configure>interface>osc>>ip
```

```
Addr is 11.0.3.200, Subnet mask is 255.255.0.0
Gateway is 11.0.3.201
FIREamp™>configure>interface>osc>>
```

11.4.5 Log Commands

The following are the Log commands:

- Configure Log Enable (p. 167)
- Configure Log Disable (p. 167)

11.4.5.1 Configure Log Enable Command

Command:

`configure log enable`

Description:

This command enables the echoing of system events to the terminal.

By default, the log of the CLI session accessed via the serial port is enabled.

Example:

```
FIREamp™>configure>log>>enable
FIREamp™>configure>log>>
```

11.4.5.2 Configure Log Disable Command

Command:

`configure log disable`

Description:

This command disables the echoing of system events to the terminal.

By default, the log of the CLI session accessed via Telnet is disabled.

Example:

```
FIREamp™>configure>log>>disable
FIREamp™>configure>log>>
```

11.4.6 Show Commands

The following are the Show commands:

- Show Alarms (p. 167)
- Show Events (p. 168)
- Show Optics (p. 168)

11.4.6.1 Show Alarms Command

Command:

show alarms [mng <num>] | [edfa <num>] | [system]

Description:

This command displays the alarms of the specified entity. If no parameters are specified, all alarms are displayed.

Example:

```
FIREamp™>>show alarms mng 1
THU JUN 18 12:22:46 2009       MNG1  Optics Loss of Light
Critical        S.A.
FIREamp™>>
```

11.4.6.2 Show Events Command

Command:

show events [mng <num>] | [edfa <num>] | [system]

Description:

This command displays the events of the specified entity. If no parameters are specified, all the events are displayed.

Example:

```
FIREamp™>>show events mng 1

THU JUN 18 12:22:44 2009        MNG 1  Link Up

Event

THU JUN 18 12:22:46 2009        MNG 1  Optics Loss of Light
 Critical        S.A.

THU JUN 18 12:22:47 2009        MNG 1  Link Down

Event

FIREamp™>>
```

11.4.6.3 Show Optics Command

Command:

show optics [mng <num>] | [edfa <num>]

Description:

This command displays the optical information of the specified port.

Example:

```
FIREamp™>show optics mng 2
Vendor: Infineon FO GmbH
Part Number: V23848-M305-C56W
Serial Number: 26572841
Wavelength: 850.00 nm
Type: Non WDM
```

```
Tx Power: -6.2 dBm
Rx Power: -8.3 dBm
Temperature: 31 C
FIREamp™>>
```

11.4.7 System Restart Command

The following is the System Restart command:

- Configure System Restart (p. 169)

11.4.7.1 Configure System Restart Command

Command:

```
configure system restart (f | c | w)
```

Description:

This command restarts the node.

Note:

- Performing this command while using Telnet will terminate the session.
- It is recommended to save the old configuration file before restoring to factory defaults.

The restart type is determined by the parameter of the command:

- **f**: Restore to factory defaults; traffic affecting; deletes the node configuration except for the IP information; removes all licensing information from the node (if applicable)
- **c**: Cold restart; traffic affecting; keeps the node configuration
- **w**: Warm restart; not traffic affecting; keeps the node configuration

Example (of a Telnet session):

```
FIREamp™>>configure system reset w
FIREamp™>>

Connection to host lost.
```

Appendix A: Connection Data

This appendix describes the connectors for the FIREamp™.

In this Appendix

A.1 CONTROL Connector

The CONTROL connector is a 9 pin D-type female connector with RS-232 asynchronous DCE interface, intended for direct connection to a supervision terminal. The connection to the supervision terminal is by means of a straight cable (a cable wired point-to-point). The connector is wired in accordance with the following table.

Table 53: CONTROL Connector Wiring

Pin	Function	Direction
2	Transmit Data (TX)	From FIREamp™
3	Receive Data (RX)	To FIREamp™
5	Signal Ground (SIG)	Common reference

A.2 ALARM Connector

The ALARM connector of the FIREamp™ is a 9-pin D-type female connector that is used to connect to the external alarm system (for example, a buzzer) of the customer.

The ALARM connector provides two connectivity methods:

- Normally Open
- Normally Closed

The connector is wired in accordance with the following table.

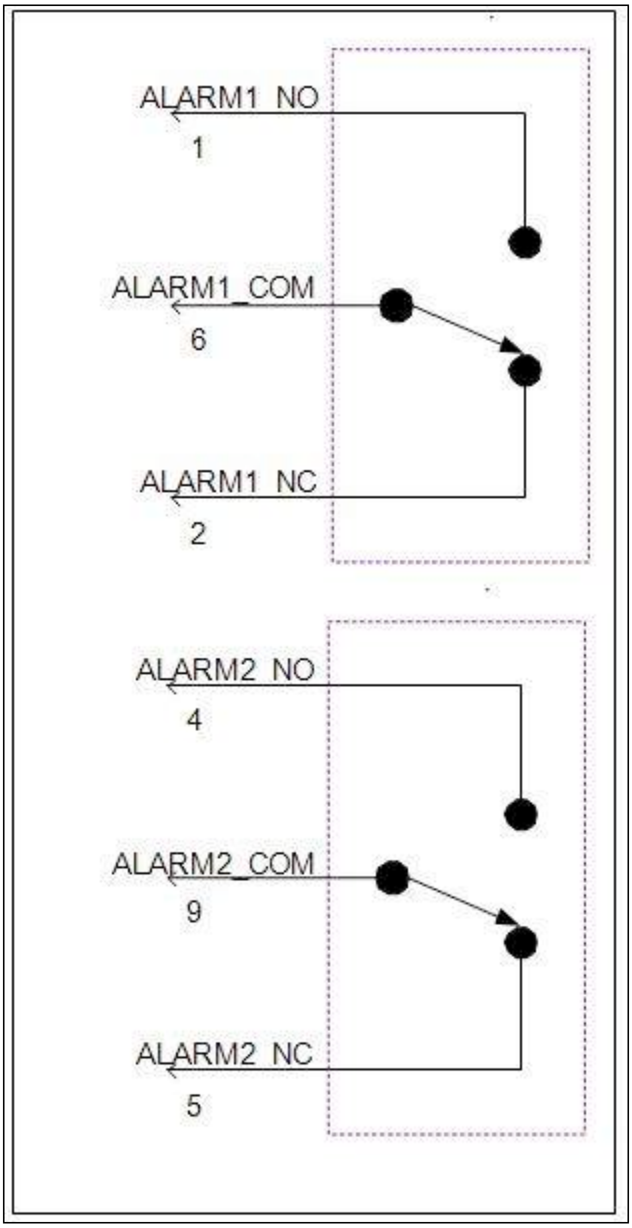


Figure 121: External ALARM Diagram

Table 54: ALARM Interface, Pin Function

Pin	Designation	Function
1	ALARM Normally Open (ALARM1_NO)	In normal operation, pin 6 (ALARM Common) is internally connected to pin 2 (ALARM Normally Closed). Upon a Major alarm event, the internal connection of pin 6 (ALARM Common) is switched to this pin (pin 1).

Pin	Designation	Function
2	ALARM Normally Closed (ALARM1_NC)	In normal operation, pin 6 (ALARM Common) is internally connected to this pin (pin 2). Upon a Major or Critical alarm event, the internal connection of pin 6 (ALARM Common) is switched to pin 1 (Alarm Normally Open)
6	ALARM Common (ALARM1_COM)	Common signal
3		Internally connected to GND.
7	ALARM IN 1	Input External Alarm
8	ALARM IN 2	Not connected
4*	ALARM Normally Open (ALARM2_NO)	In normal operation, pin 9 (ALARM Common) is internally connected to pin 5 (Alarm Normally Closed). Upon a Major alarm event, the internal connection of pin 9 (ALARM Common) is switched to this pin (pin 4).
5*	ALARM Normally Closed (ALARM2_NC)	In normal operation, pin 9 (ALARM Common) is internally connected to this pin (pin 5). Upon a Major alarm event, the internal connection of the pin 9 (ALARM Common) is switched to pin 4 (ALARM Normally Open).
9*	ALARM Common (ALARM2_COM)	Common signal

* The pin will be implemented in a future software release.

A.3 ETH Connector

The FIREamp™ ETH port is a 10/100 Base-T Ethernet interface terminated in an RJ-45 connector. The port can be connected by a standard station cable to any type of 10/100 Base-T Ethernet port.

Connector pin functions are listed in the following table.

Table 55: ETH Port Connector, Pin Functions

Pin	Designation	Function
1	RXD+	Receive Data output, + wire
2	RXD–	Receive Data output, – wire
3	TXD+	Transmit Data input, + wire
4, 5	–	Not connected
6	TXD–	Transmit Data input, – wire
7, 8	–	Not connected

A.4 Data Ports

The Data ports are two or four fixed duplex LC connectors.

Table 56: Data Port Specifications

Specification	Requirement
Fiber type	Single mode
Fiber size	2 mm optical
Connector type	LC with protective shutters
Port type	Optical COM/EDFA/OSC port

A.5 Power Supply Combinations

The following power supply combinations are feasible in the FIREamp™:

- One or two AC power supplies
- One or two DC power supplies

Note: Both AC and DC PSUs can be used in the same unit.

A.6 Power Connectors

The FIREamp™ may have the following power supply connectors:

- **AC-powered FIREamp™ units**: Standard three-pin IEC320 C5 connector 3A for connection to AC power.
- **DC-powered FIREamp™ units**: DC power is supplied with a dedicated connector for wiring.

The following figure shows how to wire the DC connector (DC power supply only).

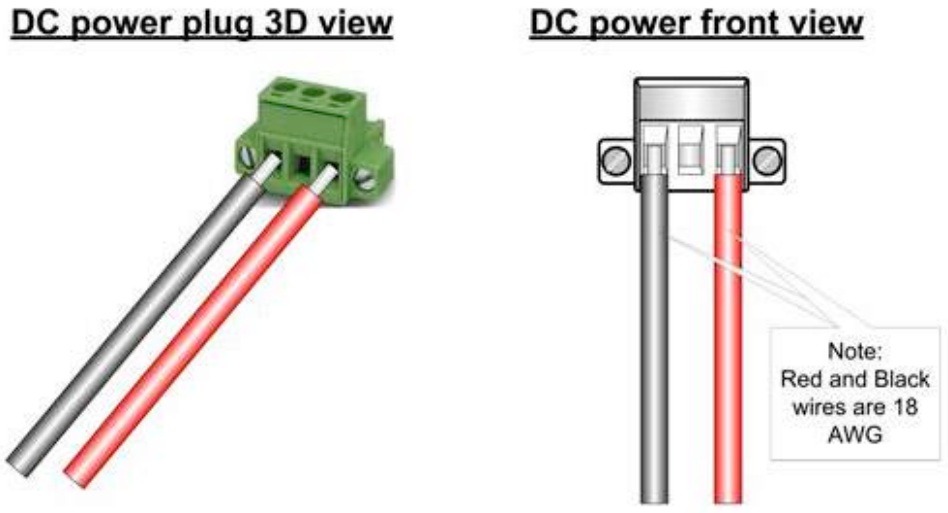


Figure 122: DC Connector Wiring Diagram

A.7 Protective Ground Terminal

The protective ground terminal of the FIREamp™, located on the rack mount, must be connected to a protective ground.

The following figure shows how to wire the ground terminal.

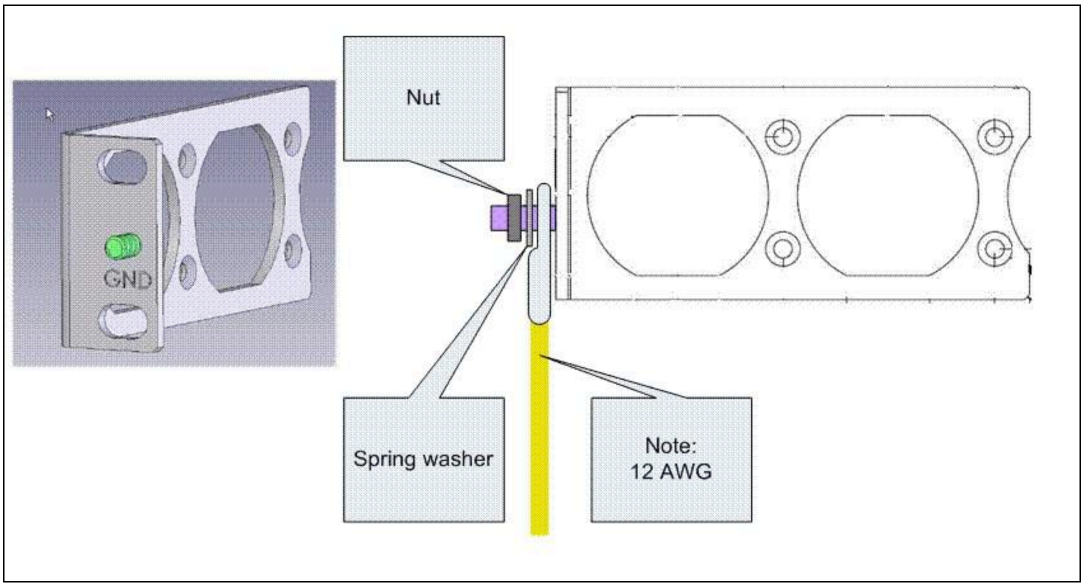


Figure 123: Protective Ground Terminal Wiring Diagram

A.8 Fiber Shelf

The fiber shelf is an optional tray that can be attached to the FIREamp™ to help you organize the optical fibers.

The following figure shows the mechanical details of the fiber shelf.

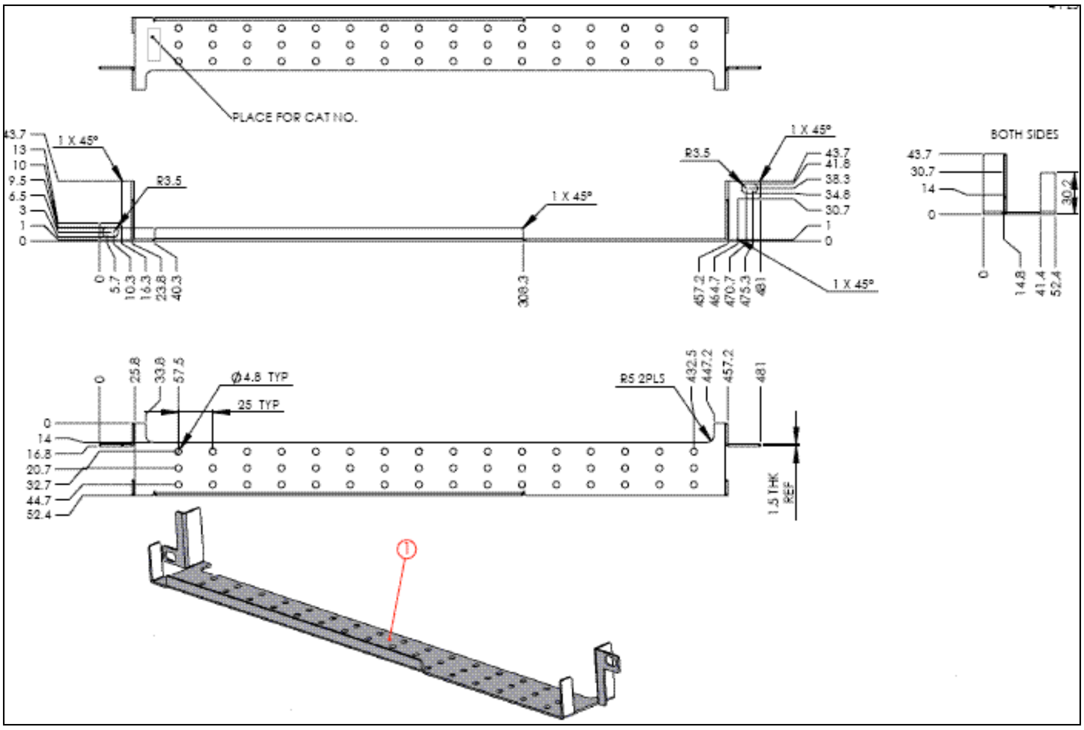


Figure 124: Fiber Shelf Diagram

Appendix B: Alarm and Event Messages

This appendix describes the possible alarm and event messages.

In this Appendix

B.1 Alarm Messages

The following table lists the possible FIREamp™ alarm messages and their interpretation and/or corrective measures.

Table 57: Alarm Messages

Source	Message	Interpretation/Corrective Measures
PSU1/PSU2	Power Supply Failure	Replace the faulty PSU.
PSU1/PSU2	Power Failure– Low Voltage	Replace the faulty PSU.
FAN	Fan Failure	The internal cooling fan of the device does not operate. Replace the FAN unit as soon as possible.
System	Hardware failure	A technical failure has been detected. Replace the device.
System	Database Restore Failed	Failed to update the system configuration.
System	Database Restore in Progress	Failed to update the system configuration.
System	Cold Restart Required: FPGA Changed	After a warm restart, the FPGA version is not consistent with the software version. A cold restart is required.
System	Software Upgrade Failed	The downloaded software is corrupted. Reload the software.
System	Network Time Protocol Failure	SNTP timing protocol failure. Check the IP connection to the NTP servers.
External Input Alarm	(As configured)	The External Input Alarm is active.
Optics	Optics Removed	The optical module has been removed. Insert an optical module or shut the port down.
Optics	Optics Loss of Light	A Loss of Light indication has been received in regards to the specific optical module. The optical power of the received signal is below the minimum power level. Check the fiber connection and/or clean the fiber connector.
Optics	Optics Transmission Fault	The transceiver is not transmitting. Replace the optical module.

Source	Message	Interpretation/Corrective Measures
Optics	Optics Hardware Failure	A hardware fault was detected in the optical module. Replace the optical module.
Optics	Optics High Transmission Power	The transmission power of the optical module is above its specification.
Optics	Optics Low Transmission Power	The transmission power of the optical module is below its specification.
Optics	Optics High Temperature	The temperature inside the optical module is above its specification.
Optics	Optics Low Temperature	The temperature inside the optical module is below its specification.
Optics	Optics High Reception Power	The incoming signal into the optical module is too high. An attenuation of the input signal is required.
Optics	Optics Low Reception Power	The incoming signal into the optical module is too low.
Optics	Optics High Laser Temperature	The temperature of the laser is above its specification..
Optics	Optics Low Laser Temperature	The temperature of the laser is below its specification..
Optics	Optics High Laser Wavelength	The laser wavelength exceeds the high alarm level.
Optics	Optics Low Laser Wavelength	The laser wavelength exceeds the low alarm level.
Optics	Optics Loss Propagation	The laser was shut down due to a problem on the interface of the port mate.
Optics	Optics Bit Rate Mismatch	The inserted optical module has a mismatch problem due to the wrong rate or type. Replace the optical module or update the configured service type.
Optics	Unauthorized Optics Inserted and is Shutdown	The inserted optical module is unauthorized for use. Replace the optical module with an authorized optical module.
EDFA	EDFA Gain	The EDFA gain is out of acceptable range.
EDFA	EDFA Hardware Failure	The interface does not respond.
EDFA	EDFA Temperature	The EDFA temperature is out of acceptable range.
EDFA	EDFA Loss of Light	No signal is detected.
EDFA	EDFA Receive Power Out of Bound	The receive signal is out of acceptable range. Check the optical power of the EDFA client signals. Use attenuation if required.

Source	Message	Interpretation/Corrective Measures
EDFA	EDFA Transmit Power Out of Bound	The transmit signal is out of acceptable range. Check the optical power of the EDFA client signals.
EDFA	EDFA Down	Closed the EDFA output upon loss of input. Check the EDFA client signals.
EDFA	EDFA End of Line	An EDFA problem. Replace the device.
EDFA	EDFA Eye Safety	Hazard. No fiber is connected to the port.
OSW	Optical Switch Loss of Signal	One of the optical switch ports has detected Loss of Signal. Check the signal level of the fibers connected to the COM ports.

B.2 Configuration Event Messages

The following table lists the configuration event messages generated by the FIREamp™ and explains their interpretation.

Table 58: Configuration Change Messages

Source	Message	Interpretation
System	Change date	The system date or time has changed.
System	Database Restore Completed	A new configuration file has been loaded.
System	Change IP	The IP of the node has changed.
System	Alarm cut-off	The Alarm Cut-off has been operated.
System	Add user	A new user was added.
System	Delete user	A user was deleted.
System	Configuration change	The configuration of the system was changed.
System	Delete routing entry	The Performance Management counters were reset.
System	Software Upgrade	Software Upgrade has been performed.
Port	Admin Down	Admin Down has been performed for the port.
Port	Admin Up	Admin Up has been performed for the port.
Port/COM	Create APS	An APS was created for the port/COM.
Port/COM	Remove APS	The APS for the port/COM has been removed.
Port/COM	APS command	An APS command was issued.
Port/COM	APS clear command	An APS command was cleared.

B.3 Other Event Messages

The following table lists the other possible event messages and explains their interpretation.

Table 59: Other Event Messages

Event Type	Source	Message	Interpretation
Inventory Changed	PSU, FAN, Optics	Inventory Changed	The node inventory has changed. A component was inserted or removed.
Switchover	COM Port	APS Switch Over	A protection switching event has occurred.
Dying Gasp	System	Remote Unit Failure	A remote unit had a power failure.
Software Upgrade	System	Software Upgrade Completed	The software upgrade operation has been completed.

Appendix C: Troubleshooting Chart

This appendix describes some trouble symptoms and their corrective measures.

In this Appendix

C.1 Troubleshooting Chart

Identify the trouble symptoms in the following table and perform the actions listed under "Corrective Measures" in the order given until the problem is corrected.

Table 60: Troubleshooting Chart

No.	Trouble Symptoms	Probable Cause	Corrective Measures
1	FIREamp™ does not turn on.	No power	1. Check that the power cable is properly connected to the FIREamp™ power connector. 2. Check that both ends of the power cable are properly connected. 3. Check that power is available at the power outlet serving the FIREamp™.
		Defective power supply	Replace the power supply unit.
		Defective FIREamp™	Replace the FIREamp™.
2	The LOS LED of a device connected to FIREamp™ is lit.	Cable connection problems	1. Check all cables at the FIREamp™ Tx and Rx port connectors. 2. Repeat check at the remote equipment. 3. Make sure that the optical module used matches the fiber type (single mode / multi-mode).
		Fiber problem	1. Use a short fiber to connect the remote equipment Rx connector to its Tx connector. 2. If the problem is solved, connect the Rx connector of the fiber to the Tx connector at the FIREamp™ location. 3. If the problem persists, replace the fiber.
		Defective remote equipment	Use a short fiber to connect the remote equipment Rx connector to its Tx. If the LOS LED is still lit, the remote equipment is defective.
		A problem with the FIREamp™ port state	Set the **Admin Status** of the COM port to **Up**.

No.	Trouble Symptoms	Probable Cause	Corrective Measures
		Loss of Propagation	Disable the **LOS Propagation** for this port. If the problem is solved, the reason for the SIG LOS is a loss on the mate FIREamp™ port.
		Defective optical module	1. Check for optical module alarms. 2. Replace the optical module.
		Defective FIREamp™	1. Use a short fiber to connect the FIREamp™ Rx connector to its Tx connector.(A signal generator may be required as the FIREamp™ does not generate signals by itself.) 2. If the LOS LED is still lit, replace the FIREamp™.
3	The LED of the local FIREamp™ port is red.	Cable connection problems	1. Check for proper connections of the cables to the FIREamp™ Tx and Rx connector. 2. Repeat check at the remote equipment.
		High Signal Level	1. Check the **Receiver Input Power** of the optical module. 2. If the power is too high, add an attenuator.
		Defective optical module	1. Check for optical module alarms. 2. Replace the optical module.
		Fiber problem	1. Check the **Receiver Input Power** of the optical module. 2. If the power is too low, replace the fiber.
		Defective FIREamp™	1. Check the FIREamp™ alarms. 2. If there are alarms, replace the FIREamp™.
		Defective remote equipment	1. Use a different remote unit. 2. If the problem is solved, replace the remote unit.
4	The equipment attached to the LAN port of the local FIREamp™ cannot communicate with the remote FIREamp™ over the WAN.	Problem with the connection to the LAN	1. Check that the LINK LED of the corresponding LAN port lights. If not, check for proper connection of the cable to the LAN port. 2. Check that the **Admin Status** of the MNG port is **Up** and that it is operating properly. 3. Check that the IP information of the remote FIREamp™ is configured correctly (for example, the default gateway).

No.	Trouble Symptoms	Probable Cause	Corrective Measures
		External problem	Check the IP configuration of the external equipment (for example, the gateway address) that is connected to the local FIREamp™ LAN port.
		Defective FIREamp™	Replace the FIREamp™.

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