PL-1000EM 3.2 INSTALLATION AND CONFIGURATION MANUAL

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1 Introduction

This chapter provides an overview of the PL-1000EM.

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1.1 Overview

The PL-1000EM is a WDM transport device. It can multiplex up to 10 client GbE services on a 10G uplink over a single wavelength, and transport it over a long distance. It is typically deployed as customer premises equipment (CPE) in enterprise campus environments and in central offices.

The PL-1000EM also provides a general purpose transponder for services up to 4.25 Gbps over another wavelength.

The PL-1000EM is a highly integrated device that can incorporate one DWDM MUX/DEMUX module and one or two EDFA modules according to the required configuration.

1.1.1 Main Features

The PL-1000EM combines the following key functions:

- 10:1 Muxponder for improved wavelength utilization by multiplexing 10 GbE services on a single 10 Gbps uplink wavelength

- Extra general purpose transponder of variable speed service (125 Mbps to 4.25 Gbps)

- In-band management channel embedded in the muxponder uplink signal

- Use of standard pluggable XFP transceivers for the uplinks of the muxponder

- Use of standard SFP optics for the GbE muxponder services and for the transponder ports

- Provides optional OTN XFP optics on the WDM side to support applications that require transport over longer distances

- Optional integrated Erbium Doped Fiber Amplifier (EDFA) and/or optical MUX/DEMUX modules

- Two 100M Optical Supervisory Channel (OSC) management channels based on SFP optics for remote management

- 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 connection

  - Web-based HTTP/HTTPS management

  - SNMP management interface

  - Remote Authentication Dial In User Service (Radius) protocol for centralized remote user authentication

  - Syslog protocol

  - Simple Network Time Protocol (SNTP) for network timing

  - TFTP and FTP for file upload and download

- Operates on single or dual fiber solutions

- Pluggable FAN unit for improved maintainability

- AC or DC, single or dual pluggable power supply units (PSUs)

- Supports Operations, Administration, and Maintenance (OAM) functions:

  - Alarm and Event fault

  - Performance monitoring (PM)

  - External alarms

  - Diagnostic loopback

  - Tx and Rx of Diagnostic Pseudo Random Binary Sequence (PRBS)

1.1.2 Typical Application

Designed as a transport device, the PL-1000EM is typically deployed as a CPE in enterprise campus environments. It offers the functionality of multiplexing several GbE services over WDM networks with a single wavelength.

The PL-1000EM is highly suitable for applications such as:

- Extension of multiple GbE services

- Interconnection of LAN or SAN islands over remote metro sites using the extra PL-1000EM transponder

- SONET/SDH transport using the extra PL-1000EM transponder

- Fiber relief for high-capacity multi-tenant buildings and campuses.

The PL-1000EM can be used to save wavelength resources and enable long distance high performance LAN connectivity.

The following figure illustrates a typical application for standalone PL-1000EM units. They are deployed as CPE in enterprise campus environments, and connect the local LANs in the two campuses across a fiber connection or via a DWDM public network.
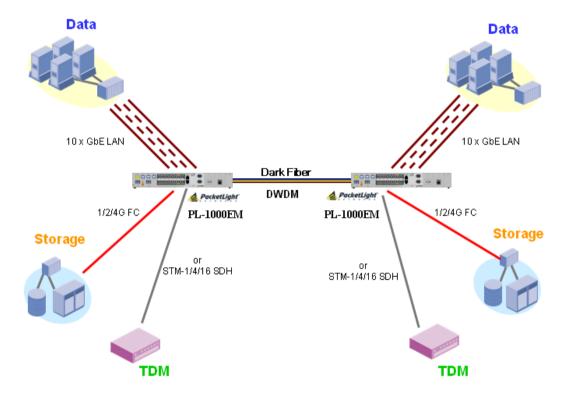
Figure 1: Typical Application for PL-1000EM Devices

1.1.3   Physical Description

The PL-1000EM 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 PL-1000EM front panel also includes LEDs that indicate its operating status.

The following figure shows the front panel of the PL-1000EM with one MUX/DEMUX module.
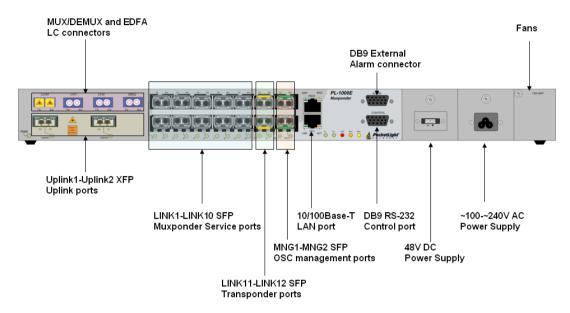
Figure 2: PL-1000EM Front Panel

1.2 Configurations

The PL-1000EM is designed in a modular way, thereby enabling many configurations and applications.

1.2.1 PL-1000EM Configurations

The PL-1000EM can be ordered with the configurations described in this section.

1.2.1.1 Muxponder Uplink Port Configurations

The PL-1000EM can be ordered with the following for the uplink ports:

- Normal 10G XFP

- OTN XFP

  When the OTN XFP is installed, the muxponder uplink uses the OTU2f signal as defined by clause 7.1 of the ITU-T G.Sup43 publication. The bit rate of this signal is 11.3176 Gbit/s and it is used to wrap the original 10.51875 Gbit/s 10G FC uplink signal rate.

  The main advantage of the OTN XFP over the regular XFP is the support for Forward Error Correction (FEC), which allows greater reach between optical nodes and higher bit rates on the same fiber. Such improvement may be required for certain network configurations.

When the optional OTN XFP transceiver is used, the muxponder uplink provides full support for the standard OTN performance monitoring (PM) and alarms.

1.2.1.2 MUX/DEMUX Configurations

The PL-1000EM can be ordered with one DWDM MUX/DEMUX module.

1.2.1.3 EDFA Module Configurations

The PL-1000EM can be ordered with two, one, or no EDFA modules. Each EDFA can be a Booster or Pre-Amp.

1.2.1.4 Example Configurations

Below are some examples of the available configurations of the PL-1000EM:

1. PL-1000EM with protected muxponder uplink:

   - 1+1 facility protection
   - Does not use the extra transponder
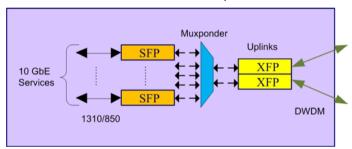
Figure 3: PL-1000EM with Protected Muxponder Uplink

2. PL-1000EM with MUX/DEMUX module:

   - Without protection
   - Uses the OSC management channel
   - Uses the extra transponder
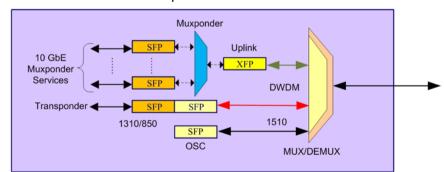
Figure 4: PL-1000EM with MUX/DEMUX Module

3. PL-1000EM with MUX/DEMUX and Booster EDFA:

   - Without protection

- ▪ Uses the OSC management channel
- ▪ Uses the extra transponder
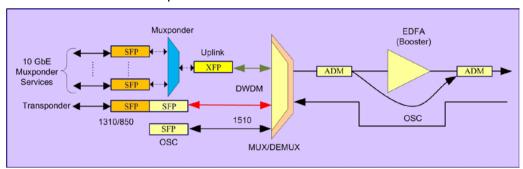
Figure 5: PL-1000EM with MUX/DEMUX and Booster EDFA

4. PL-1000EM with MUX/DEMUX and Pre-Amp EDFA:

- ▪ Without protection
- ▪ Uses the OSC management channel
- ▪ Uses the extra transponder
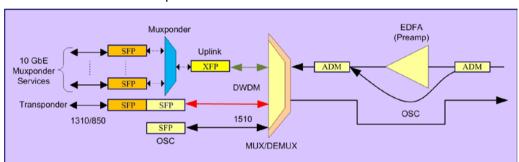
Figure 6: PL-1000EM with MUX/DEMUX and Pre-Amp EDFA

1.3   Functional Description

This section describes some of the functionality of the PL-1000EM.

1.3.1   PL-1000EM Ports

This section describes the PL-1000EM ports.

1.3.1.1   Muxponder Ports

The muxponder consists of 10 GbE service ports and 2 uplink ports.

1.3.1.1.1   Muxponder Uplink Ports

They muxponder uplink ports are labeled "Uplink 1" and "Uplink 2". These ports accept XFP transceivers.

There are two configurations for the uplink signal:

- **Default configuration**: The uplink signal has a bit rate of 10G FC.

- **Optional OTN**: The uplink signal is compliant with OTN OTU2f. For information on the management of the OTN uplink, see .

There are two configurations of the uplink ports:

- **Unprotected**: In this configuration, the PL-1000EM includes a single MUX/DEMUX module and/or a single EDFA module.

- **Protected**: In this configuration, both uplink ports should be used and be connected to two different MUX/DEMUX or EDFA modules. For example, connect to two MUX/DEMUX modules in a PL-300 node.

1.3.1.1.2 Muxponder Service Ports

The muxponder service ports are labeled "LINK1" to "LINK10". These ports accept optical/copper SFP transceivers. The only service supported by these ports is GbE.

1.3.1.2 Transponder Ports

The transponder has one service port and one uplink port labeled "LINK11" and "LINK12". Both ports accept SFP transceivers.

The following table lists the supported services.

Table 1: PL-1000EM Transponder Services

Service Type	Bit Rate	Standard
1G FC/FICON	1.0625G	INCITS T11 FC-PI
2G FC/FICON	2.125G	
4G FC/FICON	4.25G	
10M Ethernet - Copper	10M	IEEE 802.3
Fast Ethernet 100M - Optical or Copper	100M	
Gigabit Ethernet 1.25G - Optical or Copper	1G	
ESCON - 200M	200M	
OC-3/STM-1	155M	ITU-T G.707 and Telcordia GR-253-CORE
OC-12/STM-4	622M	
OC-48/STM-16	2.5G	
Other (Bypass)	N/A	

1.3.1.3 ALARM Port

The PL-1000EM has an ALARM (or External Alarm) port for the environmental alarm. This port supports one input and one output.

For more information, see .

1.3.1.4 Management Ports

This section describes the PL-1000EM management ports.
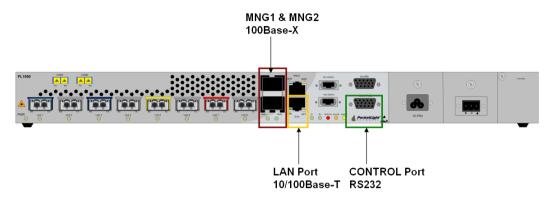
Figure 7: PL-1000EM Management Ports

1.3.1.4.1 CONTROL Port

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

Initial configuration of the PL-1000EM 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 PL-1000EM serial CONTROL connector.

After the initial configuration, the PL-1000EM may be managed, supervised, and configured by a Web browser or an SNMP network management system.

For more information, see .

1.3.1.4.2 ETH Port

The PL-1000EM can be accessed through the 10/100 Base-T management port using any of the following:

- CLI over a serial or Telnet/SSH connection
- Web management over HTTP/HTTPS
- SNMP over UDP

For more information, see .

1.3.1.4.3 MNG Ports

The PL-1000EM is equipped with two Optical Supervisory Channel (OSC) ports.

The OSC enables you to manage a remote PL-1000EM box. This management channel is multiplexed as an additional wavelength inside the optical MUX/DEMUX module.

The PL-1000EM supports two OSCs 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 PL-1000EM 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.

For more information, see Connection Data (p. 245).

1.3.2 PL-1000EM Modules

This section describes the PL-1000EM modules.

1.3.2.1 MUX/DEMUX

The PL-1000EM supports an optional passive MUX/DEMUX module.

When installed and configured:

- On the client side, the MUX/DEMUX module is typically connected to the following:

  - Muxponder uplink port via the LC connector labeled "CH1"

  - Transponder uplink via the LC connector labeled "CH2"

  - One of the MNG ports via the LC connector labeled "OSC"

- On the other side, the MUX/DEMUX module is connected internally to the Optical Amplifier Input (if present) or to the LC connector labeled "COM".

1.3.2.2 EDFA Modules

The PL-1000EM may be ordered with one or two optional 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 optical path.
- **Pre-Amp EDFA**: Used on the Rx optical path.

1.3.2.3 DCM Module

The PL-1000EM may be ordered with a DCM.

The DCM module provides compensation for a fixed amount of chromatic dispersion caused by the optical fiber, wavelength spacing and the range traversed by the optical signal.

1.3.2.4 Power Supply Unit

PL-1000EM 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 PL-1000EM is 73W.

The PL-1000EM 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 PL-1000EM 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 PL-1000EM operation

- Configuring device parameters

- Status monitoring

- Viewing PL-1000EM performance monitoring statistics

- User management for user and password authentication

- Maintenance functions, including performing port loopbacks, 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 PL-1000EM supports CLI ASCII management. CLI management is accessible via the CONTROL serial port or Telnet/SSH connection.

For more information, see .

1.3.3.1.2 Web-based Management

The PL-1000EM supervision and configuration functions can be performed using a standard Web browser.

For detailed information on Web-based management, see .

1.3.3.1.3 SNMP Management

PL-1000EM units can also be managed by PacketLight's LightWatch™ NMS/EMS, by RADview™, or by other third-party SNMP-based management systems.

For more information about available PL-1000EM MIBs and LightWatch™, contact PacketLight Technical Support.

1.4 Technical Specifications

Muxponder Service Port	Number of Ports	10
	Service Types	Gigabit Ethernet 1G – Optical or Copper
	Data Rate	1.25 Gbps
	Connector	SFP transceiver
Muxponder Uplink Port	Number of Ports	2 (1+1 protection)
	Wavelength	DWDM ITU G.694.1 Grid Channels 15-60 C-Band with 50/100 GHz spacing
	Optical Reach	40 km, 80 km, 120 km, 200 km
	Optical Power Output	-1 to +2 dBm
	Sensitivity	-24 dBm APD
	Bit Rate	10.5188 Gbps (the bit rate of 10G FC)
	In-band Management	IP connection for the management traffic
	Connector	XFP transceiver
OTN Muxponder Uplink Port (Optional)	Number of Ports	2 (1+1 protection)
	Wavelength	DWDM ITU G.694.1 Grid Channels 15-60 C-Band with 100 GHz spacing
	Optical Reach	80 km
	Optical Power Output	0 to +3
	Sensitivity	-5 to -25 dBm APD

	Bit Rate	11.3176 Gbps (the bit rate of OTU2f)
	In-band Management	IP connection for the management traffic
	Connector	OTN XFP transceiver
Transponder Service Port	Number of Ports	1
	Service Types	1G/2G/4G FC 1G/2G/4G FICON - ESCON 200M 10M Ethernet – Copper - Fast Ethernet – Optical or Copper - Gigabit Ethernet – Optical or Copper - OC-3/STM-1 - OC-12/STM-4 - OC-48/STM-16 - Other (Bypass)
	Data Rate	125 Mbps to 4.25 Gbps
	Connector	SFP transceiver
Transponder Uplink Port	Number of Ports	1
	Wavelengths	ITU G.694.1 Grid Channels 15-60; 100 GHz spacing
	Optical Reach	400 km for 1.25 Gbps 180 km for 2.66 Gbps 80 km for 4.25 Gbps
	Optical Power Output	0 to 4 dBm
	Sensitivity	-28 dBm APD
	Connector	SFP transceiver
MUX/DEMUX Module	Number of Modules	0 or 1
	Channels	2
	Wavelength	DWDM ITU G.694.1 Channels 15-60 C-Band
	Express Channel	1511 +/-6.5 nm
	Link Loss (MUX+DEMUX)	< 6 dB
	Spacing	100 GHz
	Express Channel Link Loss	< 1.5 dB
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
	Automatic Gain Control (AGC)	Keeps the amplifier gain fixed without dependency when adding or removing services.
	Automatic Power Control (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.
DCM	Number of Modules	0 or 1
	Fiber Type	ITU G.652
	Spacing	100 GHz
	Range	Up to 200 km
Supervisory and Management Ports	CONTROL Port	Used for initial configuration of the node IP or for local access to CLI. • **Interface**: RS-232 • **Connector**: DB-9, 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	2 Optical management ports
		• **Interface**: 100 Base-FX
		• **Connector**: SFP transceiver
		• **Single Mode**:
		  ▪ **CWDM**: 1290 nm or 1310 nm
		  ▪ **DWDM**: 1490 nm or 1510 nm
		• **Multi-mode**: 850 nm
		NOTE: IP of the MNG port can be configured using the Web application.

Environment Alarms	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
LINK Port LEDs	LINK1 to LINK12	• **OFF**: Admin Down • **Blinking**: Facility loopback or PRBS test • **Green**: Normal operation • **Red**: Alarm detected
Uplink Port LEDs	Uplink 1 and Uplink 2	• **Green**: No failure detected • **Red**: Major or 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 (DWDM applications only) • **Red**: EDFA failure detected
PROT	OPR	Unused
	MASTER	Unused
ETH Port LEDs	LINK	• **OFF**: The port is disconnected • **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	• **OFF**: PSU is not installed • **Green**: Normal operation • **Red**: PSU failure detected
Network Management	Protocols	• CLI over RS-232 or Telnet/SSH connection • Web-based HTTP/HTTPS management • SNMPv2c • Radius • Syslog • 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 PL-1000EM system log files, which can be exported to a text file for offline viewing.
	Performance Monitoring	PM counters for 15 minute and one day intervals for the following: • **Counters for 1G/2G/4G FC/FICON and GbE services based on 8B/10B coding errors**: CV, ES, SES, and UAS • **Counters for OC-3/OC-12/OC-48 (SONET) services based on B1 coding violations**: CV, ES, SES, and SEF • **Counters for STM-1/STM-4/STM-16 (SDH) services based on B1 coding violations**: CV, ES, SES, and OOF
	Optical PM	PM counters for 15 minute and one day intervals for the optical Rx Power for the transceivers and other optical modules installed in the system.
Diagnostics	Loopback	Facility loopback is supported for the muxponder and transponders ports.
	PRBS	PRBS generation and statistics are available for the for the muxponder uplink ports and for the transponder ports.
ALS	Optical Ports	ALS is available for all optical 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	73W maximum
	Protective Earthing Conductor	18 AWG minimum
Fans	Maintenance	Replaceable and hot pluggable
	Flow	1.14 cubic meter/minute (4 fans 0.286 m3/min each)
Physical Dimensions	Height	44 mm/1.733" (1U)
	Width	440 mm/17.32"
	Depth	230 mm/9.05"
	Weight	5.5 kg/12.1 lbs 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 • Industry Canada ICES-003:04; C108.8-M1983 • VCCI Technical Requirements, V-3/2001.04 • ETSI EN 300 132-2 • GR-1089-CORE, Issue 4
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 PL-1000EM.

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, adjustments, 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 PL-1000EM:

- Never connect cables to a PL-1000EM 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 PL-1000EM 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 PL-1000EM must be connected to a protective ground (see <u>Connection Data</u> (p. <u>245</u>)).

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 PL-1000EM 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 PL-1000EM optical modules is off when the status of the port is set to **Admin Down**.

In general, the PL-1000EM unit is equipped with laser devices that comply with Class 1M. However, the PL-1000EM 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 8: Class 1M Laser Warning

The following warning applies to Class 3B laser products.

CAUTION
HAZARD LEVEL 3B LASER RADIATION
AVOID EXPOSURE TO THE BEAM

Figure 9: Class 3B Laser Warning

PL-1000EM 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:** PL-1000EM 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 PL-1000EM unit or performing any internal settings on the PL-1000EM, 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 PL-1000EM site requirements.

2.2.1 Physical Requirements

The PL-1000EM 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 PL-1000EM 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 PL-1000EM 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).

2.2.3 Ambient Requirements

The recommended ambient operating temperature of the PL-1000EM is 0° to +45°C/+32° to +113°F, at a relative humidity of 5% to 85%, non-condensing.

The PL-1000EM 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 PL-1000EM contains a fan speed control for lower noise, improved MTBF and power save.

2.2.4 Electromagnetic Compatibility Considerations

The PL-1000EM 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 PL-1000EM must be connected to a low resistance grounding system.

- Whenever feasible, shielded cables must be used.

2.3 PL-1000EM Front Panel

The following figure illustrates the PL-1000EM front panel.

Figure 10: PL-1000EM Front Panel

The above figure shows the PL-1000EM unit with a MUX/DEMUX module and an EDFA amplifier.

In this configuration, the front panel includes the following ports:

- MUX/DEMUX LC connectors labeled "CH1", "CH2", and "OSC"

- Two muxponder uplink ports labeled "Uplink 1" and "Uplink 2" (Working and Protection)

- 10 muxponder service ports labeled "LINK1" to "LINK10"

- Two transponder ports labeled "LINK11" and "LINK12" (Service and Uplink)

- 10/100 Base-T LAN port labeled "ETH"

- Equipment protection connector labeled "PROT" (unused)

- CONTROL port: RS-232 connector

- External alarm port labeled "ALARM"

- Power connectors

2.3.1 Front Panel LEDs

The LEDs are located on the PL-1000EM front panel.

For the list of LEDs and their functions, see Technical Specifications (p. 11).

2.3.2 PL-1000EM Optical Connections Example

The optical ports are illustrated in the following figure.
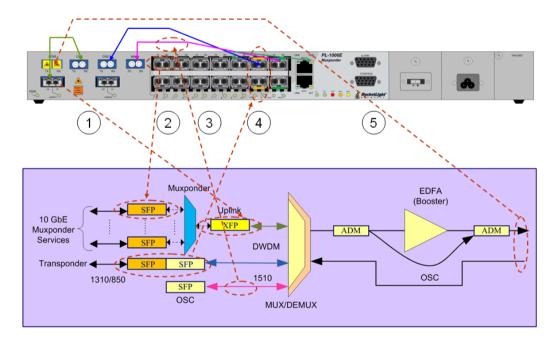
Figure 11: Connections Between the Optical Ports

The following table describes the PL-1000EM optical ports.

Table 2: PL-1000EM Optical Ports

Connection	Description
1	Working uplink XFP port labeled "Uplink 1"
2	Muxponder GbE service SFP port labeled "LINK1"
3	Fiber that connects the OSC LC connector to the MNG SFP
4	Transponder SFP ports labeled "LINK11" and "LINK12"
5	LC port labeled "COM"

2.4 Installing the PL-1000EM Unit

PL-1000EM units are intended for installation in 19-inch or 23-inch racks or placed on desktops or shelves.

⚠ **CAUTION:** Before installing a PL-1000EM 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 PL-1000EM (for procedures for using the terminal, see Operation and Preliminary Configuration (p. 27)). The software necessary for using the terminal is stored in the PL-1000EM.

2.4.1 Package Contents

The PL-1000EM package includes the following items:

- PL-1000EM unit

- Ethernet cable

- 3m RS-232 terminal cable

- Power cords (according to the ordered power supplies)

  - **AC power**: 3m power cord equipped with the appropriate plug

  - **DC power**: DC power cord

- Fiber tray (if ordered)

- Kit for rack installation: 19", 23" (if ordered), or 600 mm ETSI (if ordered)

2.4.2 Required Equipment

The cables needed to connect to the PL-1000EM depend on the PL-1000EM application. You can use standard cables or prepare the appropriate cables yourself (see Connection Data (p. 245)).

2.4.3 Cable Connections

Before starting, refer to the site installation plan and identify the cables intended for connection to this PL-1000EM unit (see <u>Site Requirements</u> (p. <u>19</u>) and <u>Connection Data</u> (p. <u>245</u>)).

2.4.3.1 Optical Cable Handling Precautions

The following are the optical cable handing 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 PL-1000EM 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 PL-1000EM unit on and connecting any other cable, the PL-1000EM 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 PL-1000EM:

- Never connect cables to a PL-1000EM 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 PL-1000EM.

- Disconnect all the cables connected to the connectors of the PL-1000EM before disconnecting the PL-1000EM power cable.

⚠️ **CAUTION:** The PL-1000EM 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 PL-1000EM, 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 PL-1000EM may also serve as the ON/OFF switch. This type of circuit breaker should be rated 10A.

Power should be supplied to the PL-1000EM through a power cable terminated in an appropriate plug, in accordance with the required power source.

To connect the PL-1000EM to ground and power:

1. Connect one end of the power cable to each PL-1000EM 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 PL-1000EM lights up and starts blinking.

2.4.3.3 Cabling the Muxponder Uplink Ports

To connect cables to the PL-1000EM MUX/DEMUX ports:

1. Remove the protective plug from the desired muxponder uplink port and insert the (OTN) XFP transceivers.

2. Connect the Working muxponder uplink to the CH1 MUX/DEMUX LC connector.

2.4.3.4 Cabling the LINK Ports

Each LINK port has two connectors marked "Tx" and "Rx".

2.4.3.4.1 Cabling the Transponder Ports

To cable the transponder ports:

1. Remove the protective plug from LINK11 and LINK12 ports and insert the SFP transceivers.

2. Connect LINK12 to the appropriate local equipment.

3. Connect LINK11 to the CH2 MUX/DEMUX LC connector.

   Always leave enough slack to prevent strain.

2.4.3.4.2 Cabling the Muxponder Service Ports

To cable the muxponder service ports:

1. Remove the protective plug from the desired muxponder service ports and insert the SFP transceivers.

2. Connect the port to the appropriate remote equipment as follows:

   - Tx connector (transmit fiber) to receive input of the remote equipment

   - Rx connector (receive fiber) to transmit output of the remote equipment

     Always leave enough slack to prevent strain.

2.4.3.5   Cabling the Management Ports

You can cable the following management ports:

- MNG port

- CONTROL port

- ETH port

2.4.3.5.1   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 MUX/DEMUX LC connector labeled "OSC".

2.4.3.5.2   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 PL-1000EM connectors, see Connection Data (p. 245).

2.4.3.5.3   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 PL-1000EM connectors, see Connection Data (p. 245).

3 Operation and Preliminary Configuration

This chapter provides general operating instructions and preliminary configuration instructions for the PL-1000EM unit. 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 PL-1000EM.

3.1.1 Connecting and Configuring the Terminal

To connect and configure the terminal:

1. Connect a terminal to the CONTROL connector of the PL-1000EM 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 PL-1000EM preliminary configuration (the exact pinout of the connector is described in).

2. Check that the installation and the required cable connections have been correctly performed (see).

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 PL-1000EM

⚠ **WARNING:** Do not connect the power before the unit is in the designated position. The PL-1000EM does not have a power ON/OFF switch and therefore starts operating as soon as the power is connected.

To turn on the PL-1000EM:

1. Connect the PL-1000EM to the power source (see <u>Connecting the PL-1000EM to Ground and Power</u> (p. <u>23</u>)).

   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 PL-1000EM 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 <u>Connection Data</u> (p. <u>245</u>)).

For more information about the CLI commands, see <u>CLI</u> (p. <u>229</u>).

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 a Telnet/SSH 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 PL-1000EM 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 <u>Configure Interface Ethernet IP Command</u> (p. <u>239</u>)).

   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**.

```
PL-1000EM>> configure interface ethernet ip 192.168.0.100 -n
255.255.255.0
```

Table 3: 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 PL-1000EM 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 PL-1000EM is properly installed.

- The PL-1000EM 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. 239)).

2. Open the Web browser.

3. In the address field of the browser, type the **IP address** of the PL-1000EM 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 PL-1000EM)

4. Press **Enter**.

    The Login window opens.

Figure 12: 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.
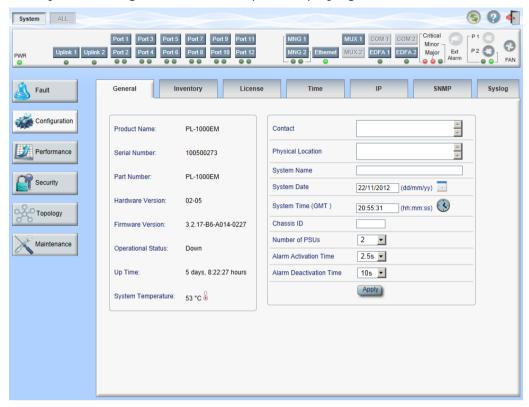
Figure 13: System Configuration Window

3.3.4 Navigating the Web Application

This section describes the PL-1000EM item buttons, sidebar buttons, and tabs.

3.3.4.1 Item Buttons

The following figure shows an example of the buttons used for performing operations in the Web application.
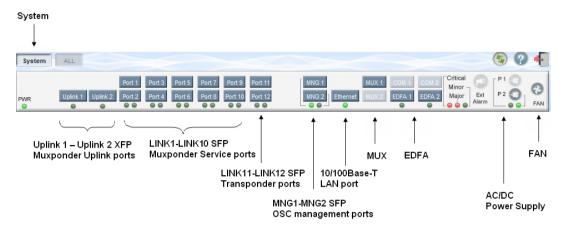
Figure 14: PL-1000EM Item Buttons (Example)

The buttons displayed vary according to the configuration. For example, if the PL-1000EM does not have an EDFA module installed, the **EDFA** button is disabled.

The Item buttons displayed also vary according to the context of the window. For example, the **FAN** button is disabled in the Fault window because no faults are defined for this unit.

3.3.4.2   Sidebar Buttons

The following figure shows the sidebar buttons.

Figure 15: PL-1000EM Sidebar Buttons

Use the sidebar buttons to do the following:

- **Fault**: View PL-1000EM faults

- **Configuration**: Configure the PL-1000EM parameters

- **Performance**: View system optical information and port performance monitoring

- **Security**: Manage users' accounts

- **Topology**: View network topology

- **Maintenance**: Perform maintenance tasks for the PL-1000EM

3.3.4.3 PL-1000EM Tabs

The following figure shows an example of the tabs used for performing system security operations.
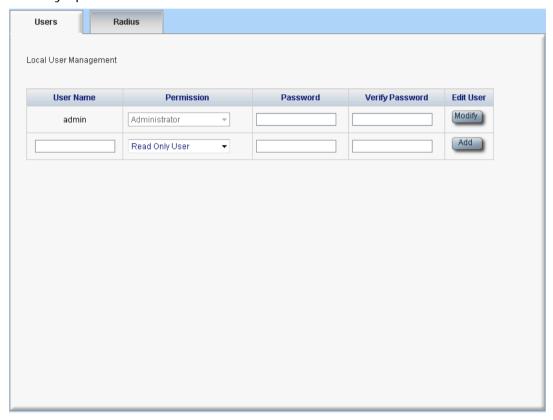
Figure 16: PL-1000EM Tabs (Example)

The tabs displayed vary according to the user permissions. For example, the **Radius** tab is only displayed for a user with Administrator permissions.
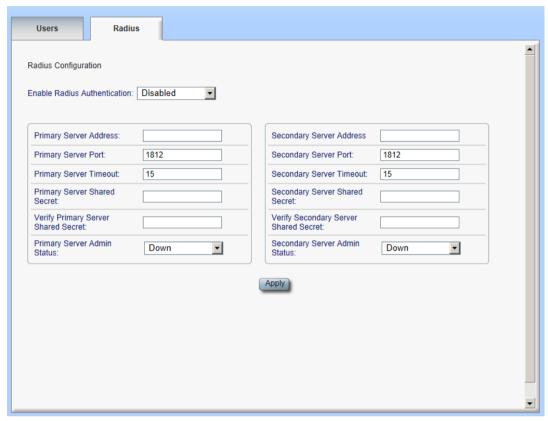
Figure 17: PL-1000EM Radius Tab

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 PL-1000EM supports the following types of users.

Table 4: User Access Levels

User Type	Permissions	Notes
Administrator		
Administrator	Access and edit 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 and manage the node; cannot manage other users but can change their own password (see Changing Your Password (p. 42)).	
Read Only User	View only; no edit permissions except to change their own password (see Changing Your Password (p. 42)).	

4.2 User Authentication Methods

The access to the PL-1000EM 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 PL-1000EM 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 5: 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 PL-1000EM 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 <u>Attribute Value Pairs</u> (p. <u>36</u>).

4.3 Security Settings
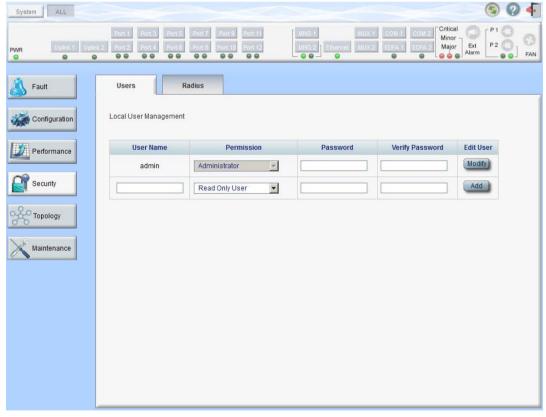
Figure 18: Security Settings Window

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)

Figure 19: 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 6: 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))
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.

Figure 20: 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 PacketLight 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.

Figure 21: 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.
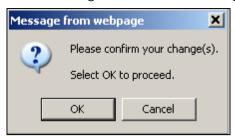
Figure 22: Confirm Delete

4. Click **OK**.

The specified user is deleted.

4.3.2 Users Tab (Non-Administrator)

Figure 23: 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.

Figure 24: Confirm Changes

5. Click **OK**.

Your password is changed.

Table 7: 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.
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)
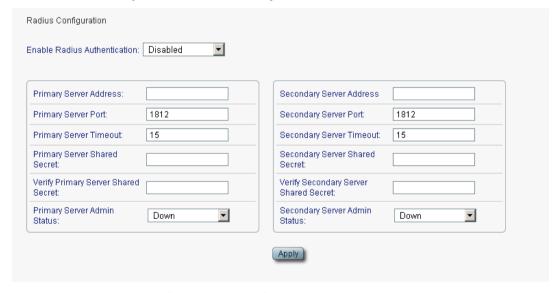
Figure 25: Radius Tab (Administrator)

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.
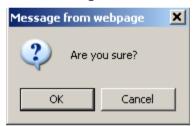
Figure 26: Confirm Configuration

4. Click **OK**.

   The Radius client is configured.

Table 8: 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

Parameter	Description	Format/Values
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 PL-1000EM fault management, which is used to localize and identify problems in the network incorporating PL-1000EM units.

In this Chapter

5.1   Fault Views

This section describes the following Fault views:

- Alarms

- Events

- Configuration Changes

5.1.1   Alarms

The PL-1000EM 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 PL-1000EM continuously monitors the traffic signals and other exceptional conditions. Whenever such a condition occurs, the PL-1000EM generates a time stamped event message and sends it as an SNMP notification to the registered management systems. The PL-1000EM 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 PL-1000EM system log files, which can be exported to a text file for offline viewing.

The PL-1000EM 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.

- **Link Up**: These are standard SNMP events that are generated when the operational status of a port is changed from **Down** to **Up**.

- **Link Down**: These are standard SNMP events that are generated when the operational status of a port is changed from **Up** to **Down**.

- **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 PL-1000EM 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 Fault Procedure

The following is the general procedure for viewing the PL-1000EM faults. The specific procedures for each item are provided in the following sections.

To view the PL-1000EM faults:

1. Click **Fault**.

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

    - **System** (see <u>System Faults</u> (p. <u>50</u>))

    - **All** (see <u>All Faults</u> (p. <u>56</u>))

    - **Uplink** (see <u>Uplink Faults</u> (p. <u>62</u>))

    - **Port** (see <u>LINK Port Faults</u> (p. <u>68</u>))

    - **MNG** (see <u>Management Port Faults</u> (p. <u>74</u>))

    - **EDFA** (if present) (see <u>EDFA Faults</u> (p. <u>86</u>))

    - **PSU** (see <u>PSU Faults</u> (p. <u>92</u>))

    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
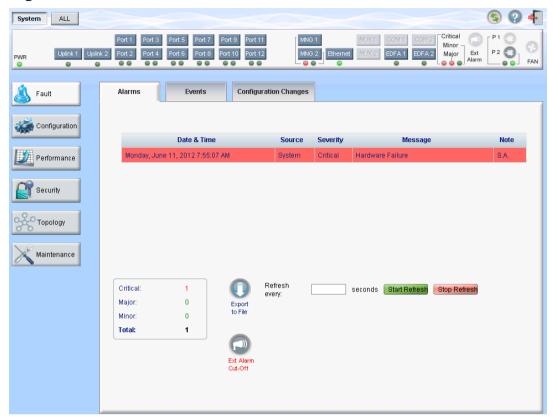
Figure 27: System Fault Window

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**

Export to File

Refresh every: [____] seconds Start Refresh Stop Refresh

Ext Alarm Cut-Off
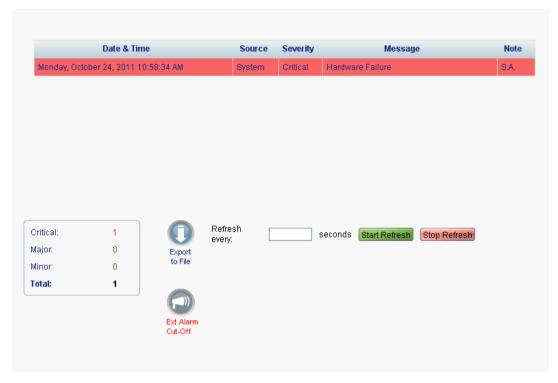
Figure 28: Alarms Tab

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 (p. 11).

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 9: 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.

5.3.2 Events Tab

Figure 29: 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 10: 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

Figure 30: 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 11: 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
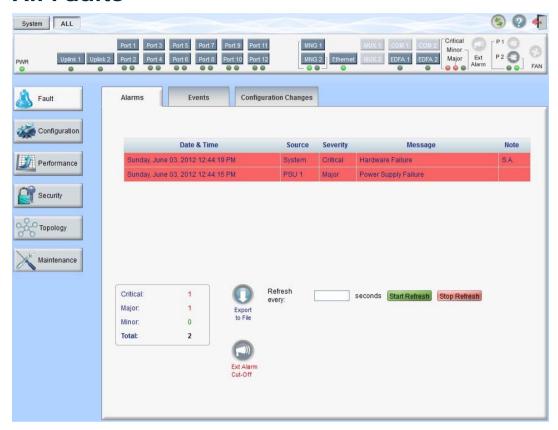
Figure 31: All Fault Window

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
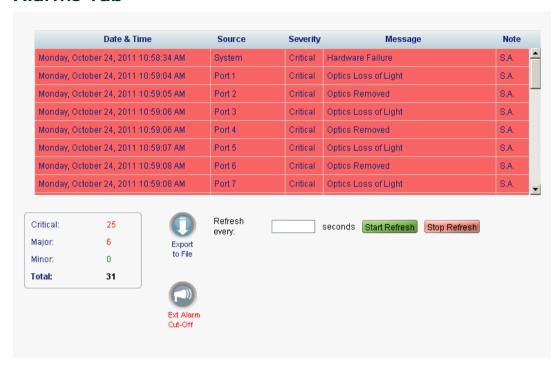
Figure 32: Alarms Tab

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 (p. 11).

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 12: 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
Monday, October 24, 2011 10:58:26 AM	System	Event	System Cold Start	
Monday, October 24, 2011 10:58:27 AM	Port 1	Event	Link Up	
Monday, October 24, 2011 10:58:27 AM	Port 2	Event	Link Up	
Monday, October 24, 2011 10:58:27 AM	Port 3	Event	Link Up	
Monday, October 24, 2011 10:58:27 AM	Port 4	Event	Link Up	
Monday, October 24, 2011 10:58:27 AM	Port 5	Event	Link Up	
Monday, October 24, 2011 10:58:27 AM	Port 6	Event	Link Up	
Monday, October 24, 2011 10:58:27 AM	Port 7	Event	Link Up	

Critical:	50
Major:	9
Minor:	0
Cleared:	28
Events:	42
Total:	**129**

Export to File

Refresh every: [   ] seconds   [Start Refresh] [Stop Refresh]

Figure 33: 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 13: 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
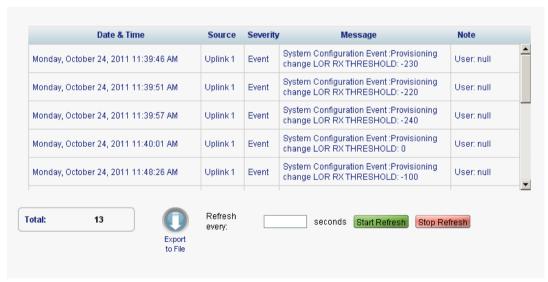
Figure 34: Configuration Changes Tab

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 14: 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 Uplink Faults
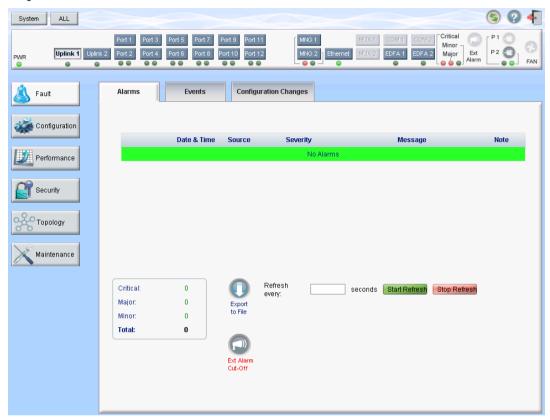
Figure 35: Uplink Port Fault Window

Use the Uplink 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 Uplink Port Fault window:

1. Click **Fault**.

2. Click an **Uplink** button to select the uplink port.

   The appropriate Uplink Port Fault window opens.

5.5.1 Alarms Tab
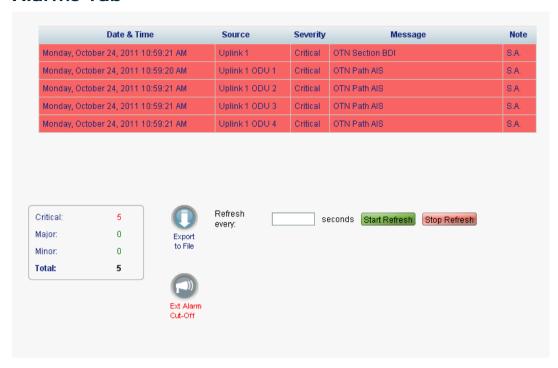
Figure 36: Alarms Tab

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 (p. 11).

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 15: 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 10:58:38 AM	Uplink 1	Event	Link Up	
Monday, October 24, 2011 10:59:01 AM	Uplink 1	Critical	OTN LOS	S.A.
Monday, October 24, 2011 10:59:03 AM	Uplink 1	Event	Link Down	
Monday, October 24, 2011 10:59:14 AM	Uplink 1	Major	Optics Low Transmission Power	S.A.
Monday, October 24, 2011 10:59:15 AM	Uplink 1	Major	Optics Low Reception Power	S.A.
Monday, October 24, 2011 10:59:15 AM	Uplink 1	Critical	XFP Reception CDR Not Locked	S.A.
Monday, October 24, 2011 10:59:16 AM	Uplink 1	Cleared	Optics Low Reception Power	
Monday, October 24, 2011 10:59:17 AM	Uplink 1	Cleared	XFP Reception CDR Not Locked	

Critical:	11
Major:	3
Minor:	0
Cleared:	9
Events:	2
Total:	**25**

Export to File

Refresh every: [_____] seconds [Start Refresh] [Stop Refresh]

Figure 37: 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 16: 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

Figure 38: 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 17: 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 LINK Port Faults
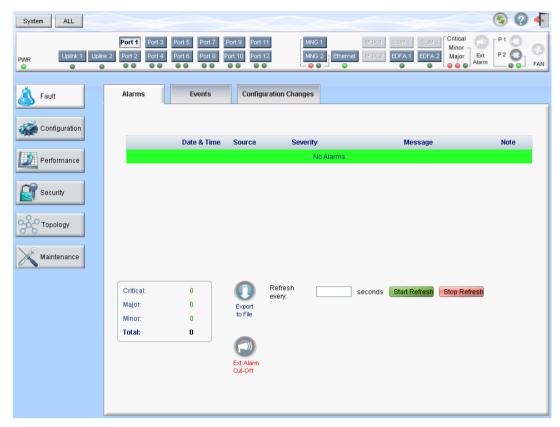
Figure 39: LINK Port Fault Window

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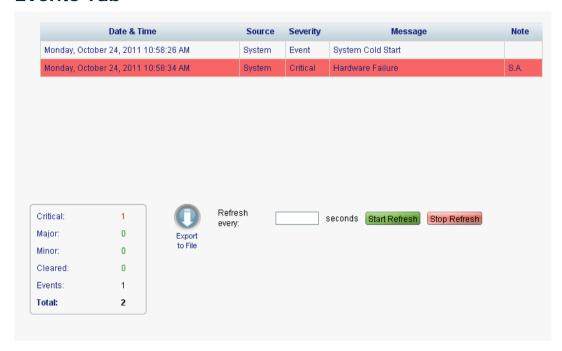
- **Event Log tab**: View the Event Log, export the log to a file, set the refresh rate, and stop the automatic refresh of the Fault display

- **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 LINK Port Fault window:

1. Click **Fault**.

2. Click a **Port** button to select the LINK port.

   The appropriate LINK Port Fault window opens.

5.6.1   Alarms Tab
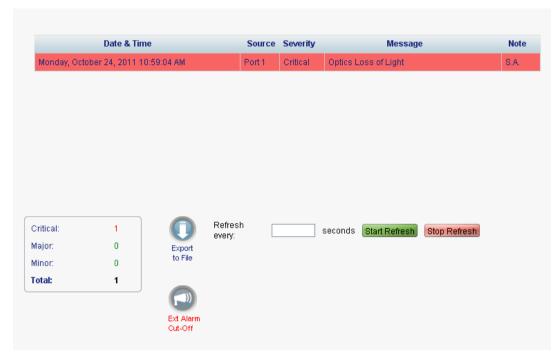
Figure 40: Alarms Tab

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 (p. 11).

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 18: 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

Figure 41: 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 19: 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

Figure 42: 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 20: 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 Management Port Faults

Figure 43: 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.

5.7.1   Alarms Tab

Figure 44: 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 (p. 11).

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 21: 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
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	

		Refresh every:	seconds	Start Refresh	Stop Refresh
Critical:	1				
Major:	0	Export to File			
Minor:	0				
Cleared:	1				
Events:	1				
Total:	**3**				

Figure 45: 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 22: 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

Figure 46: 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 23: 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 Ethernet Port Faults

Figure 47: 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.

5.8.1   Alarms Tab

Figure 48: 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 (p. 11).

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 24: 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
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**

Export to File   Refresh every: [   ] seconds   Start Refresh   Stop Refresh
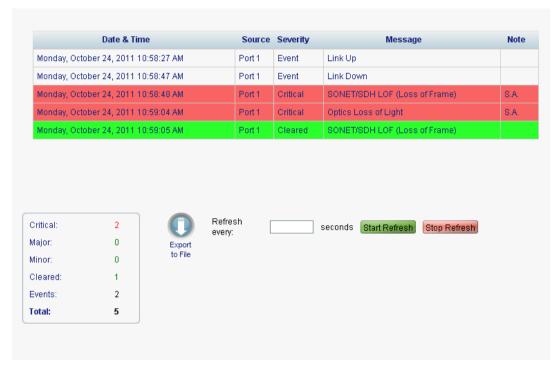
Figure 49: Events Tab

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 25: 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

Figure 50: 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 26: Configuration Changes Tab Parameters

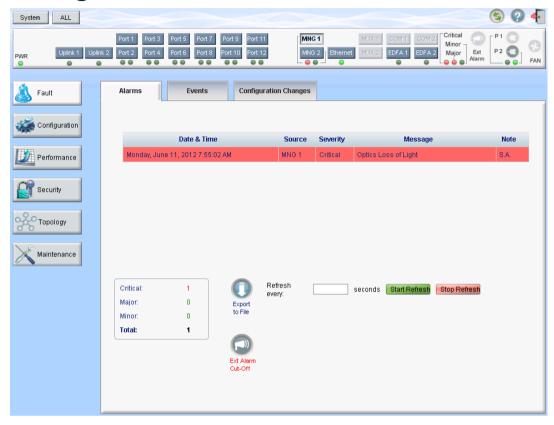| Parameter	Description	Format/Values
Date & Time	The date and time when the change was made.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the change.	
Severity	The severity of the change.	Critical, Major, Minor, Cleared, Event
Message	The type of change.	
Note	Information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

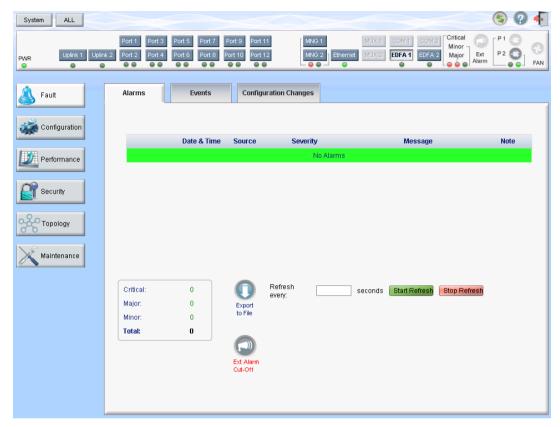
5.9   EDFA Faults

Figure 51: 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 Fault window opens.

5.9.1 Alarms Tab

Figure 52: 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 (p. 11).

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 27: Alarms Tab Parameters

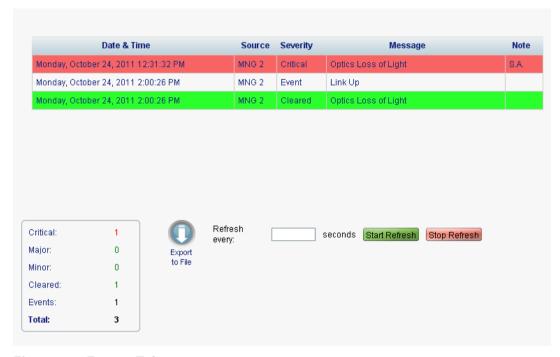| Parameter	Description	Format/Values
Date & Time	The date and time when the alarm was detected.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the alarm.	
Severity	The severity of the alarm.	Critical, Major, Minor
Message	The type of alarm.	
Note	Whether or not the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

5.9.2 Events Tab

Figure 53: 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 28: 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
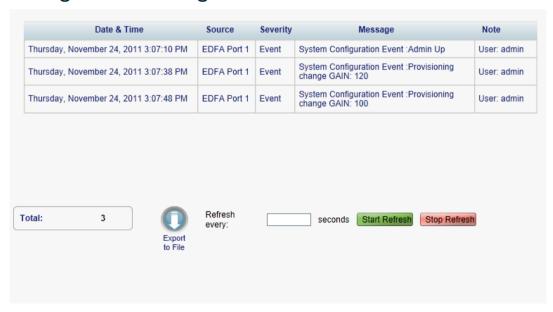
Figure 54: Configuration Changes Tab

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 29: 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.	

5.10 PSU Faults
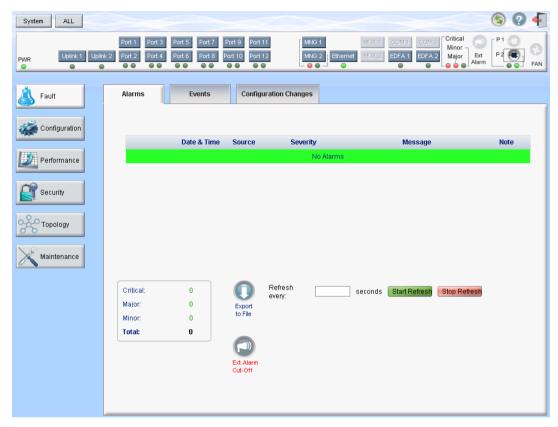
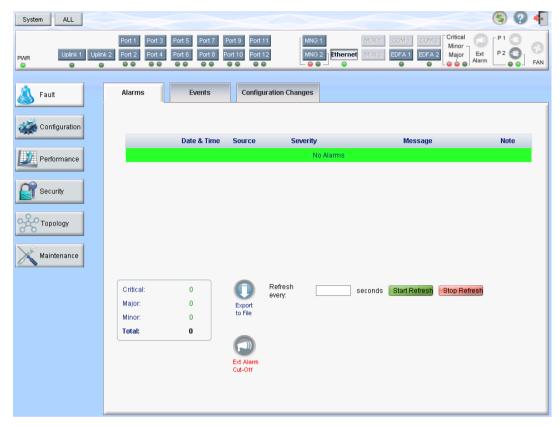**Figure 55: PSU Fault Window**

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.

5.10.1 Alarms Tab
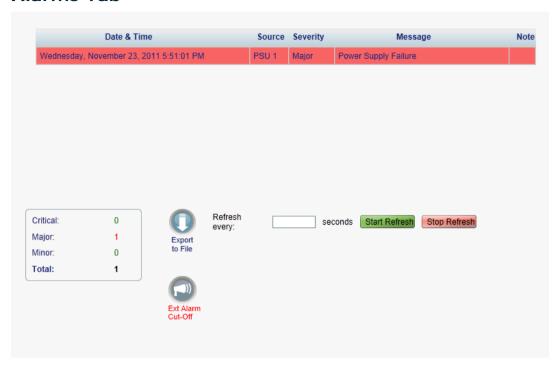
Figure 56: Alarms Tab

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 (p. 11).

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 30: Alarms Tab Parameters

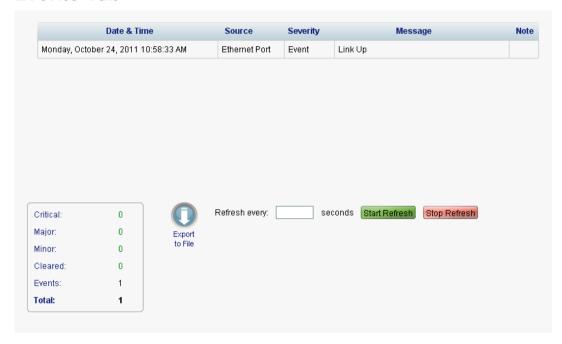| Parameter	Description	Format/Values
Date & Time	The date and time when the alarm was detected.	Day of the week, Month, Day, Year, HH:MM:SS, AM/PM
Source	The entity that caused the alarm.	
Severity	The severity of the alarm.	Critical, Major, Minor
Message	The type of alarm.	
Note	Whether or not the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

5.10.2 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

Export to File

Refresh every: [ ] seconds Start Refresh Stop Refresh
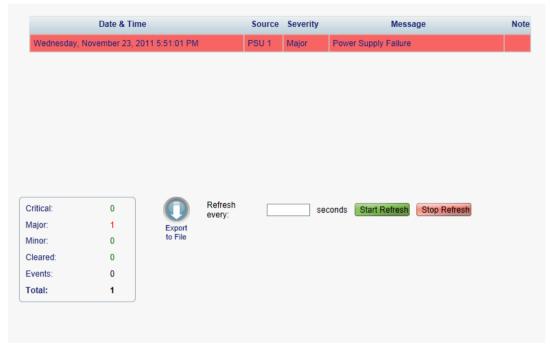
Figure 57: Events Tab

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 31: 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.

5.10.3 Configuration Changes Tab

Figure 58: 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 32: 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 PL-1000EM.

For initial configuration of the PL-1000EM 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 PL-1000EM:

- **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

- **Optical Ports**

  - Muxponder Uplink Ports (**Uplink 1 – Uplink 2**)

    - View port status

    - Configure port parameters

    - Enable or disable a port

    - View in-band management

    - Configure the XFP module, including dithering and wavelength tuning

    - Configure ALS parameters

- Configure OTN parameters

- Configure Automatic Protection Switching (APS) parameters

  ▪ Muxponder Service Ports (**Port 1 – Port 10**)

  - View port status

  - Configure port parameters

  - Enable or disable a port

  - View SFP information

  - Configure ALS parameters

  - Configure APS parameters

  ▪ Transponder Ports (**Port 11 – Port 12**)

  - View port status

  - Configure port parameters

  - Enable or disable a port

  - View SFP information

  - Configure ALS parameters

  ▪ MNG Ports (**MNG 1 – MNG 2**)

  - View port status

  - Configure port parameters

  - Enable or disable a port

  - View SFP information

  - Configure ALS parameters

- **EDFA Module**

  ▪ View module status

  ▪ Configure the EDFA mode and related properties

  ▪ Enable or disable a module

- **MUX/DEMUX Module**

  ▪ View channel wavelength configuration

- **Ethernet Port**

  ▪ View port parameters

  ▪ Configure the auto negotiation parameters

- **PSU Unit**

  ▪ View PSU parameters

- **FAN Unit**

▪ View FAN parameters

6.2 General Configuration Procedure

The following is the general procedure for viewing and configuring the PL-1000EM configuration. The specific procedures for each item are provided in the following sections.

To view and configure the PL-1000EM 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 <u>System Configuration</u> (p. <u>102</u>))

   ▪ **Optical Ports** (see Optical Ports Configuration)

      • **Uplink 1 – Uplink 2** (muxponder uplink ports) (see <u>Muxponder Uplink Port Configuration</u> (p. <u>117</u>))

      • **Port 1 – Port 10** (muxponder service ports) (see <u>Muxponder Service Port Configuration</u> (p. <u>127</u>))

      • **Port 11 – Port 12** (transponder ports) (see <u>Transponder Port Configuration</u> (p. <u>134</u>))

      • **MNG 1 – MNG 2** (management ports) (see Management Port Configuration)

   ▪ **EDFA** (if present) (see <u>EDFA Configuration</u> (p. <u>150</u>))

   ▪ **MUX** (if present) (see <u>MUX/DEMUX Configuration</u> (p. <u>148</u>))

   ▪ **Ethernet** (see <u>Ethernet Port Configuration</u> (p. <u>146</u>))

   ▪ **PSU** (see <u>PSU Configuration</u> (p. <u>153</u>))

   ▪ **FAN** (see <u>FAN Configuration</u> (p. <u>154</u>))

3. Fill in the fields as explained in the appropriate table. Note that some or all of the fields may be read only.

4. When all information is provided, click **Apply**.

6.3 System Configuration
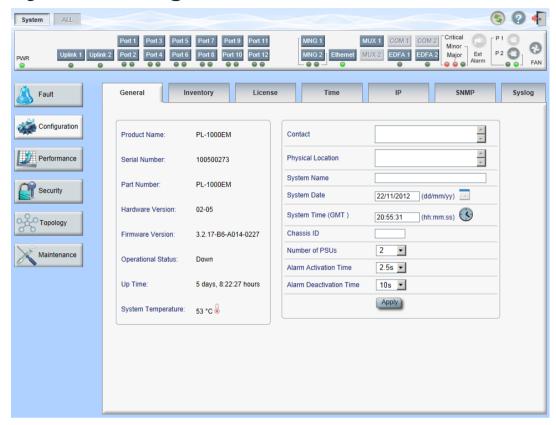
Figure 59: System Configuration Window

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 PL-1000EM

- **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
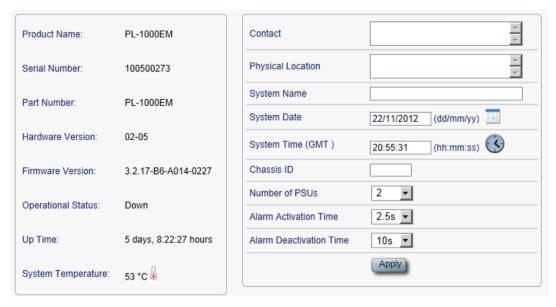
Figure 60: General Tab

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 33: General Tab

Parameter	Description	Format/Values
Product Name	The name of the product.	PL-1000EM
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)
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 PacketLight Technical Support.	Free text
Physical Location	The address of the site.	Free text

Parameter	Description	Format/Values
System Name	The logical name given to the PL-1000EM.	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. 219)).
Number of PSUs	The number of power supply units installed in the PL-1000EM.	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
PL-1000EM	Main Board	100500273	02-05	PL-1000EM	PacketLight Networks
PSU 2	AC Power Interface Card	111001039	0101	AS3371A00	
FAN Unit	Cooling Fan Unit		0100	FAN UNIT	
MUX Module 1	MUX DWDM-8				
EDFA Module 1	Amplifier Module		-		
EDFA Module 2	Amplifier Module		-		
MNG 1	Non-WDM 0 nm	0	NA	SFP-9F	RAD data comm.

Export
to File

Figure 61: 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 34: 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

Figure 62: License Tab

NOTE: The License tab is only applicable for products requiring a license and is not relevant for PL-1000EM.

6.3.4 Time Tab

Figure 63: Time Tab

Use the Time tab to configure the PL-1000EM to use the standard protocol SNTP to synchronize its calendar time with an external accurate time server.

The PL-1000EM 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 PL-1000EM 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. 108)).

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 35: 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
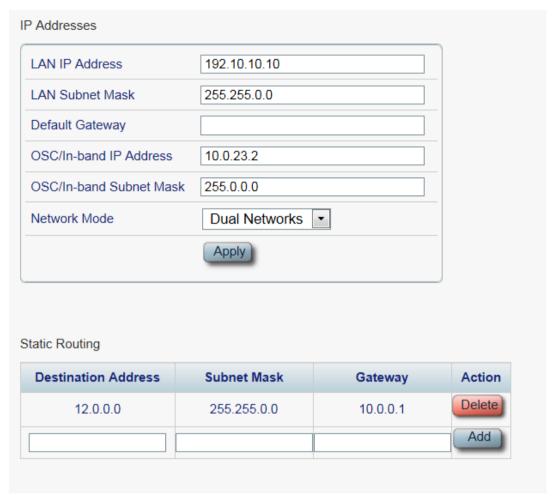
Figure 64: IP Tab - Dual Networks
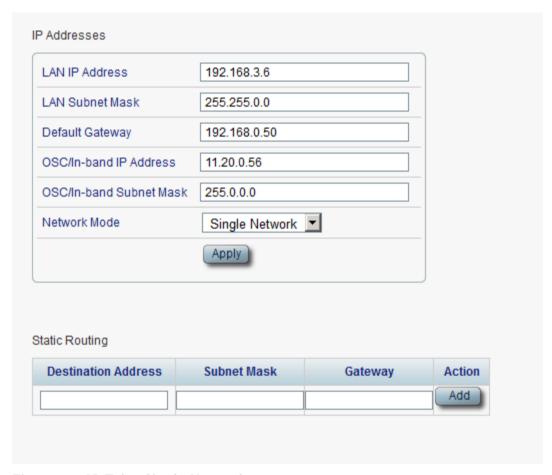
Figure 65: IP Tab - Single Network

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

The PL-1000EM node supports two network modes: **Dual Networks** and **Single Network**.

- **Dual Networks**: In this mode, the node has two IP addresses; one is the **LAN IP Address** that is used for the LAN port and the other is the **OSC/In-band Address** that is used for the MNG ports.

- **Single Network**: In this mode, the node has a single IP address (**LAN IP Address**) that is used for both the LAN port and the MNG ports.

NOTE:

- The **Single Network** mode is not provided for all hardware versions. For such versions, the **Network Mode** field is not available.

- Changing the network mode automatically restarts the PL-1000EM; the process may take a few minutes.

- 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. Click **Apply**.

   If you changed the network mode, the following confirmation message appears.
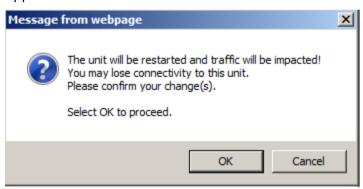
Figure 66: Confirm Changes

   Click **OK**.

4. 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**.

5. To remove a configured static route, click **Delete** in the corresponding line.

Table 36: 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`

Parameter	Description	Format/Values
OSC/In-band IP Address	The IP address of the OSC management channels.	Dot notation For example: `10.0.11.34` **NOTE:** ▪ This field is read only when **Network Mode** is set to **Single Network**. ▪ The same IP address applies to both MNG ports and for the in-band management channel.
OSC/In-band Subnet Mask	The subnet mask of the OSC.	Dot notation For example: `255.0.0.0` **NOTE:** This field is read only when **Network Mode** is set to **Single Network**.
Network Mode	The mode of the network.	Dual Networks, Single Network **NOTE:** This field appears only for certain hardware versions.
Static Routing		
Destination Address	The address of the destination.	IP address For example: `11.0.3.24`
Subnet Mask	The subnet mask of the destination route.	Dot notation For example: `255.255.255.0`
Gateway	The address of the gateway for this destination.	IP address For example: `192.168.0.150`

6.3.6 SNMP Tab

Figure 67: 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 PL-1000EM must have a specific IP route. Therefore, if needed, add the management system address to the **Static Routing** table (see IP Tab (p. 108)).

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 37: SNMP Tab Parameters

Parameter	Description	Format/Values
SNMP Configuration		
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

Parameter	Description	Format/Values
Community	The community string of the traps.	public (default)
Trap Port	The UDP port number.	162 (default)

6.3.7   Syslog Tab

Figure 68: 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 <u>Events</u> (p. <u>48</u>)).

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.
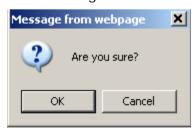
Figure 69: Confirm Configuration

    3. Click **OK**.

3. To remove a configured Syslog server:

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

   The following confirmation message appears.

Figure 70: Confirm Configuration

2. Click **OK**.

Table 38: 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 Optical Ports Configuration

The following table lists the available configuration parameters for the optical ports.

Table 39: Configuration: Optical Ports Configuration Parameters

Parameter	Muxponder Uplink Ports (Uplink 1-2)	Muxponder Service Ports (LINK 1–10)	Transponder Ports (LINK 11–12)	Management OSC Ports (MNG 1–2)
Port Type	√	√	√	√
Port Mate	√	√	√	√
View Service Type	√	√	√	√
Configure Service Type	-	-	√	-
Transponder Direction	-	-	√	-

Parameter	Muxponder Uplink Ports (Uplink 1-2)	Muxponder Service Ports (LINK 1–10)	Transponder Ports (LINK 11–12)	Management OSC Ports (MNG 1–2)
Connect Fiber Lambda	√ NOTE: Applicable only if a MUX/DEMUX module is installed.	-	√ NOTE: Applicable only if a MUX/DEMUX module is installed.	-
Auto Negotiation	-	-	√ NOTE: Applicable only if a copper (electrical) SFP is installed in the transponder port.	-
Service Rate	√	√	√	√
LOS Propagation	√	√	√	-
In-band Admin Status	√	-	-	-
In-band Operational Status	√	-	-	-
Port Alias	√	√	√	√
Admin Status	√	-	√	√
Operational Status	√	√	√	√
XFP Information	√	-	-	-
Wavelength Tuning	√ NOTE: Applicable only if an appropriate XFP is installed.	-	-	-
SFP Information	-	√	√	√
ALS Parameters	√	√	√	√
OTN Parameters	√ NOTE: Applicable only if an OTN XFP is installed.	-	-	
APS Parameters	√	√	-	-

6.4.1   Muxponder Uplink Port Configuration
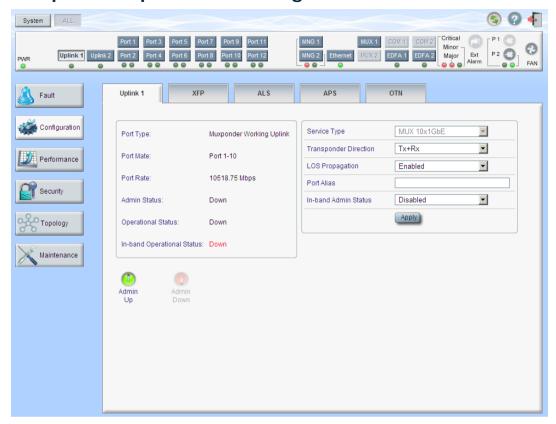
Figure 71: Muxponder Uplink Port Configuration Window

Use the Muxponder Uplink Port Configuration window to do the following:

- **Uplink tab**: Configure the muxponder uplink port parameters (see Muxponder Uplink Port Tab (p. 117))

- **XFP tab**: Configure the XFP module, including dithering and wavelength tuning (see XFP Tab (p. 120))

- **ALS tab**: Configure the ALS parameters (see ALS Tab (p. 122))

- **APS tab**: Configure the APS parameters (see APS Tab (p. 123))

- **OTN tab**: Configure the OTN parameters for an uplink port installed with OTN XFP (see OTN Tab (p. 125))

To open the Muxponder Uplink Port Configuration window:

1. Click **Configuration**.

2. Click an **Uplink** button to select the muxponder uplink port.

   The appropriate Muxponder Uplink Port Configuration window opens.

6.4.1.1 Muxponder Uplink Port Tab

Use the Muxponder Uplink Port tab to configure a muxponder uplink port and enable/disable the port.

To configure a muxponder uplink port:

1. Click the **Uplink** tab.

    The Muxponder Uplink tab opens displaying the muxponder uplink 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.
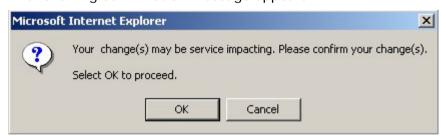
        Figure 72: Confirm Changes

    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.

Figure 73: Confirm Changes

2. Click **OK**.

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

Table 40: Muxponder Uplink Port Tab Parameters

Parameter	Description	Format/Values
Port Type	The type of port.	• **Uplink 1**: Muxponder Working Uplink • **Uplink 2**: Muxponder Protecting Uplink
Port Mate	The muxponder service ports.	Port 1-10
Service Type	The type of Interface.	MUX 10x1GbE
Connect Fiber Lambda #	The connection between the MUX/DEMUX module and the muxponder uplink port is done with LC connectors. To allow correct connectivity, the LC connectors are labeled with "CH1", "CH2" and "MNG".	• **λ1**: Should be connected to the CH1 port • **λ2:** Should be connected to the CH2 port • **OSC**: Should be connected to the MNG port **NOTE:** This field is displayed only if a MUX/DEMUX module is installed.
Service Rate	The bit rate of the native signal of the muxponder uplink.	**10518.75 Mbps**
LOS Propagation	Enable or disable LOS propagation.	Enabled, Disabled **NOTE:** ▪ Changing the **LOS Propagation** value of one muxponder port will automatically change the value of all other muxponder ports. ▪ The **LOS Propagation** value applies to both directions of the transponder. ▪ When **LOS Propagation** is enabled and a defect is detected on one of the muxponder service ports, the laser of the corresponding remote muxponder service port will be shut off. ▪ When **LOS Propagation** is enabled

Parameter	Description	Format/Values
		and a defect is detected on one of the muxponder uplink ports, the laser of the local muxponder service port will be shut off.
In-band Admin Status	The in-band administrative status of the uplink port.	Enabled, Disabled **NOTE:** ▪ Changing the **In-band Admin** value of one muxponder uplink port will automatically change the value of the other muxponder uplink port. ▪ When enabled, the in-band management channel is included in uplink port traffic.
In-band Operational Status	The status of the in-band management channel coming from the remote muxponder.	• **Down**: The link status of the in-band is **Down**. • **Up,Active**: The link status of the in-band is **Up** and the data is taken from the selected muxponder uplink. • **Up,Standby**: The link status of the in-band is **Up** and is the data is taken from the other muxponder uplink.
Port Alias	The logical name given to the port for identification purposes.	Free text
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**

6.4.1.2   XFP Tab

Figure 74: XFP Tab

Use the XFP tab to display information about the type and status of the optical transceiver inserted in the selected muxponder uplink port, and if supported by the XFP, enable or disable dithering, and select the wavelength tuning.

To configure the XFP module for a muxponder uplink port:

1. Click the **XFP** tab.

   The XFP tab opens displaying the XFP configuration.

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

3. (If applicable) To enable or disable dithering for the XFP module, select or clear the **Dithering Enable** check box.

4. (If applicable) To select the wavelength, from the **Wavelength Tuning** drop-down list, select a wavelength.

5. Click **Apply**.

Table 41: XFP Tab Parameters

Parameter	Description	Format/Values
Vendor Name	The name of the XFP vendor.	String
Nominal Wavelength	The defined wavelength of the XFP.	nm
Wavelength Tolerance	The wavelength tolerance of the XFP.	nm

Parameter	Description	Format/Values
Bit Rate Range	The range of bit rate supported by the XFP.	Gbps
Part Number	The part number of the XFP.	String
Serial Number	The serial number of the XFP.	String
Connector Type	The type of XFP connector.	LC
Transmitter Output Power	The measured output power of the XFP.	dBm
Receiver Input Power	The measured input power of the XFP.	dBm
Temperature	The measured temperature of the XFP.	Celsius
10GBE-LAN and 10GBE-WAN capabilities	The XFP capabilities of the 10GbE-LAN and 10GbE-WAN services are marked.	
10G FC capabilities	The XFP capabilities of the 10G FC services are marked.	
OC-192 and OTU-2 capabilities	The XFP capabilities of the OC-192 and OTU-2 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 the Low Receiver Power alarm.	dBm
Override Low Receiver Power Alarm Threshold	The configured threshold for the Low Receiver Power alarm.	dBm
Dithering Enable	Whether to enable or disable dithering for the XFP module.	• **Selected**: Enable dithering • **Cleared**: Disable dithering **NOTE:** This field is displayed only if the XFP module supports dithering as defined by the SFF-8477 standard.
Wavelength Tuning	Select the DWDM channel.	ITU grid channel number **NOTE:** This field is displayed only if the XFP module supports wavelength tuning as defined by the SFF-8477 standard.

6.4.1.3 ALS Tab
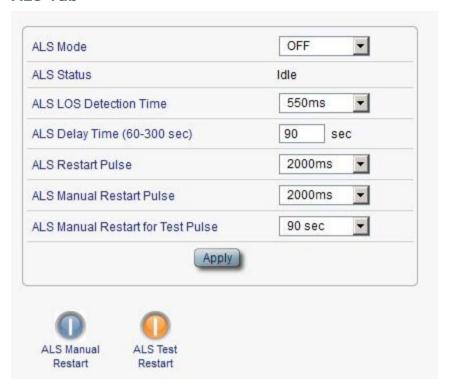
Figure 75: ALS Tab

Use the ALS tab to configure ALS for a muxponder uplink 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 PL-1000EM 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 for a muxponder uplink port:

1. Click the **ALS** tab.

   The ALS tab opens displaying the ALS configuration.

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 42: 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	The duration between two laser re-activations (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.

6.4.1.4 APS Tab
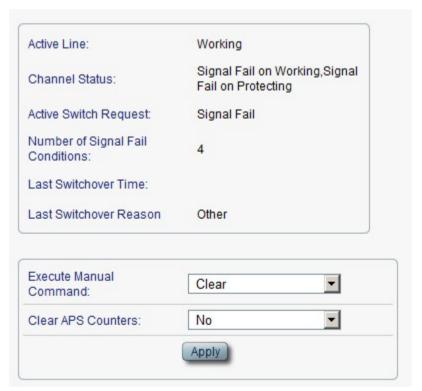
Figure 76: APS Tab

Use the APS tab to configure APS for a muxponder uplink port.

The PL-1000EM provides APS to ensure traffic continuity in case of a fiber break or a failure of muxponder uplink XFP.

The PL-1000EM supports unidirectional, non-revertive, 1+1 channel facility protection APS.

- **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 uplinks.

The APS can be used for both point-to-point (PTP) and ring topologies.

To support APS, the muxponder uses the two uplink ports:

- **Uplink 1**: Working port

- **Uplink 2**: Protection port

To configure APS for a muxponder uplink port:

1. Click the **APS** tab.

   The APS tab opens displaying the APS configuration.

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

3. Click **Apply**.

Table 43: 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 Protecting)
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
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

Parameter	Description	Format/Values
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

6.4.1.5   OTN Tab
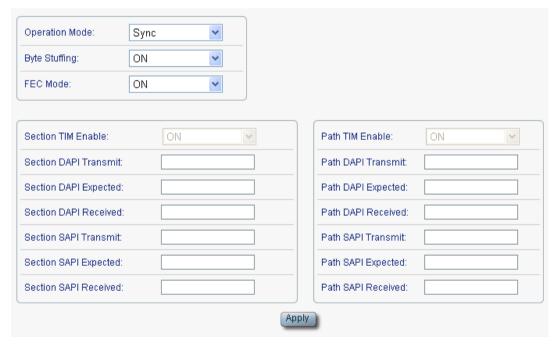
Figure 77: OTN Tab

Use the OTN tab to configure additional parameters that are specific to muxponder uplink ports with an OTN XFP installed.

To configure the OTN for a muxponder uplink port:

1. Click the **OTN** tab.

The OTN tab opens displaying the OTN configuration.

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

3. Click **Apply**.

Table 44: OTN Tab Parameters

Parameter	Description	Format/Values
Operation Mode	The operation mode of the transceiver.	• **Sync**: OTN G.709 Sync mapping with FEC • **Async**: OTN G.709 Async mapping with FEC • **Bypass**: OTN Bypass (Transparent Passthru) **NOTE:** Should be set to **Sync**.
Byte Stuffing	Enable or disable OTN byte stuffing.	• **ON**: Enable OTN Byte Stuffing (255/237) • **OFF**: Disable OTN Byte Stuffing (255/238) **NOTE:** Should always be always set to **ON**.
FEC Enable	Enable or disable FEC insertion and analysis.	• **ON (enable)**: ITU-T G.975.1 GFEC RS • **OFF (disable)**: No FEC is used; all zeros are stuffed **NOTE:** Should be set to **ON (enable)**.
Section TIM Enable	Whether or not an alarm should be given when the received trace messages and expected messages are not the same.	• **ON**: Gives an alarm when the received trace messages and expected trace messages are not the same. • **OFF**: Does not give an alarm when the received trace messages and expected trace messages are not the same. **NOTE:** This field is read only and is always set to **ON**.
Section DAPI Transmit	Transmitted OTN section destination access point identification (DAPI).	A string with up to 15 alphanumeric characters.
Section DAPI Expected	Expected OTN Section DAPI.	A string with up to 15 alphanumeric characters.
Section DAPI Received	Received OTN Section DAPI.	A read-only string with up to 15 alphanumeric characters.
Section SAPI Transmit	Transmitted OTN section source access point identification (SAPI).	A string with up to 15 alphanumeric characters.
Section SAPI Expected	Expected OTN Section SAPI.	A string with up to 15 alphanumeric characters.
Section SAPI Received	Received OTN Section SAPI.	A read-only string with up to 15 alphanumeric characters.

Parameter	Description	Format/Values
Path TIM Enable	Whether or not an alarm should be given when the received trace messages and expected messages are not the same.	• **ON**: Gives an alarm when the received trace messages and expected trace messages are not the same. • **OFF**: Does not give an alarm when the received trace messages and expected trace messages are not the same. **NOTE:** This field is read only and is always set to **ON**.
Path DAPI Transmit	Transmitted OTN Path DAPI.	A string with up to 15 alphanumeric characters.
Path DAPI Expected	Expected OTN Path DAPI.	A string with up to 15 alphanumeric characters.
Path DAPI Received	Received OTN Path DAPI.	A read-only string with up to 15 alphanumeric characters.
Path SAPI Transmit	Transmitted OTN Path SAPI.	A string with up to 15 alphanumeric characters.
Path SAPI Expected	Expected OTN Path SAPI.	A string with up to 15 alphanumeric characters.
Path SAPI Received	Received OTN Path SAPI.	A read-only string with up to 15 alphanumeric characters.

6.4.2 Muxponder Service Port Configuration

Figure 78: Muxponder Service Port Configuration Window

Use the Muxponder Service Port Configuration window to do the following:

- **Port tab**: Configure muxponder service port parameters (see Muxponder Service Port Tab (p. 128))

- **SFP tab:** Configure the SFP information (see SFP Tab (p. 131))

- **ALS tab**: Configure the ALS parameters (see ALS Tab (p. 132))

To open the Muxponder Service Port Configuration window:

1. Click **Configuration**.

2. Click a **Port** button (**Port 1 − Port 10**) to select the muxponder service port.

   The appropriate Muxponder Service Port Configuration window opens.

6.4.2.1 Muxponder Service Port Tab

Figure 79: Muxponder Service Port Tab

Use the Muxponder Service Port tab to configure a muxponder service port and enable/disable the port.

To configure a muxponder service port:

1. Click the **Port** tab.

   The Muxponder Service Port tab opens displaying the muxponder service 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.

Figure 80: 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.

Figure 81: Confirm Changes

2. Click **OK**.

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

Table 45: Muxponder Service Port Tab Parameters

Parameter	Description	Format/Values
Port Type	The type of port.	Muxponder Service
Port Mate	The uplink port(s) of the service port.	Port Uplink 1-2
Service Type	The type of Interface.	MUX 10x1GbE
Connect Fiber Lambda #	The connection between the MUX/DEMUX module and the muxponder uplink port is done with LC connectors. To allow correct connectivity, the LC connectors are labeled with "CH1", "CH2" and "MNG".	• **λ1**: Should be connected to the CH1 port • **λ2:** Should be connected to the CH2 port • **OSC**: Should be connected to the MNG port **NOTE:** This field is displayed only if a MUX/DEMUX module is installed.
Service Rate˙	The bit rate of the muxponder service.	1250 Mbps (GbE rate)

Parameter	Description	Format/Values
LOS Propagation	Enable or disable LOS propagation.	Enabled, Disabled **NOTE:** • Changing the **LOS Propagation** value of one muxponder port will automatically change the value of all other muxponder ports. • The **LOS Propagation** value applies to both directions of the transponder. • When **LOS Propagation** is enabled and a defect is detected on one of the muxponder service ports, the laser of the corresponding remote muxponder service port will be shut off. • When **LOS Propagation** is enabled and a defect is detected on one of the muxponder uplink ports, the laser of the local muxponder service port will be shut off.
Port Alias	The logical name given to the port for identification purposes.	Free text
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**

6.4.2.2   SFP Tab

Figure 82: SFP Information 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 for a muxponder service port:

1. Click the **SFP** tab.

    The SFP tab opens displaying the SFP configuration.

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

3. Click **Apply**.

Table 46: 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 the 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
Connector Type	The type of the SFP connector.	LC, Electrical RJ45

Parameter	Description	Format/Values
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 SFP capabilities of the ESCON services are marked.	
OC-3/OC-12/OC-48/OC-192 capabilities	The SFP capabilities of the OC-3, OC-12, OC-48, and OC-192 services are marked.	
100Mb/GBE/10GBE 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

6.4.2.3 ALS Tab
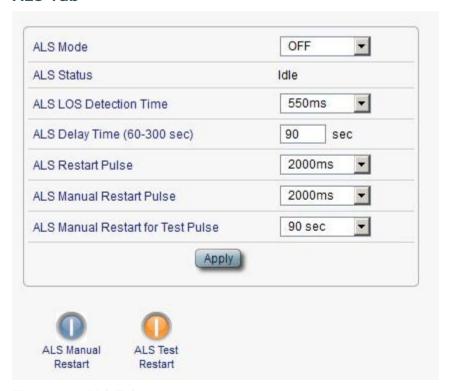
Figure 83: ALS Tab

Use the ALS tab to configure ALS for a muxponder service 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 PL-1000EM 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 for a muxponder service port:

1. Click the **ALS** tab.

   The ALS tab opens displaying the ALS configuration.

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 47: ALS Tab Parameters

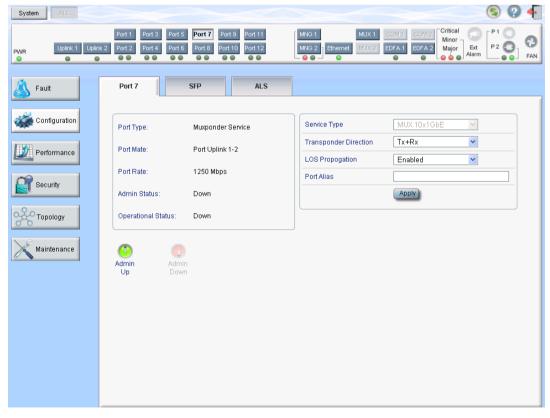| Parameter	Description	Format/Values
ALS Mode	Enable or disable ALS for this port.	OFF, ON Default: OFF
ALS Status	The current status of the ALS.	Idle, Active
ALS LOS Detection Time	The time to declare optical LOS present or clear (in milliseconds).	550 ± 50 ms Default: 550 ms
ALS Delay Time	The duration between two laser re-activations (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.

6.4.3   Transponder Port Configuration
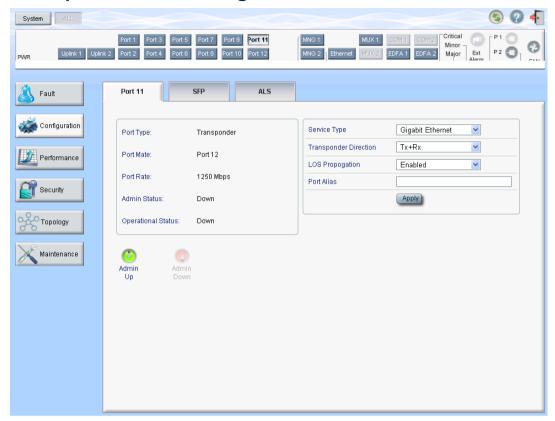
Figure 84: Transponder Port Configuration Window

Use the Transponder Port Configuration window to do the following:

- **Port tab**: Configure the transponder port parameters (see)

- **SFP tab:** View the SFP information (see)

- **ALS tab**: Configure the ALS parameters (see)

To open the Transponder Port Configuration window:

1. Click **Configuration**.

2. Click a **Port** button (**Port 11 – Port 12**) to select the transponder port.

   The appropriate Transponder Port Configuration window opens.

6.4.3.1   Transponder Port Tab
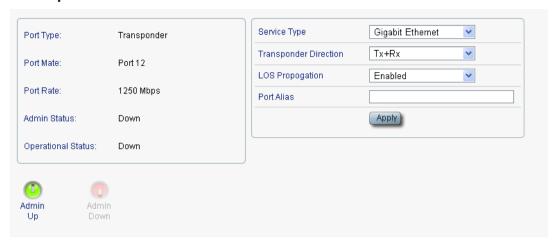
Figure 85: Transponder Port Tab

Use the Transponder Port tab to configure a transponder port and enable/disable the port.

To configure a transponder port:

1. Click the **Port** tab.

   The Transponder Port tab opens displaying the transponder 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.

Figure 86: 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.

Figure 87: Confirm Changes

2. Click **OK**.

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

Table 48: Transponder Port Tab Parameters

Parameter	Description	Format/Values
Port Type	The type of port.	Transponder
Port Mate	The uplink port(s) of the service port.	• **Port 11**: If the selected port is Port 12 • **Port 12**: If the selected port is Port 11
Service Type	The interface type.	• Gigabit Ethernet • Fast Ethernet • 10M Ethernet • 1G/2G/4G FC • 1G/2G/4G FICON • ESCON • OC-3/STM-1 • OC-12/STM-4 • OC-48/STM-16 • MUX 4x1 GbE Regen • Other (Bypass) **NOTE:** ▪ Before changing the service type, you should **Admin Down** the transponder ports. ▪ When the service type is configured for the first port in a pair, the system automatically assigns the same service type to the second port in the pair.
Transponder Direction	Used to determine the direction of the traffic for unidirectional services.	• **Tx+Rx**: Both ports are bidirectional • **Rx**: Service is Rx only; Uplink is Tx only • **Tx**: Service is Tx only; Uplink is Rx only

Parameter	Description	Format/Values
Connect Fiber Lambda #	The connection between the MUX/DEMUX module and the transponder uplink port is done with LC connectors. To allow correct connectivity, the LC connectors are labeled with "CH1", "CH2" and "MNG".	• **λ1**: Should be connected to the CH1 port • **λ2**: Should be connected to the CH2 port • **OSC**: Should be connected to the MNG port **NOTE:** This field is displayed only if a MUX/DEMUX module is installed.
Auto Negotiation	Enable or disable auto negotiation for copper (electrical) Ethernet services.	Enabled, Disabled Default: Enabled **NOTE:** ▪ This field is displayed only if electrical (copper) SFP is installed in the transponder port. ▪ **Disabled** is available only for 10M/100M service types ▪ For GbE service type, **Enabled** is the only available value.
Service Rate	The bit rate of the selected service.	The service bit rate
LOS Propagation	Enable or disable LOS propagation.	Enabled, Disabled **NOTE:** ▪ The **LOS Propagation** value applies to both directions of the transponder. ▪ When **LOS Propagation** is enabled and a defect is detected on one of the muxponder service ports, the laser of the corresponding remote muxponder service port will be shut off.
Port Alias	The logical name given to the port for identification purposes.	Free text
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**

6.4.3.2   SFP Tab

Figure 88: SFP Information 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 for a muxponder service port:

1. Click the **SFP** tab.

    The SFP tab opens displaying the SFP configuration.

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

3. Click **Apply**.

Table 49: 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 the 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 the SFP connector.	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 SFP capabilities of the ESCON services are marked.	
OC-3/OC-12/OC-48/OC-192 capabilities	The SFP capabilities of the OC-3, OC-12, OC-48, and OC-192 services are marked.	
100Mb/GBE/10GBE 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

6.4.3.3 ALS Tab

Figure 89: ALS Tab

Use the ALS tab to configure ALS for a transponder 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 PL-1000EM 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 for a transponder port:

1. Click the **ALS** tab.

   The ALS tab opens displaying the ALS configuration.

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 50: 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	The duration between two laser re-activations (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   Management Port Configuration
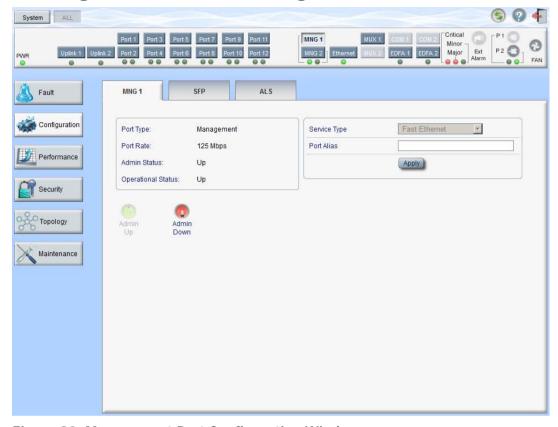
Figure 90: Management Port Configuration Window

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.

6.5.1 MNG Tab

Figure 91: 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.
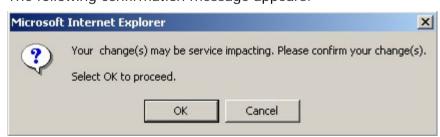
   Figure 92: Confirm Changes

   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.

Figure 93: Confirm Changes

2. Click **OK**.

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

Table 51: MNG 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

6.5.2   SFP Tab

Figure 94: SFP Information 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 configuration.

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

3. Click **Apply**.

Table 52: 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

6.5.3   ALS Tab

Figure 95: ALS Tab

Use the ALS tab to configure ALS for a management 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 PL-1000EM 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 for a management port:

1. Click the **ALS** tab.

   The ALS tab opens displaying the ALS configuration.

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 53: 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	The duration between two laser re-activations (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.

6.6 Ethernet Port Configuration

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.

6.6.1 Ethernet Tab

Figure 96: 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 54: 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**

Parameter	Description	Format/Values
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

6.7   MUX/DEMUX Configuration
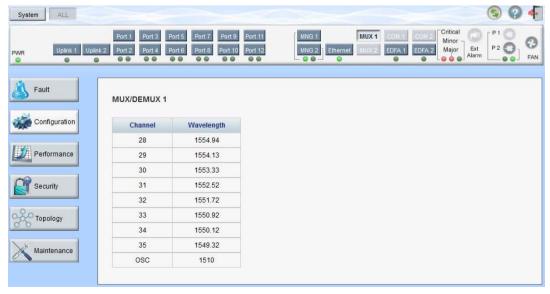
Figure 97: MUX/DEMUX Configuration Window

Use the MUX/DEMUX Module Configuration window to display the wavelengths of the MUX/DEMUX module channels.

To open the MUX/DEMUX Configuration window:

1. Click **Configuration**.

2. Click the **MUX** button to select the MUX/DEMUX module.

   The MUX/DEMUX Configuration window opens.

6.7.1   MUX/DEMUX Tab

MUX/DEMUX 1

Channel	Wavelength
28	1554.94
29	1554.13
30	1553.33
31	1552.52
OSC	1510

Figure 98: MUX/DEMUX Tab (DWDM)

Use the MUX/DEMUX tab to display the wavelengths of the MUX/DEMUX module channels so you can connect the LC connector to the correct WDM XFP; there are no configurable parameters.

The wavelengths of the XFPs are provided in the **XFP Information** window (see).

To view the MUX/DEMUX module:

• Click the **MUX** button to select the MUX/DEMUX module.

   The MUX/DEMUX tab opens displaying the MUX/DEMUX module configuration. The fields are read only and explained in the following table.

Table 55: MUX/DEMUX Tab Parameters

Parameter	Description	Format/Values
Channel	The ITU channel number supported by the MUX/DEMUX.	• **CWDM**: CWDM, OSC • **DWDM**: Channel number, OSC
Wavelength	The corresponding channel wavelength.	

6.8   EDFA Configuration

Figure 99: EDFA Configuration Window

NOTE: The **EDFA** button is enabled only if an EDFA module is 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 Configuration window opens.

6.8.1 EDFA Tab

Figure 100: 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.

Figure 101: 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.

Figure 102: Confirm Changes

2. Click **OK**.

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

Table 56: 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.
Port Alias	The logical name given to the module for identification purposes.	Free text

Parameter	Description	Format/Values
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

6.9 PSU Configuration

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

To open the PSU Configuration window:

1. Click **Configuration**.

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

   The appropriate PSU Configuration window opens.

6.9.1 PSU Tab

Figure 103: PSU Tab

Use the PSU 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 57: 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 power supply unit.	• **Up**: Normal operation • **Down**: Alarm is detected
Type	The type of power supply unit.	AC PSU, DC PSU
Hardware Revision	The hardware version of the power supply unit.	dddd

6.10   FAN Unit Configuration

Figure 104: FAN Unit Configuration Window

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

To open the FAN Unit Configuration window:

1. Click **Configuration**.

2. Click **FAN** [icon] button to select the FAN unit.

   The FAN Unit Configuration window opens.

6.10.1   FAN Unit Tab
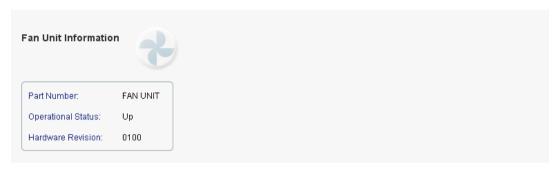
Figure 105: FAN Unit Tab

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

To view the FAN unit information:

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

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

Table 58: FAN Unit 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 Monitoring

This chapter describes the PL-1000EM system optical information and port performance monitoring.

In this Chapter

7.1 Optical Information
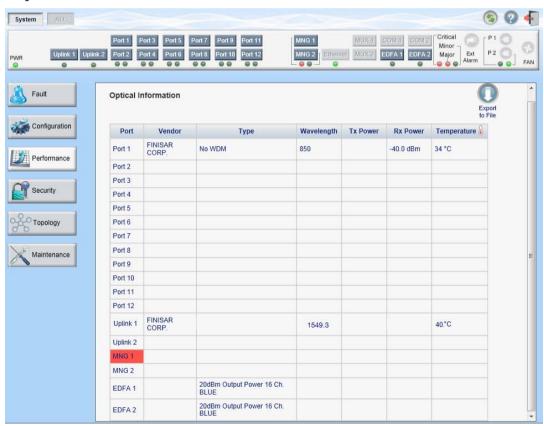
Figure 106: Optical Information Window

Use the Optical Information window to view optical performance 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

Figure 107: 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 59: 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.

7.2 Port Performance Monitoring

The PL-1000EM provides port performance monitoring for the following:

- **Uplink 1 - Uplink 2** (muxponder uplink ports):

  ▪ Native Signal PM based on coding violation errors.

  ▪ Optional OTN PM that is specific to muxponder uplink ports installed with OTN XFP:

    - **OTU Section:** PM counters are based on OTU Section BIP-8 errors.

    - **OTU Far Section:** PM counters are based on OTU Far Section BIP-8 errors.

    - **ODU Path:** PM counters are based on ODU Path BIP-8 errors.

    - **ODU Far Path:** PM counters are based on ODU Far Path BIP-8 errors.

    - **OTN FEC**: PM counters are based on FEC corrected errors.

- **Port 1 - Port 10** (muxponder service ports)

  ▪ Native Signal PM based on GbE 8B/10B coding violation errors

- **Port 11 - Port 12** (transponder ports)

  ▪ Native Signal PM according to the following services:

    - **GbE and 1G/2G/4G FC/FICON services**: PM is based on the 8B/10B coding violation errors.

    - **SDH and SONET (STM-1/OC-3, STM-4/OC-12, STM-16/OC-48) services**: PM is based on the B1 coding violation errors.

- Optical Level PM that is based on the measured Rx power:

  - Uplink 1 - Uplink 2 (muxponder uplink ports)

  - Port 1 - Port 10 (muxponder service ports)

  - Port 11 - Port 12 (transponder ports)

  - MNG 1 - MNG 2 (management ports)

  - EDFA 1 - EDFA 2 (if present)

7.3 Muxponder Uplink Port Performance Monitoring
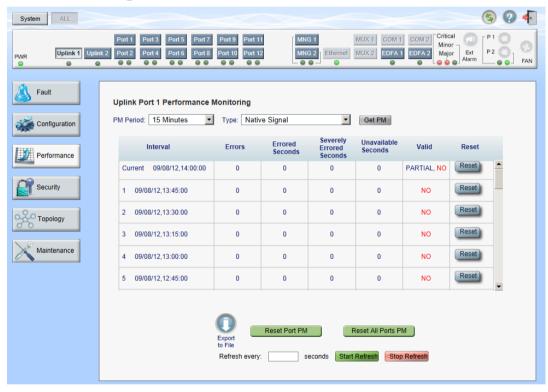
Figure 108: Muxponder Uplink Port Performance Monitoring Window

Use the Muxponder Uplink Port Performance Monitoring window to view muxponder uplink port performance monitoring.

To open the Muxponder Uplink Port Performance Monitoring window:

1. Click **Performance**.

2. Click an **Uplink** button to select the muxponder uplink port.

   The appropriate Muxponder Uplink Port Performance Monitoring window opens.

7.3.1 Viewing Native Signal Performance Monitoring
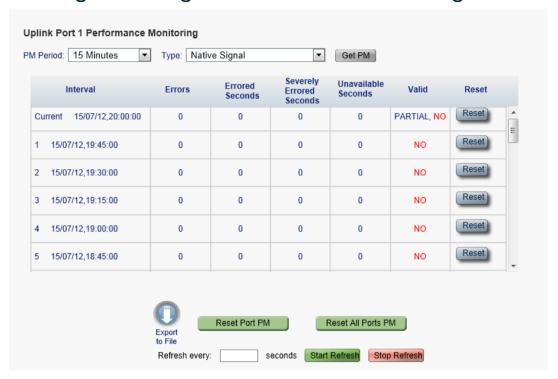
Figure 109: Native Signal Performance Monitoring

Use the Muxponder Uplink Port Performance Monitoring tab to view muxponder uplink port native signal performance monitoring.

To view native signal performance monitoring:

1. Click an **Uplink** button.

   The appropriate Muxponder Uplink Port Performance Monitoring tab opens displaying the muxponder uplink port performance monitoring. The fields are explained in the following table. The counters are read only.

2. From the **PM Period** drop-down list, select the interval.

3. From the **Type** drop-down list, select **Native Signal**.

4. Click **Get PM**.

   The performance monitoring counters are updated.

5. To export the PM information to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

6. To set the refresh rate of the PM 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.

7. To refresh the PM display manually, click **Refresh** .

   The information is updated immediately.

8. To stop the automatic refresh of the PM display, click **Stop Refresh**.

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

9. To clear the PM counters for a specific PM interval, in the table, at the end of the interval row, click **Reset**.

10. To clear PM counters for a specific port, click **Reset Port PM**.

11. To clear PM counters for all ports, click **Reset All Ports PM**.

Table 60: Muxponder Uplink Port Native Signal PM Parameters

Parameter	Description	Format/Values
PM Period	The interval for accumulating and displaying the performance monitoring counters.	15 Minutes, Days
Type	The type of performance monitoring.	Native Signal

Parameter	Description	Format/Values
Interval	The date and time of the interval.	**PM Period** is set to **15 Minutes**: • **Current**: Performance monitoring counters accumulated during the current interval of 15 minutes are displayed in the first row. • **1 to 32**: Performance monitoring counters accumulated during the last 32 intervals of 15 minutes are displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: Performance monitoring counters accumulated since last reset of the system or since the last reset of the performance monitoring counters are displayed in the first row of the table. • **Current Day**: Performance monitoring counters accumulated since 00:00 AM of the current day are displayed in the second row of the table. • **Previous Day**: Performance monitoring counters accumulated during the 24 hours since 00:00 AM of the previous day are displayed in the last row of the table.
Errors	The number of coding violation errors.	The number of coding violation errors detected during the performance monitoring interval.
Errored Seconds (ES)	The number of seconds in which at least one coding error was detected.	Number of seconds
Severely Errored Seconds (SES)	The number of seconds in which the number of errors crossed the threshold.	Number of seconds **NOTE:** The counter stops when one of the following occurs: ▪ The number of errors detected during the last second is below the threshold. ▪ The **Unavailable Seconds** counter is incremented.
Unavailable Seconds (UAS)	The number of unavailable seconds.	The count of **Unavailable Seconds** is incremented if the number of errors crossed the **Severely Errored Seconds** threshold at any time during the last 10 consecutive seconds.

Parameter	Description	Format/Values
Valid	Whether or not the performance monitoring interval has been completed, and whether or not the information is accurate.	• **Partial**: The measured interval has not been completed. • **Yes**: The performance monitoring interval has been completed. • **No**: The interval has been completed, but the performance monitoring information may not be accurate. **NOTE:** The performance monitoring information may be inaccurate due to one of the following reasons: ▪ The performance monitoring counters of the interval were reset. ▪ The node was reset during the interval. ▪ The port was set to **Admin Down** during the interval. ▪ The calendar time of the node was changed during the interval.

7.3.2 Viewing OTU and ODU Performance Monitoring

Figure 110: OTU and ODU Performance Monitoring

Use the Muxponder Uplink Port Performance Monitoring tab to view muxponder uplink port OTU and ODU performance monitoring.

NOTE: OTU and ODU performance monitoring applies only to Uplink Ports 1 and 2 with optional OTN XFP installed.

To view OTU and ODU performance monitoring:

1. Click an **Uplink** button.

   The appropriate Muxponder Uplink Port Performance Monitoring tab opens displaying the muxponder uplink port performance monitoring. The fields are explained in the following table. The counters are read only.

2. From the **PM Period** drop-down list, select the interval.

3. From the **Type** drop-down list, select **OTU Section**, **OTU Far Section**, **ODU Path**, or **ODU Far Path**.

4. Click **Get PM**.

   The performance monitoring counters are updated.

5. To export the PM information to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

2. Click **Save File**.

3. Click **OK**.

6. To set the refresh rate of the PM 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.

7. To refresh the PM display manually, click **Refresh** .

   The information is updated immediately.

8. To stop the automatic refresh of the PM display, click **Stop Refresh**.

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

9. To clear the PM counters for a specific PM interval, in the table, at the end of the interval row, click **Reset**.

10. To clear PM counters for a specific port, click **Reset Port PM**.

11. To clear PM counters for all ports, click **Reset All Ports PM**.

Table 61: Muxponder Uplink Port OTU and ODU PM Parameters

Parameter	Description	Format/Values
PM Period	The interval for accumulating and displaying the performance monitoring counters.	15 Minutes, Days
Type	The type of performance monitoring.	• OTU Section • OTU Far Section • ODU Path • ODU Far Path

Parameter	Description	Format/Values
Interval	The date and time of the interval.	**PM Period** is set to **15 Minutes**: • **Current**: Performance monitoring counters accumulated during the current interval of 15 minutes are displayed in the first row. • **1 to 32**: Performance monitoring counters accumulated during the last 32 intervals of 15 minutes are displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: Performance monitoring counters accumulated since last reset of the system or since the last reset of the performance monitoring counters are displayed in the first row of the table. • **Current Day**: Performance monitoring counters accumulated since 00:00 AM of the current day are displayed in the second row of the table. • **Previous Day**: Performance monitoring counters accumulated during the 24 hours since 00:00 AM of the previous day are displayed in the last row of the table.
Errors	The number of Background Block Errors (BBE)	The number of errors detected during the performance monitoring interval.
Errored Seconds (ES)	The number of seconds in which at least one coding error was detected.	Number of seconds
Severely Errored Seconds (SES)	The number of seconds in which the number of errors crossed the threshold.	Number of seconds **NOTE:** The counter stops when one of the following occurs: ▪ The number of errors detected during the last second is below the threshold. ▪ The **Unavailable Seconds** counter is incremented.
Unavailable Seconds (UAS)	The number of unavailable seconds.	The count of **Unavailable Seconds** is incremented if the number of errors crossed the **Severely Errored Seconds** threshold at any time during the last 10 consecutive seconds.

Parameter	Description	Format/Values
Valid	Whether or not the performance monitoring interval has been completed, and whether or not the information is accurate.	• **Partial**: The measured interval has not been completed. • **Yes**: The performance monitoring interval has been completed. • **No**: The interval has been completed, but the performance monitoring information may not be accurate. **NOTE:** The performance monitoring information may be inaccurate due to one of the following reasons: ▪ The performance monitoring counters of the interval were reset. ▪ The node was reset during the interval. ▪ The port was set to **Admin Down** during the interval. ▪ The calendar time of the node was changed during the interval.

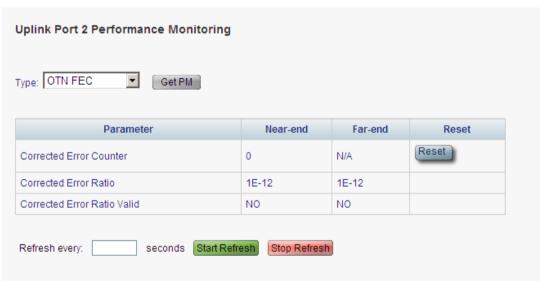## 7.3.3 Viewing OTN FEC Performance Monitoring

Figure 111: OTN FEC Performance Monitoring

Use the Muxponder Uplink Port Performance Monitoring tab to view muxponder uplink port OTN FEC performance monitoring.

NOTE: OTN FEC performance monitoring applies only to Uplink Ports 1 and 2 with optional OTN XFP installed.

To view the OTN FEC performance monitoring:

1. Click an **Uplink** button.

   The appropriate Muxponder Uplink Port Performance Monitoring tab opens displaying the muxponder uplink port performance monitoring. The fields are explained in the following table. The counters are read only.

2. From the **Type** drop-down list, select **OTN FEC**.

3. Click **Get PM**.

   The performance monitoring counters are updated.

4. To set the refresh rate of the PM 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.

5. To refresh the PM display manually, click **Refresh** ![refresh icon].

   The information is updated immediately.

6. To stop the automatic refresh of the PM display, click **Stop Refresh**.

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

7. To clear the PM counters for a specific PM interval, in the table, at the end of the interval row, click **Reset**.

Table 62: Muxponder Uplink Port OTN FEC PM Parameters

Parameter	Description	Format/Values
Type	The type of performance monitoring.	OTN FEC
Corrected Error Counter	The number of FEC corrected errors.	Integer
Corrected Error Ratio	FEC Corrected Error Ratio for near-end and far-end. Updated every second based on a 20 second window.	Listed as BER. For example, 6x10B7. **NOTE:** The ratio is updated every seconds based on a 20 second window.
Corrected Error Ratio Valid	Whether or not the measured FEC Corrected Error Ratio near-end or far-end is reliable.	YES, NO

7.3.4 Viewing Optical Level Performance Monitoring
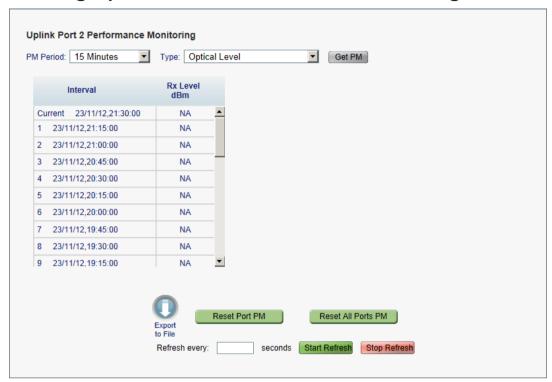
Figure 112: Optical Level Performance Monitoring

Use the Muxponder Uplink Port Performance Monitoring tab to view muxponder uplink port optical level performance monitoring.

To view optical level performance monitoring:

1. Click an **Uplink** button.

   The appropriate Muxponder Uplink Port Performance Monitoring tab opens displaying the muxponder uplink port performance monitoring. The fields are explained in the following table. The counters are read only.

2. From the **PM Period** drop-down list, select the interval.

3. From the **Type** drop-down list, select **Optical Level**.

4. Click **Get PM**.

   The optical level counters are updated.

5. To export the optical level information to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

6. To set the refresh rate of the PM 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.

7. To refresh the PM display manually, click **Refresh** .

   The information is updated immediately.

8. To stop the automatic refresh of the PM display, click **Stop Refresh**.

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

9. To clear the optical level counters for a specific port, click **Reset Port PM**.

10. To clear the optical level counters for all ports, click **Reset All Ports PM**.

Table 63: Muxponder Uplink Port Optical Level PM Parameters

Parameter	Description	Format/Values
PM Period	The interval for averaging the measured Rx power.	15 Minutes, Days
Type	The type of performance monitoring.	Optical Level
Interval	The date and time of the interval.	**PM Period** is set to **15 Minutes**: • **Current**: The date and time of the current interval of 15 minutes is displayed in the first row. • **1 to 32**: The date and time of the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: The date and time of the last reset of the system or last reset of the optical level counters is displayed in the first row of the table. • **Current Day**: The date and 00:00 AM of the current day is displayed in the second row of the table. • **Previous Day**: The date and 00:00 AM of the previous day is displayed in the last row of the table.

Parameter	Description	Format/Values
Rx Level dBm	The measured Rx power level during the interval (in dBm).	**PM Period** is set to **15 Minutes**: • **Current**: The measured Rx power for the current interval of 15 minutes is displayed in the first row. • **1 to 32**: The measured Rx power for the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: The average of the measured Rx power since last reset of the system or since the last reset of the optical level counters is displayed in the first row of the table. • **Current Day**: The average of the measured Rx power since 00:00 AM of the current day is displayed in the second row of the table. • **Previous Day**: The average of the measured Rx power during the 24 hours since 00:00 AM of the previous day is displayed in the last row of the table.

7.4 Muxponder Service Port Performance Monitoring
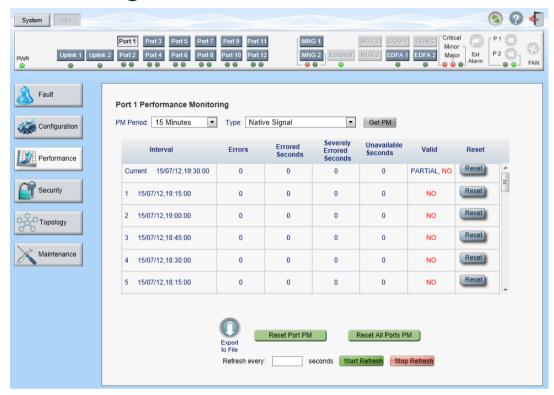
Figure 113: Muxponder Service Port Performance Monitoring Window

Use the Muxponder Service Port Performance Monitoring window to view muxponder service port performance monitoring.

To open the Muxponder Service Port Performance Monitoring window:

1. Click **Performance**.

2. Click a **Port** button (**Port 1 – Port 10**) to select the muxponder service port.

   The appropriate Muxponder Service Port Performance Monitoring window opens.

7.4.1 Viewing Native Signal Port Performance Monitoring
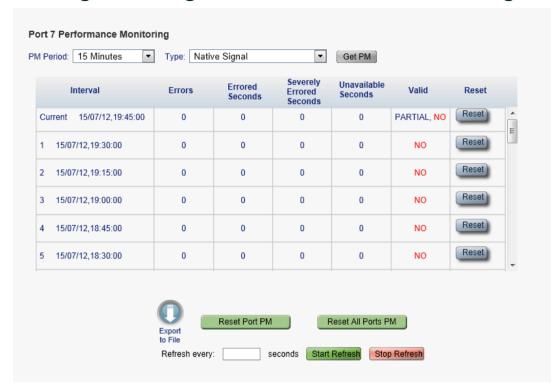
Figure 114: Native Signal Performance Monitoring

Use the Muxponder Service Port Performance Monitoring tab to view muxponder service port native signal performance monitoring.

To view native signal performance monitoring:

1. Click a **Port** button.

   The appropriate Muxponder Service Port Performance Monitoring tab opens displaying the muxponder service port performance monitoring. The fields are explained in the following table. The counters are read only.

2. From the **PM Period** drop-down list, select the interval.

3. From the **Type** drop-down list, select **Native Signal**.

4. Click **Get PM**.

   The performance monitoring counters are updated.

5. To export the PM information to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

6. To set the refresh rate of the PM 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.

7. To refresh the PM display manually, click **Refresh** .

   The information is updated immediately.

8. To stop the automatic refresh of the PM display, click **Stop Refresh**.

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

9. To clear the PM counters for a specific PM interval, in the table, at the end of the interval row, click **Reset**.

10. To clear PM counters for a specific port, click **Reset Port PM**.

11. To clear PM counters for all ports, click **Reset All Ports PM**.

Table 64: Muxponder Service Port Native Signal PM Parameters

Parameter	Description	Format/Values
PM Period	The interval for accumulating and displaying the performance monitoring counters.	15 Minutes, Days
Type	The type of performance monitoring.	Native Signal

Parameter	Description	Format/Values
Interval	The date and time of the interval.	**PM Period** is set to **15 Minutes**: • **Current**: Performance monitoring counters accumulated during the current interval of 15 minutes are displayed in the first row. • **1 to 32**: Performance monitoring counters accumulated during the last 32 intervals of 15 minutes are displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: Performance monitoring counters accumulated since last reset of the system or since the last reset of the performance monitoring counters are displayed in the first row of the table. • **Current Day**: Performance monitoring counters accumulated since 00:00 AM of the current day are displayed in the second row of the table. • **Previous Day**: Performance monitoring counters accumulated during the 24 hours since 00:00 AM of the previous day are displayed in the last row of the table.
Errors	The number of coding violation errors.	The number of coding violation errors detected during the performance monitoring interval.
Errored Seconds (ES)	The number of seconds in which at least one coding error was detected.	Number of seconds
Severely Errored Seconds (SES)	The number of seconds in which the number of errors crossed the threshold.	Number of seconds **NOTE:** The counter stops when one of the following occurs: ▪ The number of errors detected during the last second is below the threshold. ▪ The **Unavailable Seconds** counter is incremented.

Parameter	Description	Format/Values
Unavailable Seconds (UAS)	The number of unavailable seconds.	The count of **Unavailable Seconds** is incremented if the number of errors crossed the **Severely Errored Seconds** threshold at any time during the last 10 consecutive seconds.
Valid	Whether or not the performance monitoring interval has been completed, and whether or not the information is accurate.	• **Partial**: The measured interval has not been completed. • **Yes**: The performance monitoring interval has been completed. • **No**: The interval has been completed, but the performance monitoring information may not be accurate. **NOTE:** The performance monitoring information may be inaccurate due to one of the following reasons: ▪ The performance monitoring counters of the interval were reset. ▪ The node was reset during the interval. ▪ The port was set to **Admin Down** during the interval. ▪ The calendar time of the node was changed during the interval.

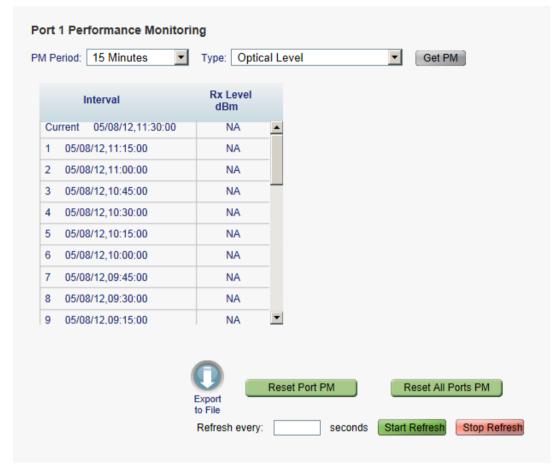## 7.4.2   Viewing Optical Level Performance Monitoring

Figure 115: Optical Level Performance Monitoring

Use the Muxponder Service Port Performance Monitoring tab to view muxponder service port optical level performance monitoring.

To view optical level performance monitoring:

1. Click a **Port** button.

    The appropriate Muxponder Service Port Performance Monitoring tab opens displaying the displaying the muxponder service port performance monitoring. The fields are explained in the following table. The counters are read only.

2. From the **PM Period** drop-down list, select the interval.

3. From the **Type** drop-down list, select **Optical Level**.

4. Click **Get PM**.

    The optical level counters are updated.

5. To export the optical level information to a file:

    1. Click **Export to File**   .

        The Opening table.csv dialog box appears.

2. Click **Save File**.

3. Click **OK**.

6. To set the refresh rate of the PM 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.

7. To refresh the PM display manually, click **Refresh** .

The information is updated immediately.

8. To stop the automatic refresh of the PM display, click **Stop Refresh**.

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

9. To clear the optical level counters for a specific port, click **Reset Port PM**.

10. To clear the optical level counters for all ports, click **Reset All Ports PM**.

Table 65: Muxponder Service Port Optical Level PM Parameters

Parameter	Description	Format/Values
PM Period	The interval for averaging the measured Rx power.	15 Minutes, Days
Type	The type of performance monitoring.	Optical Level
Interval	The date and time of the interval.	**PM Period** is set to **15 Minutes**: • **Current**: The date and time of the current interval of 15 minutes is displayed in the first row. • **1 to 32**: The date and time of the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: The date and time of the last reset of the system or last reset of the optical level counters is displayed in the first row of the table. • **Current Day**: The date and 00:00 AM of the current day is displayed in the second row of the table. • **Previous Day**: The date and 00:00 AM of the previous day is displayed in the last row of the table.

Parameter	Description	Format/Values
Rx Level dBm	The measured Rx power level during the interval (in dBm).	**PM Period** is set to **15 Minutes**: • **Current**: The measured Rx power for the current interval of 15 minutes is displayed in the first row. • **1 to 32**: The measured Rx power for the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: The average of the measured Rx power since last reset of the system or since the last reset of the optical level counters is displayed in the first row of the table. • **Current Day**: The average of the measured Rx power since 00:00 AM of the current day is displayed in the second row of the table. • **Previous Day**: The average of the measured Rx power during the 24 hours since 00:00 AM of the previous day is displayed in the last row of the table.

7.5   Transponder Port Performance Monitoring

Figure 116: Transponder Port Performance Monitoring Window

Use the Transponder Port Performance Monitoring window to view transponder performance monitoring.

To open the Transponder Port Performance Monitoring window:

1. Click **Performance**.

2. Click a **Port** button (**Port 11 – Port 12**) to select the transponder port.

   The appropriate Transponder Port Performance Monitoring window opens.

7.5.1 Viewing Native Signal Performance Monitoring

Figure 117: Native Signal Performance Monitoring

Use the Transponder Port Performance Monitoring tab to view transponder port native signal performance monitoring.

- PM counters are displayed in 15 minute and one day intervals. In addition, you may specify the time period to refresh the displayed PM information. PM is available for the following services:

  - **GbE, 1G/2G/4G FC and 1G/2G/4G FICON**: PM is based on the 8B/10B coding violation errors. In this mode, the PM counters are displayed in 15 minute and one day intervals.

  - **OC-3/STM-1, OC-12/STM-4, and OC-48/STM-16**: PM is based on the B1 coding violation errors. In this mode, the PM counters are displayed in 15 minute and one day intervals.

To view native signal performance monitoring:

1. Click a **Port** button.

The appropriate Transponder Port Performance Monitoring tab opens displaying the transponder port performance monitoring. The fields are explained in the following table. The counters are read only.

2. From the **PM Period** drop-down list, select the interval.

3. From the **Type** drop-down list, select **Native Signal**.

4. Click **Get PM**.

The performance monitoring counters are updated.

5. To export the PM information to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

6. To set the refresh rate of the PM 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.

7. To refresh the PM display manually, click **Refresh** .

The information is updated immediately.

8. To stop the automatic refresh of the PM display, click **Stop Refresh**.

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

9. To clear the PM counters for a specific PM interval, in the table, at the end of the interval row, click **Reset**.

10. To clear PM counters for a specific port, click **Reset Port PM**.

11. To clear PM counters for all ports, click **Reset All Ports PM**.

Table 66: Transponder Port Native Signal PM Parameters

Parameter	Description	Format/Values
PM Period	The interval for accumulating and displaying the performance monitoring counters.	15 Minutes, Days
Type	The type of performance monitoring.	Native Signal

Parameter	Description	Format/Values
Interval	The date and time of the interval.	**PM Period** is set to **15 Minutes**: • **Current**: Performance monitoring counters accumulated during the current interval of 15 minutes are displayed in the first row. • **1 to 32**: Performance monitoring counters accumulated during the last 32 intervals of 15 minutes are displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: Performance monitoring counters accumulated since last reset of the system or since the last reset of the performance monitoring counters are displayed in the first row of the table. • **Current Day**: Performance monitoring counters accumulated since 00:00 AM of the current day are displayed in the second row of the table. • **Previous Day**: Performance monitoring counters accumulated during the 24 hours since 00:00 AM of the previous day are displayed in the last row of the table.
Errors	The number of coding violation errors.	The number of coding violation errors detected during the performance monitoring interval.
Errored Seconds (ES)	The number of seconds in which at least one coding error was detected.	Number of seconds
Severely Errored Seconds (SES)	The number of seconds in which the number of errors crossed the threshold.	Number of seconds **NOTE:** The counter stops when one of the following occurs: ▪ The number of errors detected during the last second is below the threshold. ▪ The **Unavailable Seconds** counter is incremented.
Unavailable Seconds (UAS)	The number of unavailable seconds.	The count of **Unavailable Seconds** is incremented if the number of errors crossed the **Severely Errored Seconds** threshold at any time during the last 10 consecutive seconds.

Parameter	Description	Format/Values
Valid	Whether or not the performance monitoring interval has been completed, and whether or not the information is accurate.	• **Partial**: The measured interval has not been completed. • **Yes**: The performance monitoring interval has been completed. • **No**: The interval has been completed, but the performance monitoring information may not be accurate. **NOTE:** The performance monitoring information may be inaccurate due to one of the following reasons: ▪ The performance monitoring counters of the interval were reset. ▪ The node was reset during the interval. ▪ The port was set to **Admin Down** during the interval. ▪ The calendar time of the node was changed during the interval.

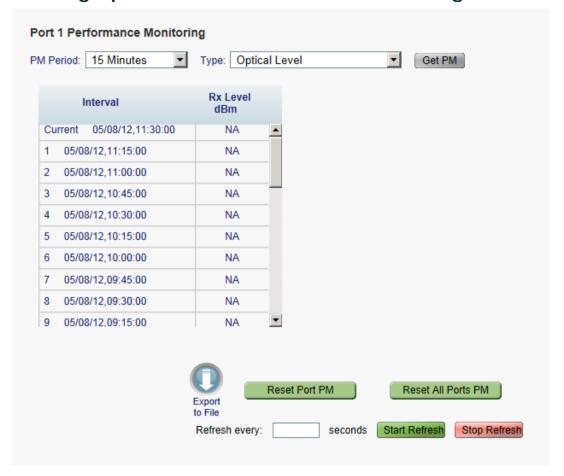## 7.5.2   Viewing Optical Level Performance Monitoring

Figure 118: Optical Level Performance Monitoring

Use the Transponder Port Performance Monitoring tab to view transponder port optical level performance monitoring.

To view optical level performance monitoring:

1. Click a **Port** button.

   The appropriate Transponder Port Performance Monitoring tab opens displaying the displaying the transponder port performance monitoring. The fields are explained in the following table. The counters are read only.

2. From the **PM Period** drop-down list, select the interval.

3. From the **Type** drop-down list, select **Optical Level**.

4. Click **Get PM**.

   The optical level counters are updated.

5. To export the optical level information to a file:

   1. Click **Export to File** .

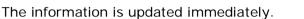   The Opening table.csv dialog box appears.

   2. Click **Save File**.

3. Click **OK**.

6. To set the refresh rate of the PM 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.

7. To refresh the PM display manually, click **Refresh** .

   The information is updated immediately.

8. To stop the automatic refresh of the PM display, click **Stop Refresh**.

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

9. To clear the optical level counters for a specific port, click **Reset Port PM**.

10. To clear the optical level counters for all ports, click **Reset All Ports PM**.

Table 67: Transponder Port Optical Level PM Parameters

Parameter	Description	Format/Values
PM Period	The interval for averaging the measured Rx power.	15 Minutes, Days
Type	The type of performance monitoring.	Optical Level
Interval	The date and time of the interval.	**PM Period** is set to **15 Minutes**: • **Current**: The date and time of the current interval of 15 minutes is displayed in the first row. • **1 to 32**: The date and time of the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: The date and time of the last reset of the system or last reset of the optical level counters is displayed in the first row of the table. • **Current Day**: The date and 00:00 AM of the current day is displayed in the second row of the table. • **Previous Day**: The date and 00:00 AM of the previous day is displayed in the last row of the table.

Parameter	Description	Format/Values
Rx Level dBm	The measured Rx power level during the interval (in dBm).	**PM Period** is set to **15 Minutes**: • **Current**: The measured Rx power for the current interval of 15 minutes is displayed in the first row. • **1 to 32**: The measured Rx power for the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: The average of the measured Rx power since last reset of the system or since the last reset of the optical level counters is displayed in the first row of the table. • **Current Day**: The average of the measured Rx power since 00:00 AM of the current day is displayed in the second row of the table. • **Previous Day**: The average of the measured Rx power during the 24 hours since 00:00 AM of the previous day is displayed in the last row of the table.

7.6 Management Port Performance Monitoring
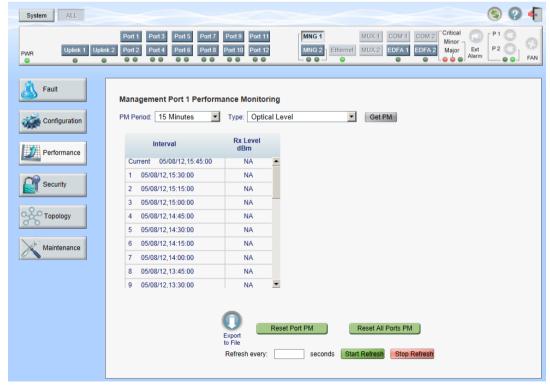
Figure 119: Management Port Performance Monitoring Window

Use the Management Port Performance Monitoring window to view management port optical performance monitoring.

To open the Management Port Performance Monitoring window:

1. Click **Performance**.

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

   The appropriate Management Port Performance Monitoring window opens.
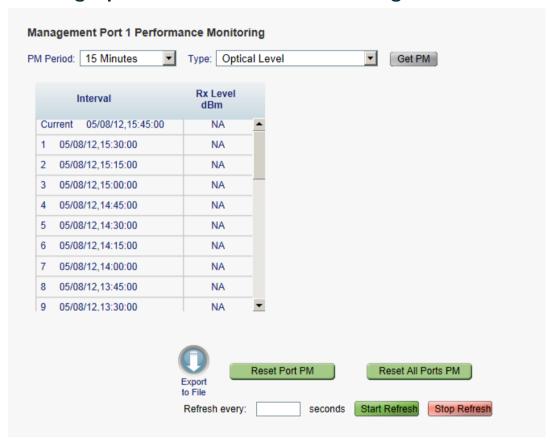
7.6.1 Viewing Optical Performance Monitoring

Figure 120: Optical Level Performance Monitoring

Use the Management Port Performance Monitoring tab to view management port optical level performance monitoring.

To view optical level performance monitoring:

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

   The appropriate Management Port Performance Monitoring tab opens displaying the displaying the management port performance monitoring. The fields are explained in the following table. The counters are read only.

2. From the **PM Period** drop-down list, select the interval.

3. From the **Type** drop-down list, select **Optical Level**.

4. Click **Get PM**.

The optical level counters are updated.

5. To export the optical level information to a file:

   1. Click **Export to File** .

      The Opening table.csv dialog box appears.

   2. Click **Save File**.

   3. Click **OK**.

6. To set the refresh rate of the PM 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.

7. To refresh the PM display manually, click **Refresh** .

   The information is updated immediately.

8. To stop the automatic refresh of the PM display, click **Stop Refresh**.

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

9. To clear the optical level counters for a specific port, click **Reset Port PM**.

10. To clear the optical level counters for all ports, click **Reset All Ports PM**.

Table 68: Management Port Optical Level PM Parameters

Parameter	Description	Format/Values
PM Period	The interval for averaging the measured Rx power.	15 Minutes, Days
Type	The type of performance monitoring.	Optical Level

Parameter	Description	Format/Values
Interval	The date and time of the interval.	**PM Period** is set to **15 Minutes**: • **Current**: The date and time of the current interval of 15 minutes is displayed in the first row. • **1 to 32**: The date and time of the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: The date and time of the last reset of the system or last reset of the optical level counters is displayed in the first row of the table. • **Current Day**: The date and 00:00 AM of the current day is displayed in the second row of the table. • **Previous Day**: The date and 00:00 AM of the previous day is displayed in the last row of the table.
Rx Level dBm	The measured Rx power level during the interval (in dBm).	**PM Period** is set to **15 Minutes**: • **Current**: The measured Rx power for the current interval of 15 minutes is displayed in the first row. • **1 to 32**: The measured Rx power for the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: The average of the measured Rx power since last reset of the system or since the last reset of the optical level counters is displayed in the first row of the table. • **Current Day**: The average of the measured Rx power since 00:00 AM of the current day is displayed in the second row of the table. • **Previous Day**: The average of the measured Rx power during the 24 hours since 00:00 AM of the previous day is displayed in the last row of the table.

7.7   EDFA Performance Monitoring

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

Use the EDFA Performance Monitoring window to view EDFA module optical performance monitoring.

To open the EDFA Performance Monitoring window:

1. Click **Performance**.

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

   The appropriate EDFA Performance Monitoring window opens.

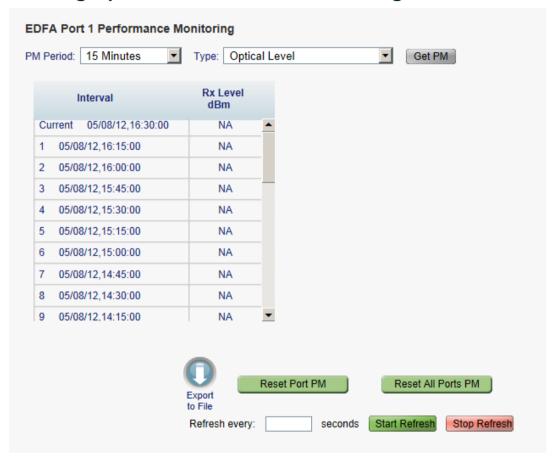## 7.7.1   Viewing Optical Performance Monitoring

Figure 121: Optical Level Performance Monitoring

Use the EDFA Performance Monitoring tab to view EDFA optical level performance monitoring.

To view optical level performance monitoring:

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

   The appropriate EDFA Performance Monitoring tab opens displaying the displaying the EDFA performance monitoring. The fields are explained in the following table. The counters are read only.

2. From the **PM Period** drop-down list, select the interval.

3. From the **Type** drop-down list, select **Optical Level**.

4. Click **Get PM**.

   The optical level counters are updated.

5. To export the optical level information to a file:

1. Click **Export to File** .

   The Opening table.csv dialog box appears.

2. Click **Save File**.

3. Click **OK**.

6. To set the refresh rate of the PM 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.

7. To refresh the PM display manually, click **Refresh** .

   The information is updated immediately.

8. To stop the automatic refresh of the PM display, click **Stop Refresh**.

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

9. To clear the optical level counters for a specific port, click **Reset Port PM**.

10. To clear the optical level counters for all ports, click **Reset All Ports PM**.

Table 69: EDFA Optical Level PM Parameters

Parameter	Description	Format/Values
PM Period	The interval for averaging the measured Rx power.	15 Minutes, Days
Type	The type of performance monitoring.	Optical Level

Parameter	Description	Format/Values
Interval	The date and time of the interval.	**PM Period** is set to **15 Minutes**: • **Current**: The date and time of the current interval of 15 minutes is displayed in the first row. • **1 to 32**: The date and time of the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: The date and time of the last reset of the system or last reset of the optical level counters is displayed in the first row of the table. • **Current Day**: The date and 00:00 AM of the current day is displayed in the second row of the table. • **Previous Day**: The date and 00:00 AM of the previous day is displayed in the last row of the table.
Rx Level dBm	The measured Rx power level during the interval (in dBm).	**PM Period** is set to **15 Minutes**: • **Current**: The measured Rx power for the current interval of 15 minutes is displayed in the first row. • **1 to 32**: The measured Rx power for the last 32 intervals of 15 minutes is displayed in the second row to the last row of the table. **PM Period** is set to **Days**: • **Untimed**: The average of the measured Rx power since last reset of the system or since the last reset of the optical level counters is displayed in the first row of the table. • **Current Day**: The average of the measured Rx power since 00:00 AM of the current day is displayed in the second row of the table. • **Previous Day**: The average of the measured Rx power during the 24 hours since 00:00 AM of the previous day is displayed in the last row of the table.

8 Maintenance

This chapter describes how to perform maintenance tasks for the PL-1000EM.

In this Chapter

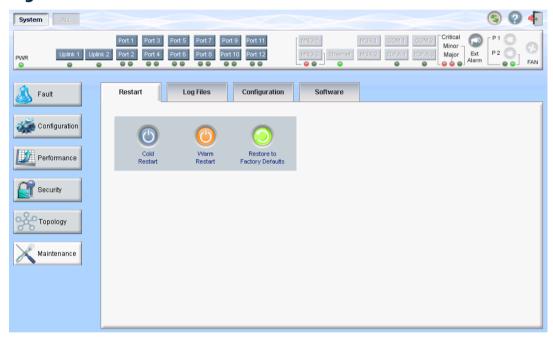## 8.1 System Maintenance

Figure 122: System Maintenance Window

Use the System Maintenance window to do the following:

- **Restart tab**: Restart the PL-1000EM unit

- **Log Files tab**: View and save the System Log files

- **Configuration tab**:

  - **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 tab**: Download and activate a new software version

To open the System Maintenance window:

1. Click **Maintenance**.

2. Click **System**.

   The System Maintenance window opens.

8.1.1 Restart Tab

Figure 123: 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

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.

To restart the PL-1000EM 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.

Figure 124: 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.
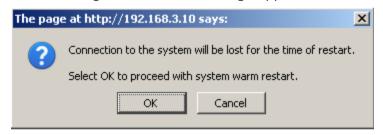
Figure 125: Confirm Changes

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.

Figure 126: Confirm Changes

2. Click **OK**.

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

Traffic is affected.

8.1.2   Log Files Tab

Figure 127: 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 128: System Log Files (Example)

8.1.3   Configuration Tab

Figure 129: 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 PL-1000EM unit

- Upload the current system configuration of the PL-1000EM unit and save it to the local file system

8.1.3.1 Updating System Configuration and Restarting the PL-1000EM Unit

Use the Configuration tab to update the system configuration, while preserving or replacing the IP addresses, and restart the PL-1000EM 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 PL-1000EM 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`.
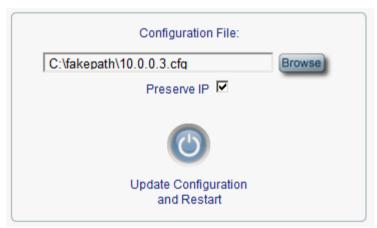
Figure 130: Update System Configuration: Configuration File

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

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

The following confirmation message appears.
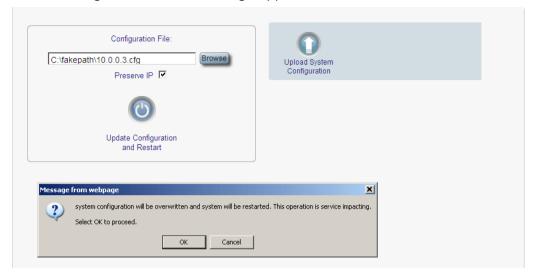
Figure 131: Confirm System Overwrite

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 132: 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.
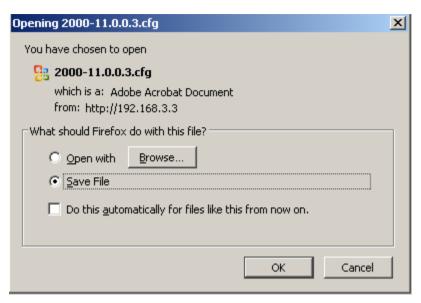
Figure 133: Opening .cfg Dialog Box

3. Click **Save File**.

4. Click **OK**.

8.1.4   Software Tab
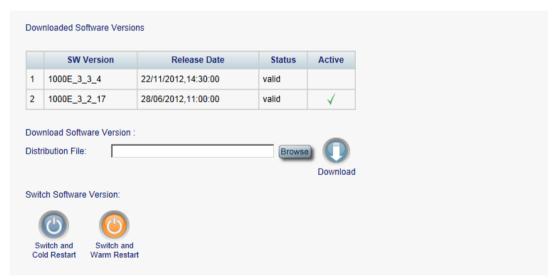
Figure 134: Software Tab

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.

   Figure 135: Software Download Message

4. Click **OK**.

   The Software Download Status window is displayed.

   Figure 136: 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 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. To perform a switch and cold restart:

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

The following confirmation message appears.

Figure 137: 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.
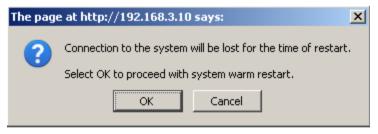
Figure 138: Confirm Changes

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 Diagnostic Tests

Port maintenance includes diagnostic testing. The following tests are provided:

- **Facility Loopback test**: Can be performed on any muxponder uplink port, muxponder service port, or transponder port

- **PRBS Loopback test**: Can be performed on any muxponder uplink port or transponder port

8.2.1 Facility Loopback Test

The facility loopback test can be performed on any muxponder uplink port, muxponder service port, or transponder port as follows:

- **Local loopback**: Applies to the muxponder service ports and transponder ports.

  This local loopback test verifies that the local unit connections are functioning properly. This loopback can be performed on the muxponder service port or on the transponder service port of the local unit.

- **Remote loopback**: Applies to the muxponder uplink ports and transponder ports.

  This remote test allows the operator to verify that the entire link is operational. This loopback can be performed on the muxponder uplink port or on the transponder uplink port of the remote unit.

The following figure shows an example of the available loopbacks where PL-1000EM A is the local node and PL-1000EM B is the remote node.
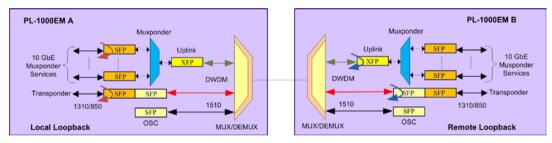
Figure 139: Facility Loopback Test

8.2.2 PRBS Loopback Test

The muxponder uplink ports and transponder ports can be configured to send and receive PRBS. The PRBS test may be used to check the connectivity and the quality of the service between two nodes.

The following figure shows an example of PRBS usage:

- Muxponder Uplink 1 of Node A sends PRBS while Muxponder Uplink 1 of Node B is configured to loopback.

- Transponder Port 11 of Node A sends PRBS while Transponder Port 10 of Node B is configured to loopback.
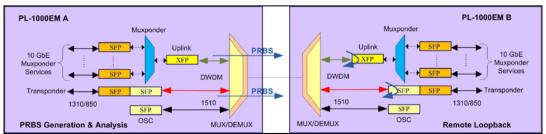
Figure 140: PRBS Loopback Test

> **NOTE:**
>
> ▪ The PRBS port and the corresponding remote loopback port should be configured to the same service type; otherwise, errors may be caused by the remote loopback port.
>
> ▪ The bit rate of 4G FC is not supported for PRBS; therefore, if you use this type of service for PRBS, the bit rate of 2G FC is used instead.
>
> ▪ The loopback on the remote side may also be done with a simple connection of the Rx and Tx fibers.
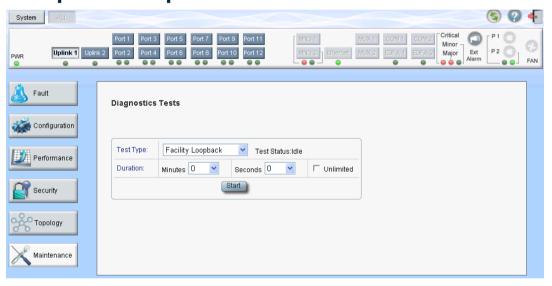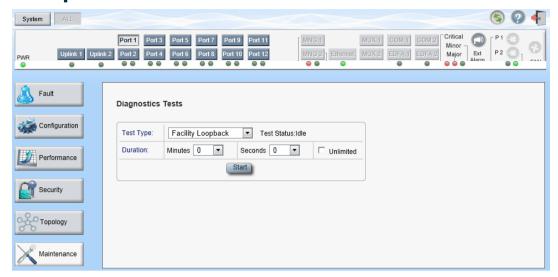
8.3   Muxponder Uplink Port Maintenance

Figure 141: Muxponder Uplink Port Maintenance Window

Use the Muxponder Uplink Port Maintenance window to perform diagnostic tests on uplink ports.

To open the Muxponder Uplink Port Maintenance window:

1. Click **Maintenance**.

2. Click an **Uplink** button to select the muxponder uplink port.

   The appropriate Muxponder Uplink Port Maintenance window opens.
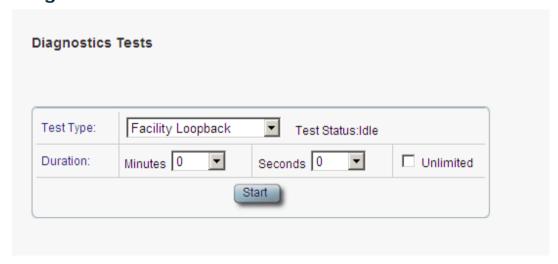
8.3.1 Diagnostics Tests Tab

Figure 142: Diagnostic Tests Tab

Use the Diagnostic Tests tab to perform facility loopback and PRBS tests on uplink ports.

To perform diagnostic tests:

1. Click an **Uplink** button.

   The appropriate Diagnostic Tests tab opens.

2. From the **Test Type** drop-down list, select **Facility Loopback** or **PRBS Test**.

3. To specify the duration of the test:

   1. From the **Minutes** drop-down list, select the number of minutes.

   2. From the **Seconds** drop-down lists, select the number of seconds.

   3. Clear the **Unlimited** check box.

4. To continue running the test until manually stopped, select the **Unlimited** check box.

5. Click **Start**.

   The loopback test is performed.

   The **Start** button toggles to **Stop** for the duration of the test.

6. To stop a loopback test, click **Stop**.

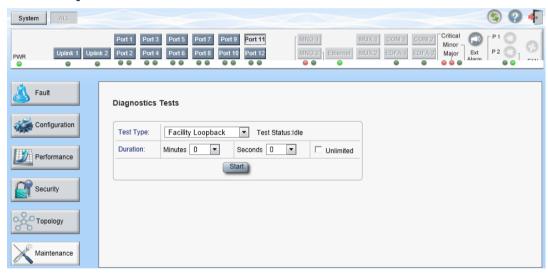   The loopback test is stopped and the **Stop** button toggles to **Start**.

For a PRBS loopback test, the results of the PRBS loopback test are displayed. The fields are read only and explained in the following table.

PRBS Test Results

SYNC: OK

ERRORS: 0

DURATION: 0 seconds

BITS: 0

BER:

Figure 143: PRBS Test Results

Table 70: PBRS Test Results

Parameter	Description	Format/Values
SYNC	Indicates if PRBS synchronization has been reached.	OK, FAIL **NOTE:** If synchronization failed, the other fields should be ignored.
ERRORS	The number of PRBS errors detected.	Integer
Duration	The duration of the test (in seconds).	Integer
BITS	The number of bits sent.	Integer (Bit Rate of configured Service Type) x (Duration)
BER	The bit error ratio.	Decimal number (ERROR / BITS) For example : 0.0000013

8.4 Muxponder Service Port Maintenance

Figure 144: Muxponder Service Port Maintenance Window

Use the Muxponder Service Port Maintenance window to perform diagnostic tests on service ports.

To open the Muxponder Service Port Maintenance window:

1. Click **Maintenance**.

2. Click a **Port** button to select the muxponder service port.

   The appropriate Muxponder Service Port Maintenance window opens.
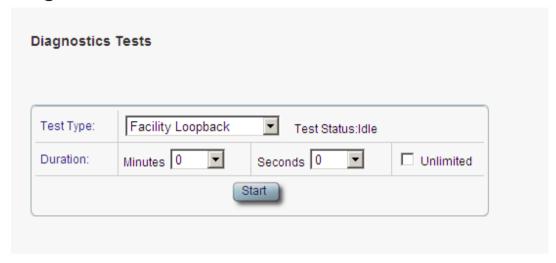
8.4.1 Diagnostics Tests Tab

Figure 145: Diagnostic Tests Tab

Use the Diagnostic Tests tab to perform facility loopback tests on service ports.

To perform diagnostic tests:

1. Click a **Port** button.

   The appropriate Diagnostic Tests tab opens.

2. To specify the duration of the test:

   1. From the **Minutes** drop-down list, select the number of minutes.

   2. From the **Seconds** drop-down lists, select the number of seconds.

   3. Clear the **Unlimited** check box.

3. To continue running the test until manually stopped, select the **Unlimited** check box.

4. Click **Start**.

   The loopback test is performed.

   The **Start** button toggles to **Stop** for the duration of the test.

5. To stop a loopback test, click **Stop**.

   The loopback test is stopped and the **Stop** button toggles to **Start**.

8.5   Transponder Port Maintenance

Figure 146: Transponder Port Maintenance Window

Use the Transponder Port Maintenance window to perform diagnostic tests on transponder ports.

To open the Transponder Port Maintenance window:

1. Click **Maintenance**.

2. Click a transponder port button (**Port 11 − Port 12**) to select the transponder port.

   The appropriate Transponder Port Maintenance window opens.

8.5.1 Diagnostics Tests Tab

Diagnostics Tests

Test Type: Facility Loopback ▾ Test Status:Idle

Duration: Minutes 0 ▾ Seconds 0 ▾ ☐ Unlimited

Start

Figure 147: Diagnostic Tests Tab

Use the Diagnostic Tests tab to perform facility loopback and PRBS tests on transponder ports.

To perform diagnostic tests:

1. Click a **Port** button (Port 11 or 12) to select the transponder port.

   The appropriate Diagnostic Tests tab opens.

2. From the **Test Type** drop-down list, select **Facility Loopback** or **PRBS Test**.

3. To specify the duration of the test:

   1. From the **Minutes** drop-down list, select the number of minutes.

   2. From the **Seconds** drop-down lists, select the number of seconds.

   3. Clear the **Unlimited** check box.

4. To continue running the test until manually stopped, select the **Unlimited** check box.

5. Click **Start**.

   The loopback test is performed.

   The **Start** button toggles to **Stop** for the duration of the test.

6. To stop a loopback test, click **Stop**.

   The loopback test is stopped and the **Stop** button toggles to **Start**.

For a PRBS loopback test, the results of the PRBS loopback test are displayed. The fields are read only and explained in the following table.

Figure 148: PRBS Test Results

Table 71: PBRS Test Results

Parameter	Description	Format/Values
SYNC	Indicates if PRBS synchronization has been reached.	OK, FAIL **NOTE:** If synchronization failed, the other fields should be ignored.
ERRORS	The number of PRBS errors detected.	Integer
Duration	The duration of the test (in seconds).	Integer
BITS	The number of bits sent.	Integer (Bit Rate of configured Service Type) x (Duration)
BER	The bit error ratio.	Decimal number (ERROR / BITS) For example : 0.0000013

8.6 External Alarm Maintenance

Figure 149: 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.

8.6.1 External Alarm Maintenance Tab

Figure 150: 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 72: 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 PL-1000EM nodes.

In this Chapter

9.1 Network Topology
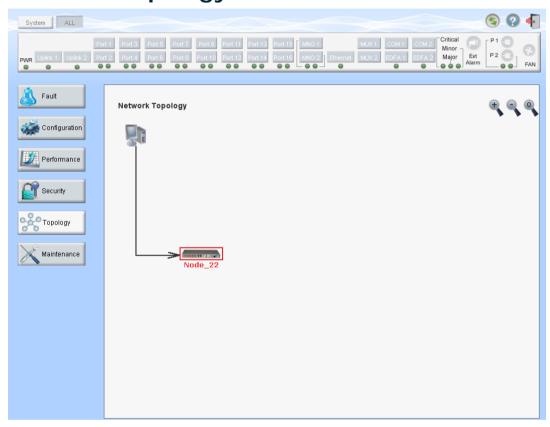
Figure 151: Network Topology Window

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
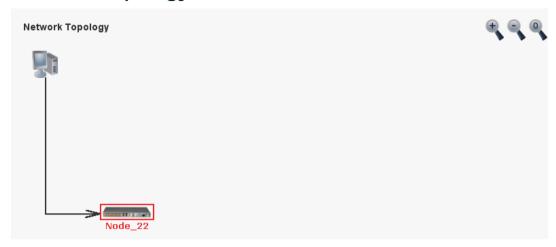
Figure 152: Network Topology Tab

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 PL-1000EM nodes connected together with the OSC channel.

9.1.1.1 Network Linear Topology

The following figure is an example of a linear topology.
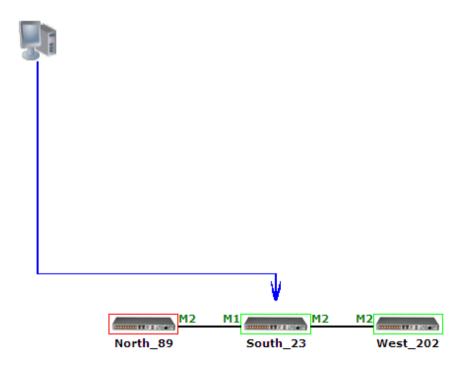
Figure 153: Linear Topology (Example)

9.1.1.2   Ring Topology

The following figure is an example of a network ring topology.
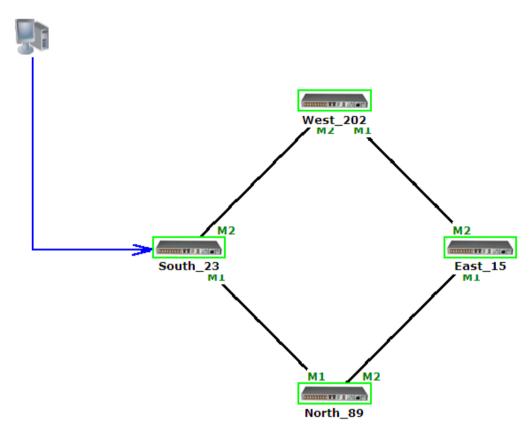
Figure 154: Ring Topology (Example)

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 PL-1000EM 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 PL-1000EM nodes connected together with the OSC channel.

2. Click a node icon .

   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. 108).)

9.1.4 Defining Multiple Nodes as Multi-Chassis

When multiple PL-1000EM 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 PL-1000EM 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.
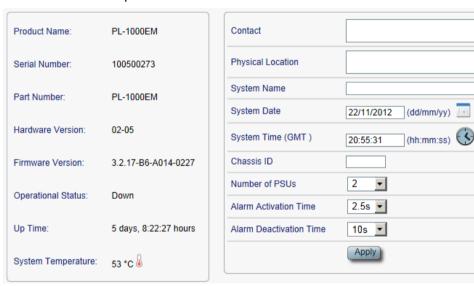
Figure 155: General Tab

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.
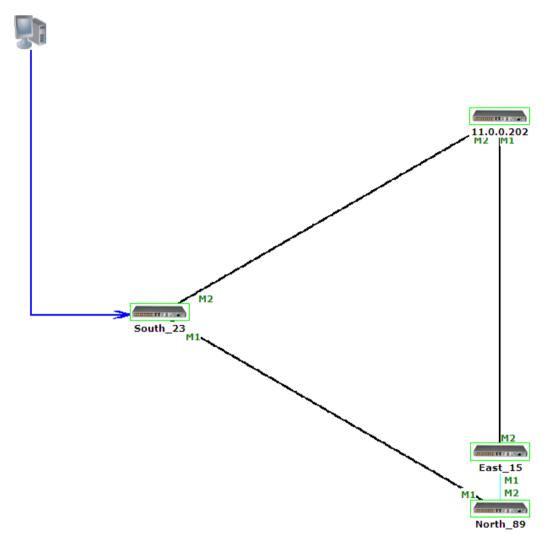
Figure 156: Multi-Chassis Nodes

10   Remote Management Configuration

This chapter provides instructions and for setting up and configuring remote management.

A remote PL-1000EM can be managed through the OSC.

In this Chapter

10.1   Remote Management Configuration Example

A remote PL-1000EM can be managed through the OSC or in-band management channel.

The following figure illustrates 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 PL-1000EM nodes A and B via the in-band management channel.
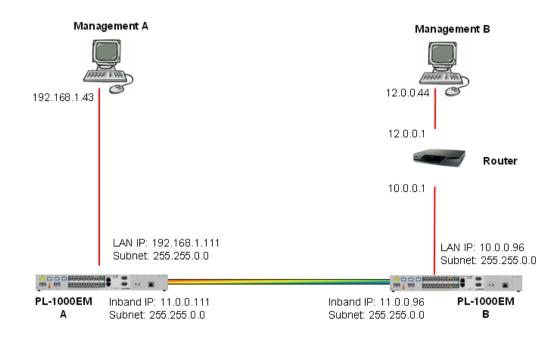
Figure 157: Remote Management Configuration (Example)

10.1.1   Setting Up Point-to-Point Management

To set up point-to-point management:

1. Make sure that you have local Web access to both PL-1000EM nodes (see Accessing the Web Application (p. 29)).

2. Configure management for PL-1000EM A.

3. Configure management for PL-1000EM B.

4. Access the Web application from Management A to PL-1000EM A.

5. Access the Web application from Management A to PL-1000EM B.

6. Access the Web application from Management B to PL-1000EM B.

7. Access the Web application from Management B to PL-1000EM A.

10.1.2 Configuring Management for PL-1000EM A

To configure management for PL-1000EM 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. 108)).

4. Set the IP address of the OSC interfaces manually. 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**: 192.168.0.96

   - **OSC/In-band IP Address**: 11.0.0.111

   - **OSC/In-band Subnet Mask**: 255.255.0.0

   NOTE: This example assumes that you are working in **Dual Network** mode.

5. Click **Apply**.

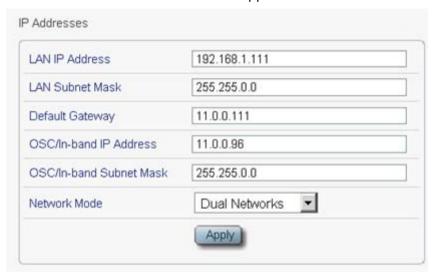The **IP Addresses** section should appear as follows.

Figure 158: IP Addresses: PL-1000EM 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 <u>SNMP Tab</u> (p. <u>111</u>)).

The SNMP Traps table should appear as follows.

Figure 159: SNMP Traps Table (Example)

10.1.3   Configuring Management for PL-1000EM B

When configuring the management for PL-1000EM 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 PL-1000EM nodes should be in the same subnet.

To configure the management for PL-1000EM 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. 108)).

4. Set the IP address of the OSC interfaces manually. 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**: 11.0.0.111

   - **OSC/In-band IP Address**: 11.0.0.96

   - **OSC/In-band Subnet Mask**: 255.255.0.0

   NOTE: This example assumes that you are working in **Dual Network** mode.

5. Click **Apply**.

   The **IP Addresses** section should appear as follows.

Figure 160: IP Addresses: PL-1000EM 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**.

REMOTE MANAGEMENT CONFIGURATION

The Static Routing table should appear as follows.

Figure 161: Static Routing Table (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. 111)).

The SNMP Traps table should appear as follows.

Figure 162: SNMP Traps Table (Example)

10.1.4   Accessing the Web Application from Management A to PL-1000EM A

To access the Web application from Management A to PL-1000EM A:

1. Open the Web browser.

2. In the address field of the browser, type the **IP address** of the LAN port of PL-1000EM A as follows:

   `http://192.168.1.111` (for HTTP access)

   or

   `https://192.168.1.111` (for HTTPS secure access) (as illustrated in Remote Management Configuration Example (p. 221))

3. Press **Enter**.

   The Login window opens.

4. Log in to the Web application (see Logging In to the Web Application (p. 30)).

10.1.5 Accessing the Web Application from Management A to PL-1000EM B

To access the Web application from Management A to PL-1000EM 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 PL-1000EM as follows:

   `http://11.0.0.96` (for HTTP access)

   or

   `https://11.0.0.96` (for HTTP secure access) (as illustrated in <u>Remote Management Configuration Example</u> (p. <u>221</u>))

4. Press **Enter**.

   The Login window opens.

5. Log in to the Web Application (see <u>Logging In to the Web Application</u> (p. <u>30</u>)).

10.1.6 Accessing the Web Application from Management B to PL-1000EM B

To access the Web application from Management B to PL-1000EM 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 PL-1000EM B as follows:

   `http://10.0.0.96` (for HTTP access)

   or

   `https://10.0.0.96` (for HTTP secure access) (as illustrated in <u>Remote Management Configuration Example</u> (p. <u>221</u>))

4. Press **Enter**.

   The Login window opens.

5. Log in to the Web Application (see <u>Logging In to the Web Application</u> (p. <u>30</u>)).

10.1.7 Accessing the Web Application from Management B to PL-1000EM A

To access the Web application from Management B to PL-1000EM 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 PL-1000EM A so that the IP address of the PL-1000EM B LAN port (`10.0.0.96` as illustrated in Remote Management Configuration Example (p. 221)) 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 PL-1000EM A as follows:

   `http://11.0.0.111` (for HTTP access)

   or

   `https://11.0.0.111` (for HTTP secure access) (as illustrated in Remote Management Configuration Example (p. 221))

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 PL-1000EM.

The CLI provides commands for status monitoring, service provisioning, and basic configuration of the PL-1000EM.

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:

- **Using a Serial Port**: This method uses the CONTROL port of the PL-1000EM 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 or in-band 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:

   ```
   PL-1000EM>>
   ```

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:

   ```
   PL-1000EM>>login
   User: admin
   Password:
   PL-1000EM>>
   ```

6. Run the desired CLI commands as described in <u>Running CLI Commands</u> (p. <u>233</u>).

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:

```
PL-1000EM>>
```

3. Log in to the node using the predefined user and password.

For example:

```
PL-1000EM>>login
User: admin
Password:
PL-1000EM>>
```

4. Run the desired CLI commands as described in <u>Running CLI Commands</u> (p. <u>233</u>).

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:
PL-1000EM>>
```
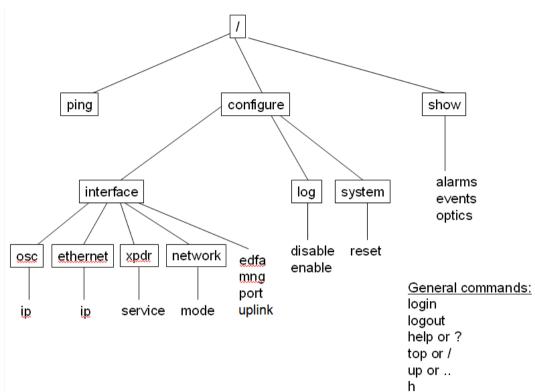
5. Run the desired CLI commands as described in <u>Running CLI Commands</u> (p. <u>233</u>).

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

- Service Provisioning command

- System Restart command

The following figure shows the hierarchy of the commands.

Figure 163: CLI Command Tree

11.4   Running CLI Commands

You can run the following CLI commands:

- General commands

  - Login (p. 234)

  - Logout (p. 235)

  - Help (p. 235)

  - History (p. 235)

  - Top (p. 236)

  - Up (p. 236)

- Ping Command (p. 237)

- Interface commands

  - Configure Interface Uplink (p. 237)

  - Configure Interface Port (p. 237)

  - Configure Interface MNG (p. 238)

  - Configure Interface EDFA (p. 238)

- IP Setting commands

  - Configure Interface Ethernet IP (p. 239)

  - Configure Interface OSC IP (p. 239)

  - Configure Network Mode (p. 238239)

- Log commands

  - Configure Log Enable (p. 240)

  - Configure Log Disable (p. 240)

- Show commands

  - Show Alarms (p. 241)

  - Show Events (p. 241)

  - Show Optics (p. 242)

- Service Provisioning Command

  - Configure Interface XPDR Service (p. 242)

- System Restart command

  - Configure System Restart (p. 243)

11.4.1 General Commands

The following are general commands that can be invoked from anywhere in the command tree:

- Login (p. 234)

- Logout (p. 235)

- Help (p. 235)

- History (p. 235)

- Top (p. 236)

- Up (p. 236)

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:

```
PL-1000EM>>login
User: admin
Password:
PL-1000EM>>
```

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:

```
PL-1000EM>>logout
PL-1000EM>>
```

11.4.1.3 Help Command

Command:

help [<command>]

or

? [<command>]

Description:

This command displays the syntax of the specified command.

Example:

```
PL-1000EM>>help con int eth ip
config interface ethernet ip [<addr> [-n <netmask>] [-g <gateway>]]
PL-1000EM>>
```

11.4.1.4 History Command

Command:

h

Description:

This command displays the last 20 commands.

Example:

```
PL-1000EM>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
PL-1000EM>show>>
```

11.4.1.5 Top Command

Command:

top

or

/

Description:

This command takes you to the root of the command tree.

Example:

```
PL-1000EM>configure>interface>>top
PL-1000EM>>
```

11.4.1.6 Up Command

Command:

up

or

..

Description:

This command takes you up one level in the command tree.

Example:

```
PL-1000EM>configure>interface>ethernet>>up
PL-1000EM>configure>interface>>
```

11.4.2 Ping Command

Command:

ping <ip-address>

Description:

This command sends a ping request to the specified IP address.

Example:

```
PL-1000EM>>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
PL-1000EM>>
```

11.4.3 Interface Commands

The following are the Interface commands:

- Configure Interface Uplink (p. 237)

- Configure Interface Port (p. 237)

- Configure Interface MNG (p. 238)

- Configure Interface EDFA (p. 238)

11.4.3.1 Configure Interface Uplink Command

Command:

configure interface uplink <num> [up | down]

Description:

This command sets the **Admin Status** of the uplink to the required value.

If the **Admin Status** is not specified, the administrative status of the uplink is displayed.

Example:

```
PL-1000EM>configure>interface>>uplink 2 up
PL-1000EM>configure>interface>>
```

11.4.3.2 Configure Interface Port Command

Command:

configure interface port <num> [up | down]

Description:

This command sets the **Admin Status** of the port to the required value.

If the **Admin Status** is not specified, the administrative status of the port is displayed.

Example:

```
PL-1000EM>configure>interface>>port 1
Port 1 is DOWN
PL-1000EM>configure>interface>>port 1 up
PL-1000EM> configure>interface>>port 1
Port 1 is UP
PL-1000EM>configure>interface>>
```

11.4.3.3 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:

```
PL-1000EM>configure>interface>>mng 1 down
PL-1000EM>configure>interface>>mng 1
Port MNG 1 is DOWN
PL-1000EM>configure>interface>>
```

11.4.3.4 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:

```
PL-1000EM>configure>interface>>edfa 1 up
PL-1000EM>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:

```
PL-1000EM>configure>interface>ethernet>>ip 10.0.3.200 –n 255.255.0.0 –g
10.0.44.44
PL-1000EM>configure>interface>ethernet>>ip
Addr is 10.0.3.200, Subnet mask is 255.255.0.0
Gateway is 10.0.44.44
PL-1000EM>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:

```
PL-1000EM>configure>interface>osc>>ip 11.0.3.200 –n 255.255.0.0 –g
11.0.3.201
PL-1000EM>configure>interface>osc>>ip
Addr is 11.0.3.200, Subnet mask is 255.255.0.0
Gateway is 11.0.3.201
PL-1000EM>configure>interface>osc>>
```

11.4.4.3   Configure Network Mode

Command:

`configure interface network mode [dual | single]`

Description:

This command sets the network mode to **Dual Networks** mode or **Single Network** mode.

- **Dual**: In this mode, the node has two IP addresses; one for the LAN port and the other for the MNG ports.

- **Single**: In this mode, the node has a single IP address that is used for the all management ports (LAN port and MNG ports).

NOTE: After changing network mode, you must cold restart the node (see Configure System Reset Command (p. 243)).

Example:

```
PL-1000EM>configure>interface>network>>? mode
config interface network mode [dual|single]
PL-1000EM>configure>interface>network>>mode
Current network mode is single
PL-1000EM>configure>interface>>..
PL-1000EM>configure>>interface network mode dual
PL-1000EM>configure>>system reset c
```

11.4.5 Log Commands

The following are the Log commands:

- Configure Log Enable (p. 240)

- Configure Log Disable (p. 240)

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:

```
PL-1000EM>configure>log>>enable
PL-1000EM>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:

```
PL-1000EM>configure>log>>disable
PL-1000EM>configure>log>>
```

11.4.6   Show Commands

The following are the Show commands:

- Show Alarms (p. 241)

- Show Events (p. 241)

- Show Optics (p. 242)

11.4.6.1   Show Alarms Command

Command:

show alarms [port <num> | mng <num> | edfa <num> | uplink <num> |system]

Description:

This command displays the alarms of the specified port. If no parameters are specified, all alarms are displayed.

Example:

```
PL-1000EM>>show alarms port 1
THU JUN 18 12:22:46 2009      PORT 1  Optics Loss of Light     Critical
S.A.
THU JUN 18 12:22:46 2009      PORT 1  Loss Propagation         Minor
PL-1000EM>>
```

11.4.6.2   Show Events Command

Command:

show events [port <num> | mng <num> | edfa <num> | uplink <n> | system]

Description:

This command displays the events of the specified port. If no parameters are specified, all events are displayed.

Example:

```
PL-1000EM>>show events port 1
THU JUN 18 12:22:44 2009      PORT 1  Link Up
Event
THU JUN 18 12:22:46 2009      PORT 1  Optics Loss of Light     Critical
S.A.
THU JUN 18 12:22:46 2009      PORT 1  Loss Propagation         Minor
THU JUN 18 12:22:47 2009      PORT 1  Link Down
Event
PL-1000EM>>
```

11.4.6.3 Show Optics Command

Command:

show optics [port <num>] | [mng <num>] | [edfa <num>] | [uplink <num>]

Description:

This command displays the optical information of the specified entity.

Example:

```
PL-1000EM>>show optics port 5
Vendor: PLTELE COMPANY
Part Number: PL-XPL-VC-S13-21
Serial Number: 447LC018
Wavelength: 850.00 nm
Type: Non WDM

Tx Power: -Inf dBm
Rx Power: -35.2 dBm
Temperature: 33 C
PL-1000EM>>show optics mng 2
Vendor: PLTELE COMPANY
Part Number: PL-XPL-VC-S13-21
Serial Number: 430LC0R1
Wavelength: 850.00 nm
Type: Non WDM

Tx Power: -Inf dBm
Rx Power: -28.2 dBm
Temperature: 27 C
PL-1000EM>>
```

11.4.7 Service Provisioning Command

The following is the Service Provisioning command:

- <u>Configure Interface XPDR Service</u> (p. 242)

11.4.7.1 Configure Interface XPDR Service Command

Command:

configure interface xpdr service [<port> [<service type>]]

Description:

This command provisions the transponder with the specified service.

NOTE: Before configuration make sure that:

- The **Admin Status** of the port is **Down**.
- No provisioning is defined for this service port.

The following service types are available:

- GBE (Gigabit Ethernet)
- FE (Fast Ethernet)

- 10M (10M Ethernet)

- 1G/2G/4G FC

- 1G/2G/4G FICON

- OC-3/STM-1

- OC-12/STM-4

- OC-48/STM-16

- MUX4REG (MUX 4x1GbE Regen)

- BYPASS (Other)

- MUX10

If the **service type** parameter is not specified, the current provisioned service is displayed.

If no parameter is specified, all service types are displayed.

Example:

```
PL-1000EM>configure>interface>xpdr>>ser 11 FE
XPDR 11-12 service type to 2
PL-1000EM>configure>interface>xpdr>>ser 11
Service Type is FE
PL-1000EM>configure>interface>xpdr>>
```

11.4.8   System Restart Command

The following is the System Restart command:

- Configure System Reset (p. 243)

11.4.8.1   Configure System Reset Command

Command:

configure system reset (f | c | w)

Description:

This command restarts the node.

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

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.

Example (of a Telnet session):

```
PL-1000EM>>configure system reset w
PL-1000EM>>

Connection to host lost.
```

Appendix A: Connection Data

This appendix describes the connectors for the PL-1000EM.

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 73: CONTROL Connector Wiring

Pin	Function	Direction
2	Transmit Data (TX)	From PL-1000EM
3	Receive Data (RX)	To PL-1000EM
5	Signal Ground (SIG)	Common reference

A.2 ALARM Connector

The ALARM connector of the PL-1000EM 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 164: External ALARM Diagram

Table 74: 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 PL-1000EM 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 75: 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 Optical PL-1000EM Connectors

The optical PL-1000EM connectors can be one of the following ports:

- MUX/DEMUX
- Muxponder uplink
- Muxponder service
- Transponder
- MNG

A.4.1 MUX/DEMUX Ports

The MUX/DEMUX ports are up to four fixed duplex LC connectors.

Table 76: MUX/DEMUX Ports Specification

Specification	Requirement
Fiber Type	Single mode
Fiber Size	2 mm optical fiber
Connector Type	LC with protective shutters
Port Type	Optical MUX/DEMUX ports

A.4.2 Muxponder Uplink Ports

The muxponder uplink ports are two XFP adapters that accept XFP modules of the following type: DWDM XFP.

Table 77: Muxponder Uplink XFP Specifications

Specification	Requirement
Fiber Type	Single mode
Wavelength	ITU DWDM Grid
Fiber Size	2 mm optical fiber
SFP connector Type	LC
Port Type	10G Uplink

A.4.3 Muxponder Service Ports

The muxponder service ports are 10 SFP adapters that accept optical or copper (electrical) SFP modules.

Table 78: Muxponder Service SFP Specifications

Specification	Requirement
Fiber/Cable Type	• **Optical SFP**: Single mode or multi-mode • **Copper SFP**: Twisted pair
Wavelength	• 850 nm multi-mode • 1310 nm single mode
Fiber Size	2 mm optical fiber
Connector Type	• **Optical SFP**: LC • **Copper SFP**: RJ-45
Port Type	GbE service

A.4.4 Transponder Ports

The transponder ports are two SFP adapters that accept optical or copper (electrical) SFP modules.

Table 79: Transponder SFP Specifications

Specification	Requirement
Fiber/Cable Type	• **Optical SFP**: Single mode or multi-mode • **Copper SFP**: Twisted pair
Wavelength	• ITU CWDM Grid • ITU DWDM Grid • 850 nm multi-mode • 1310 nm single mode
Fiber Size	2 mm optical fiber
Connector Type	• **Optical SFP**: LC • **Copper SFP**: RJ-45
Port Type	Transponder

A.4.5 MNG Ports

The MNG ports are two SFP adapters that accept optical or copper (electrical) SFP modules.

Table 80: MNG SFP Interface Specifications

Specification	Requirement
Fiber/Cable Type	• **Optical SFP**: Single mode or multi-mode • **Copper SFP**: Twisted pair
Wavelength	• **CWDM**: 1290 nm or 1310 nm • **DWDM**: 1490 nm or 1510 nm • **non-WDM single mode**: 1310 nm • **multi-mode**: 850 nm

Specification	Requirement
Fiber Size	2 mm optical fiber
Connector Type	• **Optical SFP**: LC • **Copper SFP**: RJ-45
Port Type	Management

A.5 Power Supply Combinations

The following power supply combinations are feasible in the PL-1000EM:

- 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 PL-1000EM may have the following power supply connectors:

- **AC-powered PL-1000EM units**: Standard three-pin IEC320 C5 connector 3A for connection to AC power.

- **DC-powered PL-1000EM 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).
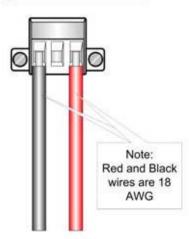
Figure 165: DC Connector Wiring Diagram

A.7 Protective Ground Terminal

The protective ground terminal of the PL-1000EM, located on the rack mount, must be connected to a protective ground.

The following figure shows how to wire the ground terminal.
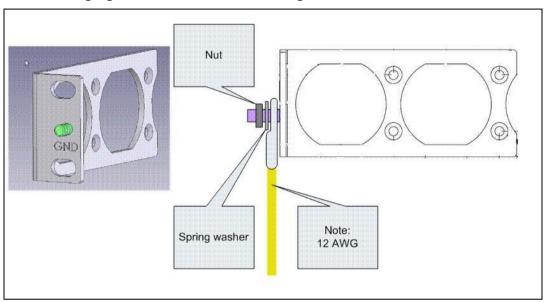
Figure 166: Protective Ground Terminal Wiring Diagram

A.8 Fiber Shelf

The fiber shelf is an optional tray that can be attached to the PL-1000EM to help you organize the optical fibers.

The following figure shows the mechanical details of the fiber shelf.
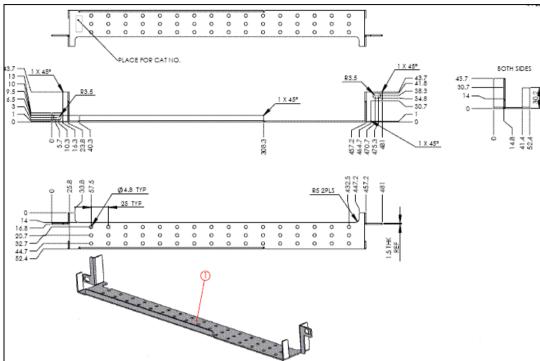
Figure 167: Fiber Shelf Diagram

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 PL-1000EM alarm messages and their interpretation and/or corrective measures.

Table 81: 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	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.
GbE (Copper)	Ethernet Link Failure	Check the **Auto Negotiation** parameters.
GbE or 1/2/4G FC/FICON	Loss of Synchronization	Loss of Synchronization has been detected on the GbE or FC/FICON link. Check that the input signal rate is correct.
SONET/SDH	RFI-L (Line Remote Failure Indication)/MS-RFI (MS Remote Failure Indication)	Remote Failure Indication (RFI) has been detected on the SONET/SDH link.
SONET/SDH	AIS-L (Line Alarm Indication Signal)/MS-AIS (MS Alarm Indication Signal)	Alarm Indication Signal (AIS) has been detected on the SONET/SDH link.

Source	Message	Interpretation/Corrective Measures
SONET/SDH	Loss of Frame	Loss of Frame (LOF) has been detected on the SONET/SDH link.
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.
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 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 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 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.

Source	Message	Interpretation/Corrective Measures
Muxponder Uplink Port	Muxponder LOF	LOF has been detected on the muxponder uplink. Improve the received signal of the muxponder uplink.
Muxponder Uplink Port	Muxponder RDI	Remote Defect Indication (RDI) has been detected on the muxponder uplink. Improve the transmit signal of the muxponder uplink.
Muxponder Uplink Port	Muxponder In-band Failure	The in-band channel of the muxponder has failed. Check that the remote in-band is enabled.
Muxponder Uplink Port	Muxponder Path AIS	Client signal failure is indicated by the remote muxponder. Check that the remote client is properly installed.
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.
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 End of Life	An EDFA problem. Replace the device.
EDFA	EDFA Eye Safety	Hazard. No fiber is connected to the port.
XFP	XFP Transmission Not Ready	• Bad line conditions *or* • Bad XFP module.
XFP	XFP Transmission CDR Not Locked	Clock Data Recovery (CDR). • Bad line conditions *or* • Bad XFP module.
XFP	XFP Reception Not Ready	• Bad line conditions *or* • Bad XFP module.
XFP	XFP Reception CDR Not Locked	• Bad line conditions *or* • Bad XFP module.
OTN XFP	OTN FEC Trail Excessive Error	Bad line conditions.
OTN XFP	OTN FEC Trail Degrade	Bad line conditions.
OTN XFP	OTN Path Degrade	Bad line conditions.
OTN XFP	OTN Section Degrade	Bad line conditions.

Source	Message	Interpretation/Corrective Measures
OTN XFP	OTN LOS	• Rx and Tx connectors intermixed *or* • Fiber break *or* • Bad XFP module.
OTN XFP	OTN LOF	• Wrong fiber is connected *or* • Bad XFP *or* • Bad line conditions.
OTN XFP	OTN Loss of Multiframe	Bad line conditions.
OTN XFP	OTN Path BDI	Backward Defect Indication (BDI). Remote uplink has detected a problem with an ODU1.
OTN XFP	OTN Section BDI	Remote uplink has detected a problem with the OTU2.
OTN XFP	OTN Path AIS	Remote uplink reports a defect with an ODU1.
OTN XFP	OTN Section AIS	Problem in the remote node.
OTN XFP	OTN Path Payload Mismatch	Wrong fiber is connected to the uplink.
OTN XFP	OTN Section Trace Mismatch	• Wrong Trace message is configured *or* • The uplink is connected to the wrong fiber.
OTN XFP	OTN Path Trace Mismatch	• Wrong Trace message is configured *or* • The uplink is connected to the wrong fiber.
OTN XFP	OTN Path Locked	The upstream connection is locked.
OTN XFP	OTN Path Open Connection	The upstream connection is open.

B.2   Configuration Event Messages

The following table lists the configuration event messages generated by the PL-1000EM and explains their interpretation.

Table 82: Configuration Event Messages

Source	Message	Interpretation
System	Change date	The system date or time has changed.
System	Restore provisioning	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.
Port	Admin Down	Admin Down has been performed for the port.
Port	Admin Up	Admin Up has been performed for the port.
Port	Test Operated	A test has been operated.
Port	Test Released	A test has been released.
Port	Reset PM counters	Reset performance monitoring counters.
Muxponder Uplink Port	APS command	An APS command was issued.
Muxponder Uplink Port	APS clear command	An APS command was cleared.
Transponder Port	Provisioning change	The provisioning of the port has changed.

B.3   Other Event Messages

The following table lists the other event messages generated by the PL-1000EM and explains their interpretation.

Table 83: 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	Muxponder Uplink Port	APS Switchover	A protection switching event has occurred.
Test	Port	Test Mode changed	The port test mode has changed.
ALS Status Changed	Port	ALS Laser	ALS was activated or deactivated for the port.
Optical Power Drop	LINK Port	Power Level Drop	The Rx power of the port has been dropped by more than 2 dB since last interval.
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 84: Troubleshooting Chart

No.	Trouble Symptoms	Probable Cause	Corrective Measures
1	PL-1000EM does not turn on.	No power	1. Check that the power cable is properly connected to the PL-1000EM 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 PL-1000EM.
		Defective power supply	Replace the PSU.
		Defective PL-1000EM	Replace the PL-1000EM.
2	The LOS LED of a device connected to PL-1000EM is lit.	Cable connection problems	1. Check all cables at the PL-1000EM 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 PL-1000EM 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 connector. If the LOS LED is still lit, the remote equipment is defective.
		A problem with the PL-1000EM port state	Set the **Admin Status** of the PL-1000EM uplink 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 LOS LED is a loss on the port mate.
		Defective optical module	1. Check for optical module alarms. 2. Replace the optical module.
		Defective PL-1000EM	1. Use a short fiber to connect the PL-1000EM Rx connector to its Tx connector. (A signal generator may be required as the PL-1000EM does not generate signals by itself.) 2. If the LOS LED is still lit, replace the PL-1000EM.
3	The LED of the local PL-1000EM port is red.	Cable connection problems	1. Check for proper connections of the cables to the PL-1000EM Tx and Rx connector. 2. Repeat check at the remote equipment.
		Loss of Propagation	Disable the **LOS Propagation** for this port. If the problem is solved, the reason for the LOS LED is a loss on the port mate.
		High Signal Level	1. Check the **Receiver Input Power** of the optical transceiver. 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 transceiver. 2. If the power is too low, replace the fiber.
		Defective PL-1000EM	1. Check the PL-1000EM alarms. 2. If there are hardware failure alarms, replace the PL-1000EM.
		Defective remote equipment	1. Use a different remote unit. 2. If the problem is solved, replace the remote unit.
4	The system LED is red.	Defective PL-1000EM	1. Check the PL-1000EM alarms. 2. If there are alarms, replace the PL-1000EM.

No.	Trouble Symptoms	Probable Cause	Corrective Measures
5	The equipment attached to the LAN port of the local PL-1000EM cannot communicate with the remote PL-1000EM 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 PL-1000EM is configured correctly (for example, the default gateway) .
		External problem	Check the IP configuration of the external equipment (for example, the gateway address) that is connected to the local PL-1000EM LAN port.
		Defective PL-1000EM	Replace the PL-1000EM.

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