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Optical Wavelength Manager User's Guide

Software Version:	**2.3.0**
Part Number:	**9-0206-03161-07**
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Preface

This guide describes the functional behavior and software capabilities of the Digital Lightwave Optical Wavelength Manager (OWM). This guide also explains how to configure and maintain the OWM.

Audience

The audience for this guide includes:

- Operations Personnel
- System Administrators
- Product Support Personnel

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Organization

Table -1. Document Organization

Chapter Number	Chapter Title	Description
Chapter 1	System Description	Provides a high-level textual and graphical description of the OWM.
Chapter	System Hardware	Provides a detailed textual and graphical description of the hardware components of the OWM.
Chapter 3	Operations	Describes the features of the OWM used in day-to-day operations.
Chapter	Configuration	Describes the configuration information used in the OWM, which includes devices, channel maps and channel definitions, tap values, channel and general alarms and channel and alarm validations.
Chapter	Command Line Interface	Explains the software functionality of the system including features, operation modes, command protocol and message format, protocol values, command usage rules, summary of the CLI commands and CLI data.
Chapter	Graphical User Interface	Explains the system requirements. Includes installing the GUI software, connecting the OWM, establishing the Internet Protocol (IP) address, connecting the network cable, starting the GUI and a description of the menu bar, toolbar and views.
Chapter	Simple Network Management Protocol	Describes the OWM Simple Network Management Protocol (SNMP) Agent.
Appendix A	System Specifications	Describes the OWM system compliance and unit specifications. Provides the industry and regulatory standards for the OWM.
Appendix B	Performance Verification	Describes the required equipment and procedure necessary to verify OWM performance.
Appendix C	Error Messages	Provides a description of all Command Line Interface (CLI) and Boot Loader error messages.
Appendix D	Alarm and Event Messages	Provides a description of all alarm and event messages generated by the OWM.
	Glossary	Contains a description of commonly used acronyms and phrases.

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Conventions

Table -2. Conventions

Convention	Description
bold	Commands or keywords that you must enter are in bold text.
italics	Parameters or arguments for which you supply a value.
[**x**]	Optional keywords or arguments that you may enter.
{ **x** | **y** | **z** }	Choice or alternate values (select exactly one).
"string"	String of characters that you enter. You must use double quotation marks around the character string.
`screen`	Information that appears on the screen.
^ or Ctrl or <ctrl>	Control keys, for example, ^D means pressing the Control and the D keys simultaneously.
*********	Nonprinting characters; for example; passwords.

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Contact Information

Technical Support

Technical Support is available by calling toll free (in the US) **1.877.929.HELP (4357)** 24 hours/day 7 days/week. Outside of the US, call **727.519.2860**.

Return Shipping Instructions

If it is necessary to return the unit, obtain a **Return Material Authorization (RMA) number** and **Return Shipping Address** by contacting Technical Support between 8:00 a.m. and 6:30 p.m. EST, Monday through Friday.

Please enclose a letter that briefly describes the reason for returning the unit and include the following information:

- Unit Serial Number
- Customer Name and Shipping Address
- Customer Contact Name and Telephone Number
- Secondary Customer Contact Name and Telephone Number
- Customer Supplied Purchase Order Number (if applicable)

If the original shipping container (box) is available, place the unit (and letter that describes the reason for the return) into the original Digital Lightwave, Inc. shipping container. **Do not include personal items such as jumper cords or connectors. Digital Lightwave, Inc. will not be responsible for these items.** Use the original foam inserts to protect all six sides of the unit.

Securely seal the shipping container, and mark **FRAGILE** on the container to ensure careful handling.

Include the **RMA number** on the outside of the shipping container.

If the original shipping container is not available, pack the unit (and the letter that describes the reason for the reason returns) and use the following general instructions to repack the unit using commercially available materials:

- Use a strong shipping container, similar to the original unit shipping box. Verify that the substitute container is rated at **350 lbs. per square inch** pressure durable.
- Make sure that the unit is satisfactorily protected using a layer of ESD Protected short absorbing foam material. The foam padding must be applied to all six sides of the unit to provide adequate protection. Make sure the unit cannot move or shift within the container.
- Securely seal the shipping container, and mark **FRAGILE** on the container to ensure careful handling.
- Include the **RMA number** on the outside of the shipping container.

Contact Technical Support for the Repair Department's Return Shipping Address.

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When service is complete, your unit will be returned to you postage paid if the shipment is within the United States. You are responsible for paying all shipping charges, duties, taxes, and other charges for products returned to Digital Lightwave, Inc. from any location within or outside of the United States.

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Safety Standards

The following information describes the safety standards required to safely operate the Optical Wavelength Manager (OWM).

Safety Notices

This device is intended for installation in a Restricted Access Location.

Observe the safety precautions outlined in the following sections for product damage, optical lasers, powering off and connecting to the unit when using the Optical Wavelength Manager (OWM). Failure to comply with these and other specific warnings and cautions in this manual violates Digital Lightwave's safety standards and the intended use of the equipment.

Digital Lightwave assumes no liability for the user's failure to comply with these precautions.

Product Damage



DANGER!

Do not use this product if it: has been subject to severe transportation stresses, has been stored in unfavorable conditions, shows visible damage or fails to operate. Secure the unit against any unintended operation and contact your Digital Lightwave technical support engineer for assistance.



Caution!

There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

Optical Lasers



DANGER!

The semiconductor laser transmitters which supply optical signals to the OWM, emit infrared lightwaves into the fiber optic cables at potentially hazardous levels. A DWDM signal, in particular, can equal the combined output of up to 50 laser transmitters.



WARNING!

Never attempt to view any un-terminated optical connector directly or with an optical instrument other than an indirect image-converting device. Viewing the laser light directly tends to combine the energy from an optical fiber and increase the risk of injury.

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Turning the Power Off

Although there is no special procedure required for turning off the power for this equipment or the operational software, it is recommended that all input power be disconnected from the source prior to removing the protective terminal block cover located on the input power terminal block. Only trained service personnel should install or remove this equipment from service.

Electric Shock Hazard



DANGER!

To avoid the possibility of severe injury, observe the following precautions when installing the OWM.

Do not install the unit if there are signs of damage to the unit.

When connecting DC power to the unit, connect the unit's ground lug to office ground before connecting the power lines.

Route unit power through a power safety device such as a power distribution panel equipped with circuit breakers. Verify that the unit's breaker is in the open position before connecting the power lines.

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The following table describes safely symbols which may appear on the unit or in this manual.

Safety Symbol	International Standard IEC - International Engineering Consortium ISO - International Organization for Standardization	Description
	IEC 417, No. 5031	Direct current
	IEC 417, No. 5032	Alternating current
	IEC 417, No. 5033	Both direct and alternating current
	IEC-617-2, No. 02-02-06	Three-phase alternating current
	IEC 417, No. 5017	Earth (ground) terminal
	IEC 417, No. 5019	Protective Conductor Terminal
	IEC 417, No. 5020	Frame or chassis terminal
	IEC 417, No. 5021	Equipotentiality
	IEC 417, No. 5007	On (Supply)
	IEC 417, No. 5008	Off (Supply)
	IEC 417, No. 5172	Equipment protected throughout by double insulation or reinforced insulation.[a]
	ISO 3384, No.8.3.6	**Caution:** risk of electric shock.
	ISO 3384, No.8.3.1	**Caution:** refer to the referenced documents.

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a. Equivalent to Class II of IEC 536, See annex. H.

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CHAPTER

System Hardware

Introduction

This chapter contains descriptions of the hardware components of the Digital Lightwave Optical Wavelength Manager (OWM) including physical, electrical and power characteristics. Pre-installation requirements and installation and connection requirements are also provided in this chapter.

Physical Description

The Digital Lightwave OWM is 3.5 inches (2U – 8.9 cm) high, 10.9 inches (27.7 cm) deep and 17.5 inches (44.5 cm) wide and includes rack-mountable assembly designed for mounting on either a 19-inch or a 23-inch EIA equipment mounting rack.

The unit weighs 15 pounds (21 pounds when placed inside its shipping container). The OWM unit contains the following components.

- Optical spectrometer
- Control processor
- DC power supply
- Front panel connectors
- Front panel status indicators (LEDs)



FIGURE -1. Digital Lightwave Optical Networking OWM System Hardware

Front Panel

Figure -1 displays the following components:

- Front panel status indicators:
  - FAIL
  - ACTIVE
  - ALARM

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- PCMCIA Slots
  - PCMCIA SLOT-1
  - PCMCIA SLOT-2
- Monitor Input Ports
  - PORT 1
  - PORT 2



The OWM can support many Monitor Input Ports. The number of input ports supported by the OWM is determined at the time of purchase. This example shows 2 Monitor Input Ports.

- Communication Ports
  - CRAFT (RS-232)
  - LAN-A (Ethernet)
  - LAN-B (Ethernet)
- Dual Power Supply Inputs
  - PWR A -48 VDC
  - PWR A RTN
  - PWR B -48 VDC
  - PWR B RTN

Electrical Connectors

Table -1 describes the electrical connectors on the front panel of the OWM system.

Table -1. Electrical Connectors

Connector	Description
ALARM	RJ-45 type terminal connection for alarm relays.
LAN-A LAN-B	RJ-45 type connectors used to connect the OWM to the network Ethernet LAN. Note: A shielded cable should be used and grounded at both ends.
CRAFT	Serial RS-232/DB9M connector used to locally control the OWM using an RS-232 serial console from a workstation/PC. The port is configured to run at 9600 baud, 8 bits per character, no parity, one stop bit and no flow control.

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Pre-Installation Requirements

This section explains the prerequisites that are necessary before installing and connecting the OWM system hardware. This section includes:

- Site planning
- Unpacking instructions
- Hardware requirements
- Optical cleaning methods

Site Planning

The following recommendations should be considered prior to installing the Optical Wavelength Manager (OWM).

- Place the OWM closely to the source of the signals being monitored to minimize measurement inaccuracies caused by inherent loss in cable.
- Avoid mounting the OWM above units generating large amounts of heat.
- If the OWM is being mounted in a closed cabinet, maximize the airflow around the unit to keep the ambient temperature as low as possible.

Each OWM shelf requires less than 10 Watts of power. This requirement should be considered when planning the office power requirements.

Unpacking Instructions

The OWM unit is shipped fully assembled.

1. Remove all packing material and inspect the unit for signs of shipping damage.
2. Report any damage found to the carrier before proceeding.
3. Save the packing material for later use in shipping the unit to another location or for use in returning the unit to Digital Lightwave.

Hardware Requirements

Before installing the OWM, consider the following:

- The OWM is designed to be installed on a 19-inch or a 23-inch equipment mounting rack meeting EIA-RS-310C standards.
- Mounting rack may be either open or enclosed within a cabinet assembly. If the equipment rack is enclosed within a cabinet, the cabinet must include provisions for venting hot air such as fans or air conditioning.
- Air space measuring at least 1 inch wide is required between the sides of the OWM and the cabinet side panels.
- Air space measuring at least 3 inches wide is required between the rear of the OWM and the cable access door panel located at the rear of the cabinet.
- Mounting hardware such as screws and brackets are supplied by the customer.

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Cleaning Optical Connectors and Fibers



Before installing the OWM, thoroughly clean all fiber-optic cables and connectors.

Fiber optic connectors are cleaned at assembly, but require re-cleaning when the equipment is installed. Clean these connectors before mating them with the optical connectors on the OWM unit. There are two basic processes that may be used for cleaning optical connectors and fibers; the dry cleaning method and the wet cleaning method.

Dry Cleaning Method

The dry cleaning method is faster and easier to perform than the wet cleaning method and it produces consistent results. It is also better suited to environments where working conditions may be less than ideal. To use this method:

1. Use a cleaning tape made of a non-scratching cloth fiber that is housed in a protective enclosure similar to a tape rule, for example, a CLETOP™ Optical Fiber Connector Cleaner (a self-contained cleaner).
2. Slide open the door on the tape dispenser to advance the tape inside and expose a new section of tape.
3. Brush the optical connector across the tape in two directions to clean off any film or debris on the glass surface.

Wet Cleaning Method

The wet method requires greater care than the dry cleaning method, but produces better results than the dry method and is typically recommended in head end and central office applications.

1. Use a soft cleaning pad, for example, Texwipe's TX404™, apply 99.9% pure isopropyl alcohol (do not use common rubbing alcohol) to clean the ends of the fiber and the unit optical connectors. Specially designed non-scratching, cotton-tipped swabs are also available for cleaning the optical connectors with isopropyl alcohol.
2. Use a dust-removing aerosol air can, for example, Ultrajet® 2000 by Chemtronics® to dry the optical interface and for blowing off any dust particles, which might be clinging to the optical surface.



When using a dust removing aerosol can, be sure to hold the can in an upright position. Do not shake the can. Do not blow air directly on the fiber. Failure to follow this procedure may damage the connector or cause contaminants on the fiber surface.

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Installation and Connection Requirements

This section describes how to establish the hardware connections necessary to connect optical fibers, system hardware for serial and network connections, establish power connections and add an alarm relay. Refer to the front panel illustration in Figure -2 during the installation process.

Before proceeding, you need the following cables to connect to the OWM:

- Fiber-optic cables compatible with the Monitor Input port connector type. A blue SC/UPC port interface can only accept a SC/UPC (typically blue) fiber connector. Similarly, a green SC/APC port interface can only accept a SC/APC (typically green) fiber connector.
- RS-232 cable for connecting to the CRAFT port.
- Category 5 Ethernet cable to connect the LAN ports to a switch or a hub.
- Category 5 Ethernet crossover cable to connect LAN ports to a workstation or a PC.
- Alarm cable (26 AWG) terminated with an RJ-45 connector on the end that connects to the alarm port. The other end connects to the alarm collection equipment and is terminated according to local site standards.

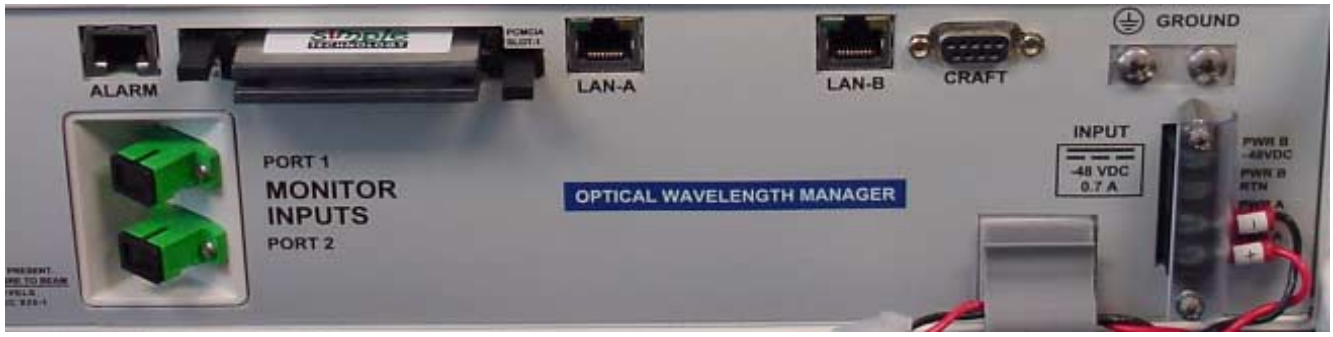


FIGURE -2. Front Panel

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Connecting the Optical Fiber Cable to the OWM



The semiconductor laser transmitters, which generate optical signals in the network, emit infrared light waves at potentially hazardous levels into the light guide cables. ***Never*** *attempt to view any unterminated optical connector directly or damage to the eyes may result.*

An optical tap can be inserted into a fiber span to supply the OWM optical input signal. Various optical taps may be used, however, the OWM generally uses a 1% tap (Figure -3). If you are operating the OWM exclusively as an OSA, however, a 100% optical tap should be used (Figure -4).

The optical signal power coming into the OWM must not cause any individual channel to exceed -10 dBm (+/- 3 dB tolerance). If a broadband optical source is used at the input, the spectral power density must be held below -1 dBm/nm (+/- 3 dB tolerance). Failure to comply with these thresholds will cause saturation but will not damage the OWM.

It is important that the fibers be clean before the following steps are performed:

1. Verify the connector type at the Monitor Input Port interface is compatible with the fiber connector. A blue SC/UPC port interface can only accept a SC/UPC (typically blue) fiber connector. Similarly, a green SC/APC port interface can only accept a SC/APC (typically green) fiber connector.
2. Inspect the cable ends using a commercially available, indirect image-converting optical scope and clean the connector appropriately (see *"Cleaning Optical Connectors and Fibers" on page - 4*). Cleaned cable ends should be capped if not immediately connected to the OWM. Small dust particles on the ends of the optical fiber can be harmful to system performance.
3. Align the connector key with the notch on the port connector.
4. Insert the connector using light pressure.

   Forcing a connector during insertion can cause damage. Dropping a connector can scratch the optical surface and adversely affect system performance.

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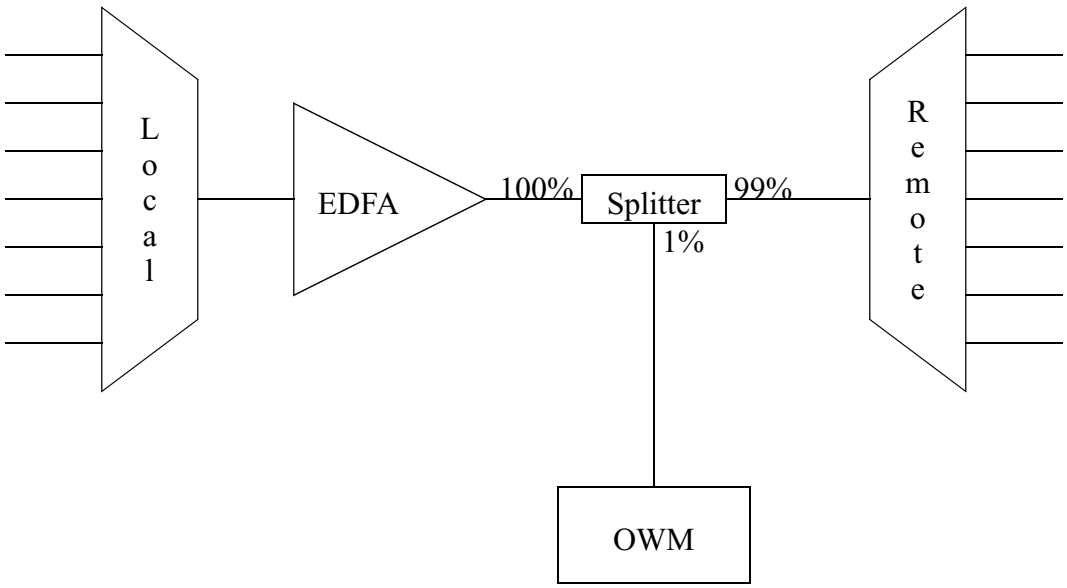


FIGURE -3. 1% Tap Power

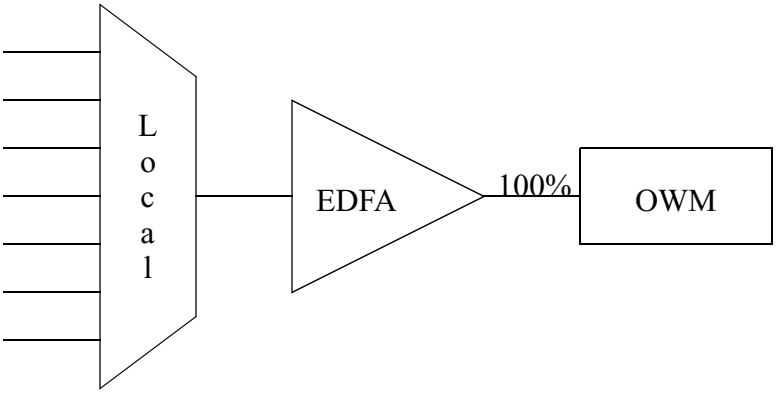


FIGURE -4. 100% Tap Power

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Connecting the System Hardware for Serial Communications

A connection to the OWM's RS-232 serial communications port must first be established to allow network settings to be configured.

You access the OWM by connecting from a computer or workstation to the OWM system hardware for serial communications. Connecting through the serial port provides total control of the OWM, because the connection goes directly to the OWM System Hardware from your computer.

To connect the OWM system hardware for serial communications, use a null modem cable:

1. Connect one end of a DB9 null modem cable to the CRAFT RS-232 interface port (DB9 male) on the OWM. The end of the cable connecting to the OWM must be female.
2. Connect the other end of the null modem cable to your workstation/PC COM port. The end of this cable must be appropriate for your workstation/PC COM port. Typically this is either a DB9 female or DB25 female.

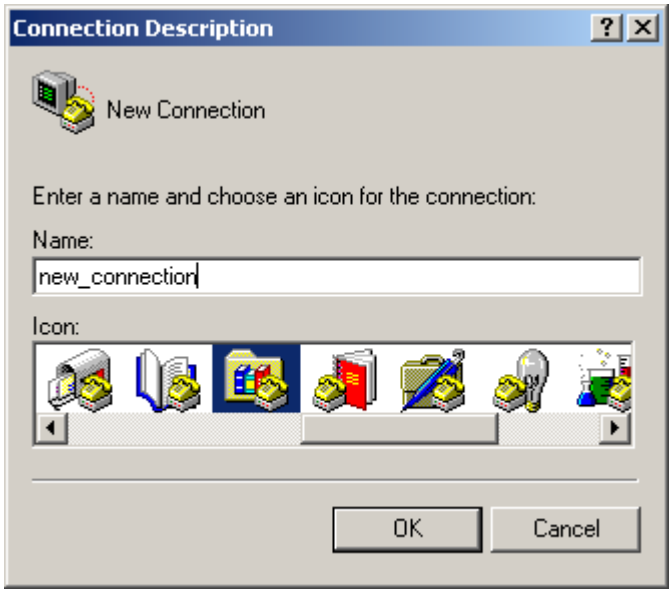
You are now ready to configure the PC's COM port using a serial port terminal emulation program such as HyperTerminal.

3. Select **Start>Programs>Accessories>Communications>HyperTerminal**.



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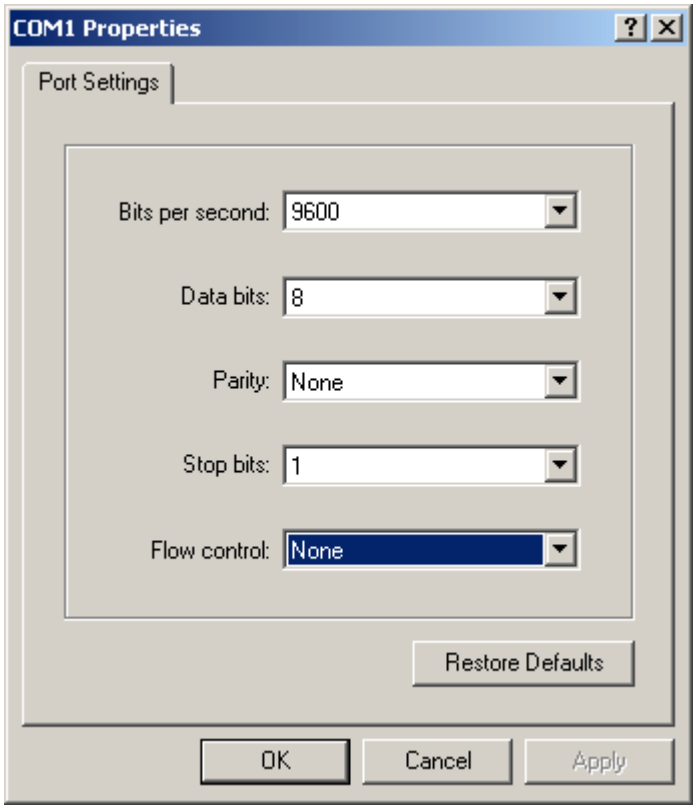
4. From the Connection Description dialog box, enter a name and select an icon for your new connection and click **OK**.



5. From the Connect To dialog box, select the appropriate COM Port and click **OK**.



6. From the COM1 Properties dialog box, enter the port settings. It is important that Flow control is set to None. Click **OK**.



Power Connections

To supply power to the OWM, perform the following steps:

1. Unscrew and remove the two phillips head screws on plastic housing covering the terminal block.
2. Remove the plastic housing.
3. Unscrew and remove the 4 slotted phillips head screws on the terminal block.
4. Align the terminal block power adaptor holes over the terminal block holes and screw in the four terminal block screws.
5. Reattach the plastic housing that covers the terminal block using the two plastic housing screws.
6. Insert the J1 receptacle on the power supply into the J1 plug on the OWM and gently push until the connection is properly seated.
7. Pull back the power cord restrainer clip and run the DC power cord across the terminal block housing and through the power cord restrainer clip. This will prevent the power cord from accidently being disconnected.
8. Connect the AC power cord on the power supply to an AC outlet.

Once the power connections have been made the OWM will boot after approximately 30 seconds.

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Set the OWM's IP Address

For a direct network connection, perform the following steps to set the IP address on the OWM:

1. **Login to the OWM** – Using a terminal emulation package (such as HyperTerminal) login to the OWM's Command Line Interface (CLI) using "***admin***" as the default login and password.
2. **Set the OWM's IP address** – To set the OWM's IP address and subnet mask, use the command "***ip***" at the OWM's command line prompt. This example will set the IP address to "`10.254.254.254`" and the subnet mask to the default of "`255.0.0.0`":

   <opm>% ip 10.254.254.254
3. **Verify the IP address** – To verify that the OWM's IP address has been set, use the command "***show ip***" at the OWM's command line prompt.

   % show ip

   % ip 10.254.254.254 0xff000000

Connecting the System Hardware for Network Communications

You can access the OWM by connecting from a laptop computer or workstation to the OWM system hardware for network communications. Connecting through a telnet session provides convenience and accessibility, because users can be a distance away from the OWM System Hardware.

To connect to the OWM system hardware for network communications:

1. Attach a straight through CAT-5 Ethernet cable to the OWM LAN port (LAN A or LAN B).
2. Attach the other end of the CAT-5 Ethernet cable to the network hub or switch.

To connect directly to your PC or workstation:

1. Attach a crossover CAT-5 Ethernet cable to the PC Ethernet LAN port.
2. Attach the other end of the crossover CAT-5 Ethernet cable to the OWM LAN port (LAN A or LAN B).

Validate Ethernet Link

Once a valid Ethernet link is established, the Link Integrity light next to the LAN port on the OWM will light up, indicating a valid Ethernet (i.e. Data Link Layer 2) link.



The Link Integrity light does not indicate a valid or invalid IP (i.e. Network - Layer 3) link and/or associated configuration. It only indicates a valid Ethernet (i.e. Data Link, Layer 2) link.

Set the PC's IP Address

Setting the PC's IP address is necessary to establish a direct network connection.

Changes to the IP configuration are likely to be disruptive to your PC's current functionality. To re-establish current PC functionality, existing PC settings should be recorded prior to making any configuration changes.

Configure your PC with a valid static (i.e. hard coded) IP address within the same subnet and utilizing the same subnet mask as the OWM.

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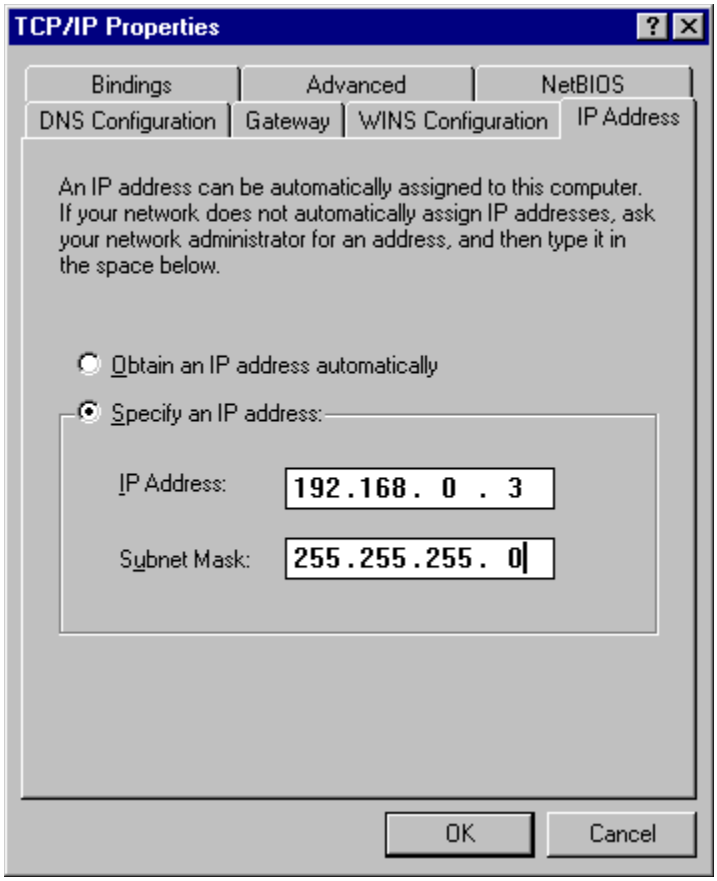
The following instructions will offer some guidance on where to configure the static IP address and subnet mask on your PC. Operating systems and their configurations differ between PCs, therefore, the following examples are only some of the ways to configure a static IP address. The examples shown demonstrate how to configure a PC with IP address 10.254.254.2 and subnet mask 255.0.0.0.

Windows 2000: Start >Settings >Control Panel >Network and Dial-up Connections >Local Area Connections >Properties >Internet Protocol (TCP/IP) >Properties >Use the following IP address.



Windows 98: Start >Settings >Control Panel >Network >TCP/IP >Properties >IP Address >Specify an IP address

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Using the "Obtain an IP address automatically" setting will fail to establish a proper IP connection between your PC and the OWM. It is intended ONLY for use with an Ethernet Connection to your organization's LAN Environment.

Validate IP Connectivity (optional step)

The following optional steps will validate that the PC's IP configuration has been set properly and that the PC can communicate with the OWM via IP.

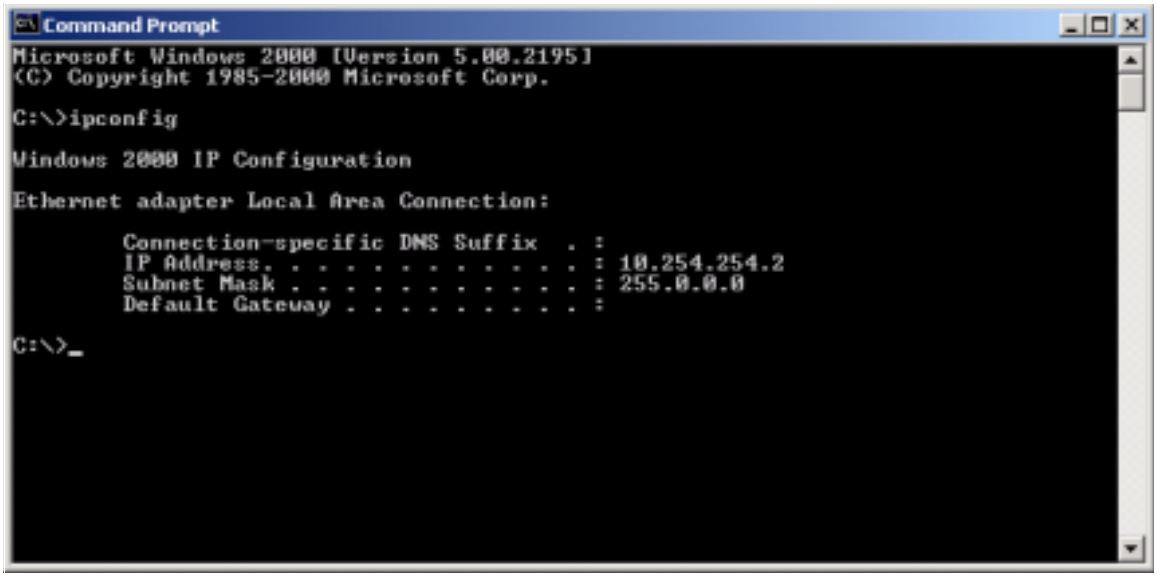
1. From your PC, bring up the MS-DOS command prompt. Examples are shown for Windows 2000 and Windows 98 operating systems.

   Windows 2000: Start > Programs > Accessories > Command Prompt

   Windows 98: Start > Programs > MS-DOS Prompt

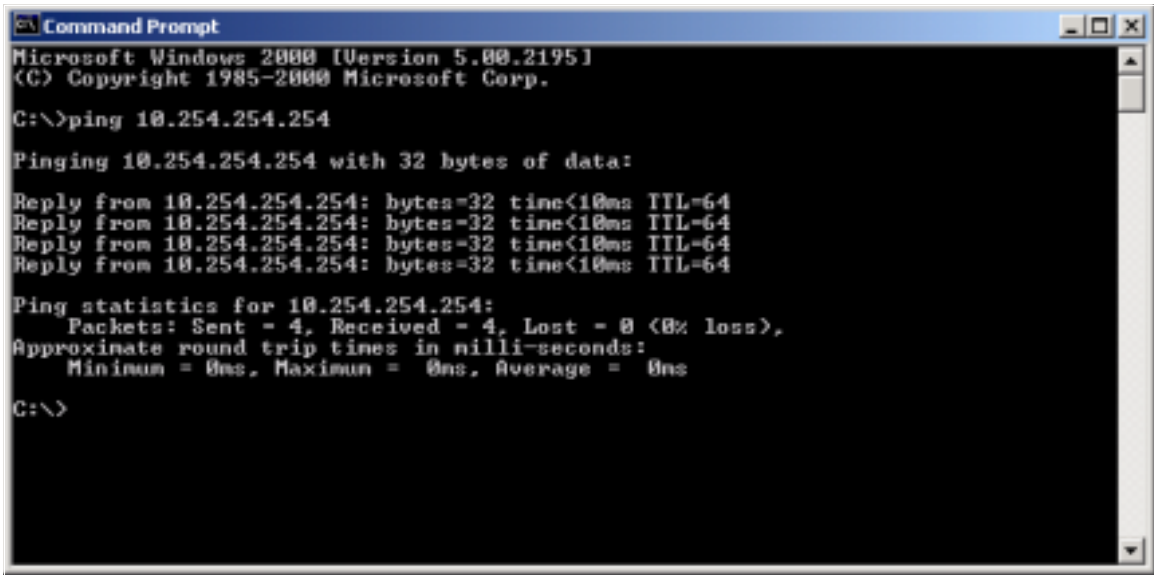
The Windows 98 operating system may require the user to reboot the PC.

2. Type the command "***ipconfig***".
3. Verify that the IP address and the Subnet Mask are the same as the ones that were entered previously in the section entitled "Set the OWM's IP Address" on page -11.



4. Type the command "***ping 10.254.254.254***".
5. The PC and the OWM's TCP/IP settings are correct if the OWM replies with something similar to the following message:

   Reply from 10.254.254.254: bytes=32 time<10ms TTL=64



6. Recheck the connectivity and PC and OWM configurations if the following message appears:

   Request timed out

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*Contact your System Administrator if after rechecking the connectivity, the **"Request timed out"** message appears.*

Alarm Connections

Figure -2 shows the ALARM receptacle as it appears on the OWM system unit. Figure -5 shows the pin out for the RJ-45 alarm connector.

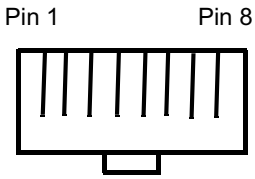


FIGURE -5. Alarm Connector Pin Out

Use an 8-wire, 26 gauge cable equipped with an RJ-45 connector to connect the OWM alarm relays to the office alarm system. The RJ-45 connector pin assignments are shown in Table -2.

Table -2. Alarm Connector Pin Assignments

Pins	Purpose
1,2	Critical alarm relay (normally open)
3,4	Major alarm relay (normally open)
5,6	Minor alarm relay (normally open)
7,8	Information alarm relay (normally open)

Hardware Installation Completion

Now that the hardware installation is complete, you may want to install the Graphical User Interface (GUI). For detailed instructions on installing and using the GUI, refer to Chapter entitled Graphical User Interface.

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CHAPTER

Theory of Operations

Introduction

This chapter describes the features of the Optical Wavelength Manager (OWM) used in day-to-day operations. Some features are accessible in User Mode while other features are only accessible from Configure Mode.

Operation Modes

The OWM supports two operating modes; User Mode and Configure Mode.

User Mode

User mode is the standard access level for most users. This mode of operation allows the user to view the features and configuration of the OWM, and change non-critical no-performance related settings. In the CLI, User mode is indicated by a % (percent sign) prompt. To see the commands available in User Mode, refer to Table -1, "CLI Command Syntax and Access Levels" on Page -6.

In general, User Mode allows you to perform basic operations like:

- Displaying operations information
- Displaying current measured data such as peak values, spectrum values, power, wavelength and OSNR data from the OWM system
- Copying and deleting files
- Pinging and displaying IP address information
- Acknowledging alarms
- Viewing data log, event and alarm information
- Setting non-optical properties for the OWM. Date, time, SNTP, SNMP are examples of non-optical settings.

Configure Mode

Configure Mode is the advanced level which allows users with *admin* or *config* security access levels to change or modify configuration parameters. Configuration mode is entered from the GUI by clicking on **Admin** in the main menu bar and selecting **Managing Configuration**. Configuration mode is entered from the CLI when the user types **configure** at the command prompt.

In general, configuration mode allows you to perform basic optical configuration operations like:

- Configuring, adding and deleting information about devices, channels, alarms and ports
- Setting OSNR and port tap values
- Issuing benchmarks

Parameters changed in Configuration Mode must be "applied" or "saved" to the OWM.

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When entering configure mode, a copy is made of all optical settings. All edits are made against the copied data. At this point, only the person making the edits will see any changes. To see the new settings, the editor uses the "show new..." commands.

When an "apply" is issued, then the copied data is moved into the system data. At this point, all logged on users will see any changes made to the system. These changes are only in the OWM system memory. If, the OWM is rebooted, data that has been applied (but not saved) will be lost and the OWM will operate using a stored configuration database.

After data has been applied, it must be saved to be made permanent. Saved data is stored in persistent memory (disk) and is retained and utilized after an OWM reboot procedure. To save the changes *and* affect the current OWM operation, you must "apply" the data first and then "save".

Managing the OWM Interface

The OWM can be controlled by several different interfaces.

- **CLI** - Command Line Interface
- **GUI** - Graphical User Interface
- **SNMP** - Simple Network Management Protocol

Each of these interfaces offers a different method of interacting with the OWM. Consequently, each interface offers unique advantages.

The CLI is useful for users that enjoy a programming-like environment and are comfortable using an ASCII interface. In environments where network failures are a frequent problem, it may be advantageous to use the CLI which utilizes a reliable RS232 serial interface. The CLI would also be a good choice for users needing to run scripts.

The GUI is advantageous for users comfortable operating in a windowed environment. Its user-friendly point-and-click interface makes navigating the OWM quick and easy. Colorful graphical presentations make the GUI the best method for visually interpreting optical activity.

SNMP is often used in large Network Operation Centers (NOC) and is commonly used to monitor alarm conditions by setting traps.

GUI

The Digital Lightwave Graphical User Interface (GUI) is designed to monitor, manage and configure OWM optical and system tasks. The Java GUI provides a user-friendly, point-and-click graphical interface used to navigate the OWM. It presents colored graphs and charts that make monitoring information easy to read and navigate.

A series of menu driven dialogs control the flow of OWM operation. A handy toolbar is also provided which contains icons for easy point-and-click command access. Holding the mouse over an icon reveals a brief description of the command.

The GUI also supports keyboard command shortcuts. Keyboard command shortcuts are used to issue commands via keyboard entry and navigate through the menus and sub-menus on the main menu bar. Commands on the main menu bar (i.e. File, View, Display etc.) and commands within the sub-menus (i.e. Users, Peak View, Graphic properties etc.), have an underlined character associated with each command. A keyboard command shortcut is activated by holding down the <ALT> key and pressing the underlined character associated with a command on the keyboard. For example,

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<ALT>F will display the File menu. Once the File menu's sub-menu is displayed, keyboard shortcuts can be used for commands in the sub-menu. Keyboard shortcuts only work for commands that are visible on the desktop. For example, <ALT>V must be performed to display the View sub-menu before <ALT>P will display Peaks view.

CLI

The Digital Lightwave Optical Wavelength Manager (OWM) Command Line Interface (CLI) is an ASCII interface used to monitor, manage and configure OWM optical and system tasks.

Connection to the CLI is achieved through either a serial port or a Telnet session. A serial port provides a direct connection using an RS232 port (CRAFT port) located on the OWM system unit. A Telnet session is made through a LAN connection using the IP address. Instructions for connecting system hardware for serial and network communications can be found in Installation and Connection Requirements.

The CLI operates in two modes; User mode and Configuration mode. When you first login to the CLI, you automatically enter User mode. Typing **configure** allows the user to enter Configuration mode. These modes are easily identified by their command line prompts. The User mode command line prompt is **%** and the Configuration mode prompt is **<***name***>%** where *name* is the OWM name. If no name is defined, the Configuration mode prompt is **<>%**.

Typing **help, ?** or **h** at the command prompt, provides a convenient way to list all OWM commands accessible in the current mode. All commands are accessible from Configuration mode and a subset of commands (primarily read-only commands) are accessible from User mode. The command list is useful for checking command syntax. For a complete description of all the CLI commands including examples, refer to the "Summary of Commands" on page -6.

Dialoguing between the CLI and the OWM consists of a sequence of request and reply messages. Requests are generated when users issue a command at the command line prompt. Replies are issued by the OWM in response to commands, alarms and error messages. Solicited reply messages are sent in response to request messages. Unsolicited reply messages are sent in response to asynchronous events such as alarm events. Unsolicited reply messages are easily recognized because they begin with the string "!ALARM". Syntax errors result in a reply message beginning with the string "!SYNTAX".

Request and reply messages employ the following formatting rules:

- Commands are case insensitive. Mixing upper and lowercase characters is allowed. However, character strings are case sensitive.
- Requests terminate with a new line (ASCII 0x0a) character.
- Space characters are ignored on input, except in character strings which appear between quotation marks.
- Any sequence of one or more white space characters are treated as a single space. White space includes using the horizontal bar, vertical bar, form feed key and space (ASCII 0x09, 0x0B, 0x0C and 0x20) characters.
- Blank lines are ignored.
- Numbers conform to standard programming format rules for integers and floating point values. All numbers are either an integer or a floating point (rational) number.

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- Successful command completion generally results in a reply message (one or more lines of output) at the command line prompt. A new line containing a command line prompt will follow the reply message.
- Unsolicited reply messages begin with an exclamation (**!**) character (ASCII 0x21) and end with a command line prompt.

SNMP

The OWM supports Simple Network Management Protocol (SNMP).

SNMP is an application-layer communication protocol that allows network devices to exchange management information. SNMP enables network administrators to manage network performance, find and solve network problems and plan network growth. OWM SNMP implementation uses standard Internet Engineering Task Force (IETF) MIBs to convey management information for generic read-only management. SNMP allows limited management of the OWM by generic SNMP management software. The OWM supports SNMP Version 1 (SNMPv1) and SNMP Version 2c (SNMPv2c). Both versions share many features, but SNMPv2c includes additional protocol operations.

For a list of supported MIBs, refer to Table 1-1, "MIBs Supported by the OWM" on Page 1-7.

For a summary of MIB compliance, refer to Table -1, "MIB-II Compliance" on Page -1.

Ports

Monitor input ports provide the "window" in which optical signals enter the OWM device. A splitter, or optical tap, provided by the consumer is used to separate a small portion of light from a main communication fiber for analysis by the OWM. Typically a 1% tap is used. A 1% tap passes 99% of optical power through the main fiber and splits off 1% (-20 dB) of power to the OWM. A signal with a power level 3 dBm in the main fiber appears at a -17 dBm level at the OWM input port. Setting the tap power ratio to 1% permits the OWM to report this signal as 3 dBm referred to the main fiber, by correcting for the 20 dB power reduction at the coupler.

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Table -1. Tap Power Ranges

Tap Power %	Tap Power (dBm)	Reported Range (dBm)		Reported Range (+/- 3 dBm)	
100.0%	0.0	-10.0	-70.0	-7.0	-73.0
90.0%	-0.5	-9.5	-69.5	-6.5	-72.5
50.0%	-3.0	-7.0	-67.0	-4.0	-70.0
25.0%	-6.0	-4.0	-64.0	-1.0	-67.0
12.5%	-9.0	-1.0	-61.0	2.0	-64.0
10.0%	-10.0	0.0	-60.0	3.0	-63.0
1.0%	-20.0	10.0	-50.0	13.0	-53.0
0.5%	-23.0	13.0	-47.0	16.0	-50.0
0.1%	-30.0	20.0	-40.0	23.0	-43.0

In order to simulate activity on the main communication fiber (100% tap), a correction is applied to the sample coming in at the input port. To apply the correction, the OWM must be supplied with the percent of light coming in from the splitter. This is why each port has a user defined port tap power associated with it. The port tap power, or scaling factor, must be defined to coincide with the tap percentage of the splitter on the incoming fiber. In order to report the power levels in the main fiber being monitored, it is necessary to know the tap power ratio. Failure to set the port tap power parameter correctly will adversely affect the power measurement accuracy of the OWM.

The OWM has tap power entries for "ports" and also for "devices". The *port* tap power is the default value used until *devices* are defined during OWM setup. When devices are activated, the tap power settings of the device override the port tap power parameters. For more information on device tap power, see "Devices" on page -5.

Devices

An OWM can have a series of defined devices. An OWM device provides additional information and rules to the raw port data. A device has a tap power and channel map and is associated with port. By having device definitions, we can generate benchmarks, tidemarks, and log information. Devices also give us the ability to define alarms.

The maximum number of devices that can be defined is equal to the number of physical ports on the OWM. Typically, each port will be associated with only one device. However, this is not necessary. A port can be associated with more than one device. An OWM can define multiple devices but can sample only one device at a time. Note also that the tap power percentage for the device can be used to compensate for additional losses in the optical path.

Channel Map

When a device is created, a channel map, also known as a channel plan, is also created. A channel map contains configuration data that is required by the spectrometer to perform monitoring for one or more channels that are present on an optical fiber. The channel map provides the OWM with channel definitions. When a device is *activated*, the channel map is downloaded to the OWM spectrometer.

Channel Definitions

A channel definition is the configuration and control information used by the OWM to monitor a single channel. A list of channel definitions is used to create a channel map for monitoring all of the channels on a device. Channel definitions provide:

- Channel Number
- Channel ID
- Channel Description
- Minimum, Center and Maximum Wavelengths
- Wavelength Alarms that include:
  - Critical alarm values for minimum wavelength trigger, minimum wavelength clear, maximum wavelength clear and maximum wavelength trigger
  - Major alarm values for minimum wavelength trigger, minimum wavelength clear, maximum wavelength clear and maximum wavelength trigger
  - Minor alarm values for minimum wavelength trigger, minimum wavelength clear, maximum wavelength clear and maximum wavelength trigger
- Power Alarms that include:
  - Critical alarm values for minimum power trigger, minimum power clear, maximum power clear and maximum power trigger
  - Major alarm values for minimum power trigger, minimum power clear, maximum power clear and maximum power trigger
  - Minor alarm values for minimum power trigger, minimum power clear, maximum power clear and maximum power trigger
- Optical signal-to-noise ratio (OSNR) Alarms that include:
  - Critical OSNR values for minimum OSNR trigger, minimum OSNR clear
  - Major OSNR values for minimum OSNR trigger, minimum OSNR clear
  - Minor OSNR values for minimum OSNR trigger, minimum OSNR clear

Channel bandwidth requirements

- All frequency wavelengths are specified to 2 decimal places.
- The maximum bandwidth is limited to the value specified.

Channel Validations

A channel is validated before being added to device channel map. Validation is performed in the following sequence:

- The minimum wavelength is greater than the system minimum wavelength.
- The maximum wavelength is less than the system maximum wavelength.

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- The minimum wavelength must be less than the center wavelength and the center must less than the maximum.
- The center wavelength is added to the existing channel map which is sorted by the center wavelength.
- The minimum and maximum wavelengths are checked against the previous channel and the next channel. The minimum wavelength must be greater than the previous maximum wavelength. The maximum wavelength must be less than the next minimum wavelength. If the channel fails either of these tests, then it is removed from the channel map.

Assigning Channel Wavelength Definitions

Defining channel wavelengths can be generated in one of two ways: manual keyboard entry or by automatic generation.

Instructions for manual channel definition can be found in "Configuring a Channel Manually" on page -85.

Automatic wavelength generation employs the Auto Define feature which allows channel wavelengths to automatically be defined in one of three ways:

1. Peaks with Alarms
2. Peaks
3. C-Band

Once automatic channel wavelength definitions are created, it is possible to change a definition manually.

Peaks with Alarms

The Peaks with Alarms option performs the Peak command and generates a best estimate on channel and alarm definitions. When Peaks with Alarms option is invoked, the current state of the OWM is captured including the current port, the current device and the Sequencer state. It switches to the specified device port and gets the peaks for that port. For each peak, a channel is defined. The specified GHz parameter is used to determine the **maximum** bandwidth of the channel. Current values are 200 GHz (1.6 nm bandwidth), 100 GHz (0.8 nm bandwidth) and 50 GHz (0.4 nm bandwidth).

The channel defined must be valid. From each peak, power and OSNR values are taken and alarms are defined and stored with the channel definition. The system is then restored to its original state.

To calculate the minimum wavelength offset

1. Take the difference between the current peak and the previous channel center wavelength and subtract 0.01 nm. The 0.01 nm is used to prevent overlapping channels.

   If the difference is greater than 1/2 maximum bandwidth, use the 1/2 maximum bandwidth as the offset.

2. Take the current peak and subtract the offset.

   If this value is less than the minimum OWM system wavelength, use the minimum OWM system value.

To calculate the maximum channel wavelength offset

1. Take the difference between the current peak and the next channel center wavelength.

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If this is greater than 1/2 maximum bandwidth, use the 1/2 maximum bandwidth as the offset.

2. Take the current peak and add the offset.

   If this value is greater than the maximum OWM wavelength, use the maximum OWM system value.

Channel Alarm Definition From Peaks

Alarms are defined by applying predefined offsets to the captured wavelength, power and OSNR values. These offsets are applied using the following rules:

- The wavelength alarms are offset from the channel minimum/maximum definition. The alarms are **not** offset from the center wavelength.
- The power alarms are offset from the power readings taken from the peak.
- The OSNR alarms are offset from the OSNR readings taken from the peak.
- The offset is subtracted or added based on if the alarm being defined is a minimum or maximum alarm.

Table -2 defines the offset values to be used for alarm definitions. These offset values are hard-coded and cannot be changed.

Table -2. Alarm Definition Offset Values

		Trigger (GHz)		Clear (GHz)	
Type	**Level**	**50**	**100/200**	**50**	**100/200**
Wavelength (nm)	Critical	0.1	0.28	0.12	0.3
	Major	0.13	0.32	0.15	0.34
	Minor	0.16	0.35	0.18	0.37
Power (dBm)	Critical	2.5		2.0	
	Major	1.5		1.0	
	Minor	0.8		0.3	
OSNR (dB)	Critical	3.5		3.0	
	Major	2.5		2.0	
	Minor	1.5		1.0	

Before an alarm is created, it is validated. For the validation rules, see "Channel Alarm Validations" on page -12. Alarms are defined in the following order: critical, major and minor. If the first attempt at defining the critical alarm does not succeed, the alarm is defined using the major alarm offset values. This alarm will still be a critical alarm but it will use the major alarm offsets. If it fails again, the minimum offset values are used. If it continues to be unsuccessful, the alarm remains undefined and

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alarm definition continues with the next alarm for that channel. This is repeated for the maximum and minimum alarms. The process is repeated for wavelength, power and OSNR alarms.

After the channel alarms have been automatically generated, the individual channel alarm settings can be modified. All automatically defined alarms are disabled by default.

The following figure shows a channel defined with all alarms defined from peaks.



FIGURE -1. Channel Detail Dialog with Alarm Definitions

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Peaks

The Peaks option performs the Peak command and generates a best estimate on channel definitions. The Peaks option defines channels using the same process as ""Peaks with Alarms" on page -7" except that alarms are not generated.

CBand

The CBand option defines channels by taking the first 50 channels in the CBand that meet the minimum requirements for an OWM channel. No alarms are defined.

Channels From C-Band

100 GHz Channel Spacing

The following values are used for the Channels from C-Band command for 100 GHz channel spacing. Each value represents the center wavelength of a channel to be defined. The command starts defining channels beginning with the lowest value. A channel is not defined unless the center wavelength falls between the OWM system wavelength limits. The first 50 valid channels are defined. The maximum bandwidth for each channel is 0.8 nm.

1527.22, 1527.99, 1528.77, 1529.55, 1530.33,

1531.12, 1531.90, 1532.68, 1533.47, 1534.25,

1535.04, 1535.82, 1536.61, 1537.40, 1538.19,

1538.98, 1539.77, 1540.56, 1541.35, 1542.14,

1542.94, 1543.73, 1544.53, 1545.32, 1546.12,

1546.92, 1547.72, 1548.52, 1549.32, 1550.12,

1550.92, 1551.72, 1552.52, 1553.33, 1554.13,

1554.94, 1555.75, 1556.56, 1557.36, 1558.17,

1558.98, 1559.79, 1560.61, 1561.42, 1562.23,

1563.05, 1563.86, 1564.68, 1565.50, 1566.31

50 GHz Channel Spacing

The following values are used for the Channels from C-Band command for 50 GHz channel spacing. Each value represents the center wavelength of a channel to be defined. The command starts defining channels beginning with the lowest value. A channel is not defined unless the center wavelength falls between the OWM system wavelength limits. The first 100 valid channels are defined. The maximum bandwidth for each channel is 0.4 nm.

1527.22, 1527.61, 1527.99, 1528.39, 1528.77,

1529.16, 1529.55, 1529.94, 1530.33, 1530.73,

1531.12, 1531.51, 1531.90, 1532.29, 1532.68,

1533.07, 1533.47, 1533.86, 1534.25, 1534.64,

1535.04, 1535.43, 1535.82, 1536.22, 1536.61,

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1537.00, 1537.40, 1537.79, 1538.19, 1538.58,
1538.98, 1539.37, 1539.77, 1540.16, 1540.56,
1540.95, 1541.35, 1541.75, 1542.14, 1542.54,
1542.94, 1543.33, 1543.73, 1544.13, 1544.53,
1544.92, 1545.32, 1545.72, 1546.12, 1546.52
1546.92, 1547.32, 1547.72, 1548.12, 1548.52
1548.92, 1549.32, 1549.72, 1550.12, 1550.52
1550.92, 1551.32, 1551.72, 1552.12, 1552.52
1552.93, 1553.33, 1553.73, 1554.13, 1554.54
1554.94, 1555.34, 1555.75, 1556.15, 1556.56
1556.96, 1557.36, 1557.77, 1558.17, 1558.58
1558.98, 1559.39, 1559.79, 1560.20, 1560.61
1561.01, 1561.42, 1561.83, 1562.23, 1562.64
1563.05, 1563.46, 1563.86, 1564.27, 1564.68
1565.09, 1565.50, 1565.91, 1566.31, 1566.72

Alarm Hysteresis

OWM channel alarm definitions have "trigger" and "clear" values, allowing for a lag in response ("hysteresis") to changes in measured wavelength, power and OSNR values. Hysteresis prevents a "ping-pong" effect, where an undesirable number of alarm events may be generated, allowing some space to be defined between the "trigger" and "clear" values. Trigger and clear provide hysteresis to prevent alarm storms. The trigger point is the alarm threshold. Clear is above the alarm threshold.

Alarm Example

An example of an alarm is the critical minimum wavelength alarm. When the wavelength of a defined channel drifts below the minimum alarm trigger value, an alarm is activated. The alarm remains activated until the wavelength exceeds the minimum alarm clear value.

If the wavelength is between the trigger and clear values, the alarm remains activated. The wavelength must cross the "alarm clear value" for the alarm condition to discontinue.

After the wavelength returns above the minimum alarm clear value, the alarm remains cleared until the wavelength falls below the minimum alarm trigger value. If the wavelength is between the minimum alarm trigger value and the minimum alarm clear value, no alarm is activated.

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Channel Alarm Validations

This section describes the validation criteria for configuring wavelength, power and OSNR alarms.

Wavelength Alarm Configuration Rules

Figure -2 illustrates the OWM wavelength alarm configuration. Note that there must be a 0.1 nm difference between wavelength definitions.

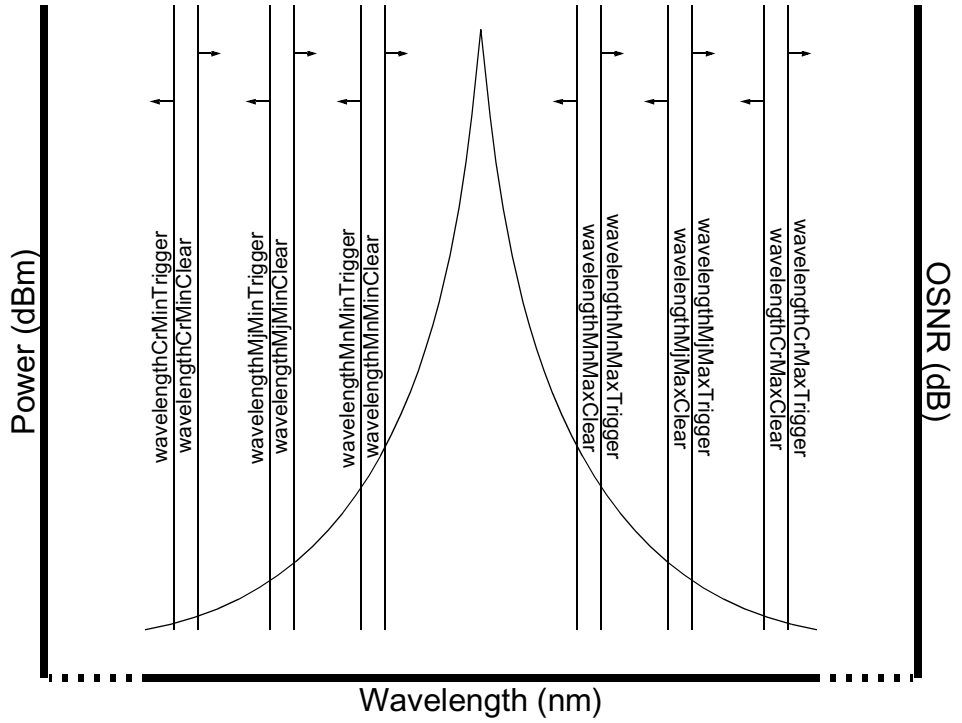


FIGURE -2. OWM Wavelength Alarm Configuration

Critical Maximum Wavelength

For the critical maximum wavelength alarm parameters (Figure -2), follow the rules below:

- Trigger must be less than the maximum wavelength
- Trigger must be greater than the center wavelength
- Trigger must be greater than clear

Critical Minimum Wavelength

For the critical minimum wavelength alarm parameters, follow the rules below:

- Trigger must be greater than the minimum wavelength.
- Trigger must be less than the center wavelength.
- Trigger must be less than clear.

Major Maximum Wavelength

For the major maximum wavelength alarm parameters, follow these rules:

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- Trigger must be less than maximum wavelength
- Trigger must be greater than center wavelength
- Trigger must be greater than clear

if critical maximum wavelength exists:

- Trigger must be less than critical maximum wavelength clear

Major Minimum Wavelength

For the major minimum wavelength alarm parameters, follow these rules

- Trigger must be greater than minimum wavelength
- Trigger must be less than center wavelength
- Trigger must be less than clear

if critical minimum wavelength exists, the trigger must be greater than critical minimum wavelength clear.

Minor Maximum Wavelength

For the minor maximum wavelength alarm parameters, follow these rules:

- Trigger must be greater than minimum wavelength
- Trigger must be less than the center wavelength
- Trigger must be less than or equal to clear

If critical minimum wavelength exists:

- Trigger must be greater than critical minimum wavelength clear

If minimum wavelength exists:

- Trigger must be greater than major minimum wavelength clear

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Power Alarm Configuration Rules

Power alarms can be defined for each alarm level in the same way as you defined wavelength.

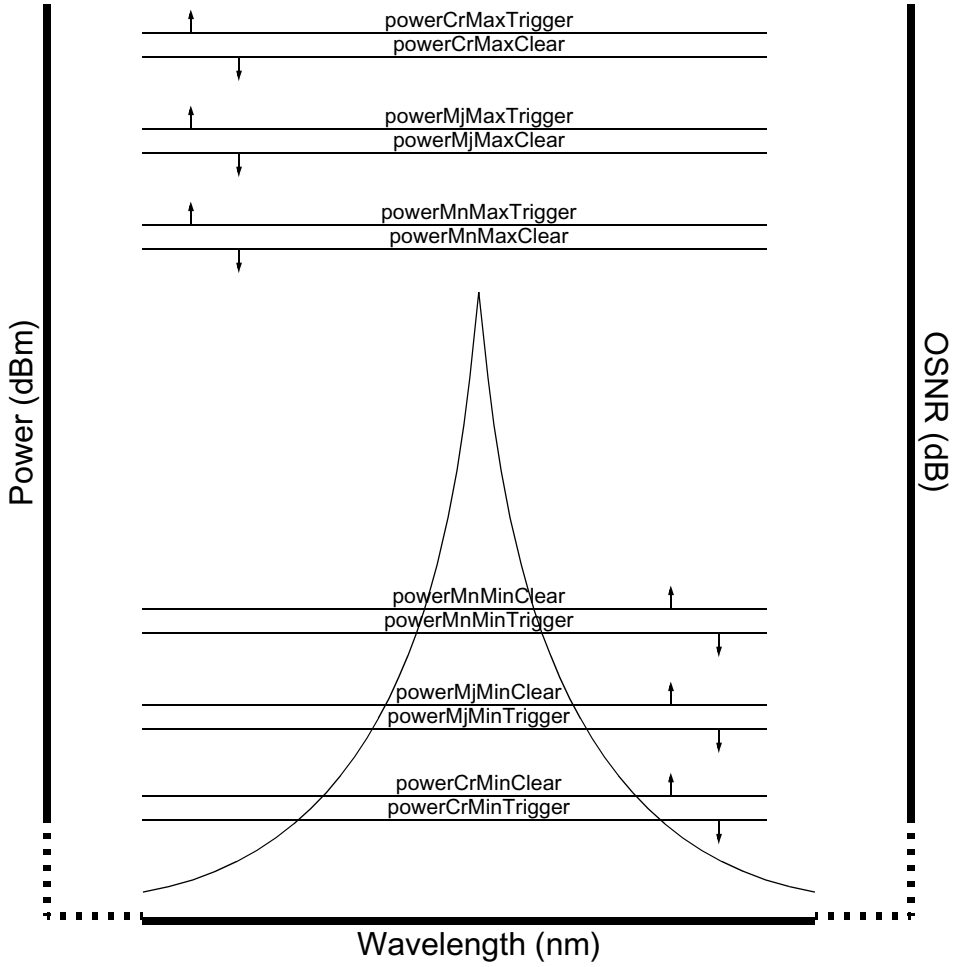


FIGURE -3. OWM Power Alarm Configuration

Critical Minimum Power

For the critical minimum power alarm parameters, follow these rules:

- Trigger must be greater than the power offset
- Trigger must be less than the power threshold
- Trigger must be less than clear

If critical maximum power exists:

- Trigger must be less than the critical maximum clear
- Clear must be less than the critical maximum clear

Critical Maximum Power

For the critical maximum power alarm parameters, follow these rules:

- Trigger must be greater than the power offset

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- Trigger must be less than the power threshold
- Trigger must be less than clear

If critical minimum power exists:

- Trigger must be greater than the critical minimum power clear
- Clear must be greater than the critical minimum power clear

If critical minimum wavelength exists:

- Trigger must be greater than the minimum wavelength
- Trigger must be less than the center wavelength
- Trigger must be less than clear

Major Minimum Power

For the major minimum power alarm parameters, follow these rules:

- Trigger must be greater than power offset
- Trigger must be less than power threshold
- Trigger must be less than clear

If major maximum power exists:

- Trigger must be less than major maximum clear
- Clear must be less than major maximum clear

If critical minimum power exists:

- Trigger must be greater than critical minimum power clear
- Clear must be greater than critical minimum power clear

Major Maximum Power

For the major maximum power alarm parameters, follow these rules:

- Trigger must be greater than power offset
- Trigger must be less than power threshold
- Trigger must be greater than clear

if major minimum power exists:

- Trigger must be greater than major minimum power clear
- Clear must be greater than major minimum power clear

if critical maximum power exists:

- Trigger must be less than critical maximum power clear
- Clear must be greater than critical maximum power clear

Minor Minimum Power

For the minor minimum power alarm parameters, follow these rules:

- Trigger must be greater than power offset
- Trigger must be less than power threshold

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- Trigger must be less than or equal to clear

If minor maximum power exists

- Trigger must be less than minor maximum clear
- Clear must be less than minor maximum clear

If critical minimum power exists

- Greater than critical minimum power clear
- Clear must be greater than critical minimum power clear

If major minimum power exists, the trigger must be greater than major minimum power clear

- Clear must be greater than major minimum power clear

Minor Maximum Power

For the minor maximum power alarm parameters, follow these rules:

- Trigger must be greater than power offset
- Trigger must be less than power threshold
- Trigger must be greater than or equal to clear

If minor minimum power exists:

- Trigger must be greater than minor minimum power clear
- Clear must be greater than minor minimum power clear

If critical maximum power exists:

- Trigger must be less than critical maximum power clear
- Clear must be greater than critical maximum power clear

If major maximum power exists:

- Trigger must be less than major maximum power clear
- Clear must be greater than major maximum power clear

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OSNR Alarm Configuration Rules

OSNR alarms can be defined for minimum trigger and minimum clear values.

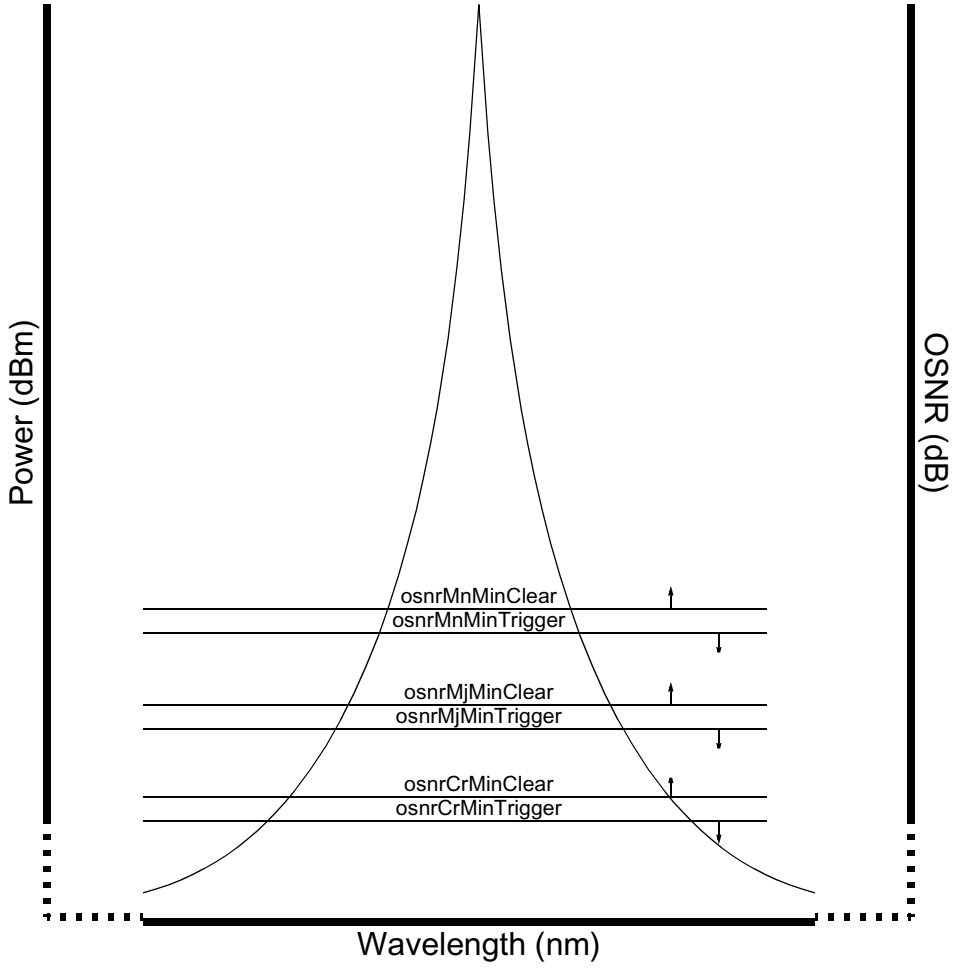


FIGURE -4. OWM OSNR Alarm Configuration

Critical Minimum OSNR

For the critical minimum OSNR alarm parameters, follow these rules:

- Trigger must be greater than 5.0 dB
- Trigger must be less than 22.0 dB
- Clear must be greater than trigger
- Clear must be less than 22.0 dB

Major Minimum OSNR

For the major minimum OSNR alarm parameters, follow these rules:

- Trigger must be greater than 5.0 dB
- Trigger must be less than 22.0 dB
- Clear must be greater than or equal to trigger

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- Clear must be less than or equal to 22.0 dB

if critical minimum OSNR exists, the trigger must be greater than critical minimum OSNR clear.

Minor Minimum OSNR

For the minor minimum OSNR alarm parameters, follow these rules:

- Trigger must be greater than 5.0 dB
- Trigger must be less than 22.0 dB
- Clear must be greater than or equal to trigger
- Clear must be less than or equal to 22.0 dB

If major minimum OSNR exists,

- Trigger must be greater than major minimum OSNR clear

Sequencing

Another interesting feature of devices is the ability of the OWM to sequence between defined devices. Automatic cycling between devices is achieved by using the sequencer feature. The sequencer cycles through the defined devices periodically. The periodicity, or sequencer cycling rate, is dependent on the number devices defined on the OWM and the number of ports on the OWM. Table -3 identifies the device sampling time interval for 8 Port OWMs configured with one to eight devices. For a 2 Port OWM, the sampling time is 30 seconds.

Table -3. Sequencer Cycling Rate For 8 Port OWM

Number of Devices	1	2	4	8
Device Sampling Time Interval	n/a	4 sec	2 sec	1 sec

Monitoring multiple devices is easily achieved with the sequencer enabled.

Benchmarks

The benchmark feature provides the ability to record and display a snapshot of channel values. Benchmarks apply only to devices and serve as a useful tool for comparing current channel values with benchmark channel values that were captured when the snapshot was taken.

To create a benchmark, the user must be in configuration mode and device definitions must be "applied". Benchmarks can be created for a specific device or all defined devices. When benchmarking all devices, the OWM will switch between devices to collect channel and spectral measurements. Consequently, this benchmarking will take approximately 0.3 seconds per device. When the benchmark feature is invoked, current channel values are collected from each device channel as well as spectral values. These benchmark measurements are time-stamped and preserved until the user issues a command to clear the benchmark or initiate a new benchmark. Benchmarks must be saved in configuration mode for the values to be preserved and the feature to succeed.

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Once created, benchmark information can be retrieved for reporting and display purposes. Only the GUI can display benchmarks graphically in spectrum and channel view. They can also be displayed in datalog view on a per channel basis. Graphically, benchmarks appear in pink and are displayed as dashed lines. Enabling/disabling benchmark viewing in Spectrum, Channel and Dual Table view is achieved by toggling checkboxes in the Options menu. Benchmarks are toggled on/off using the Benchmark button in Datalog view.

It is possible that the device configuration data can change after a benchmark is generated. These changes may affect the recording and viewing of benchmark data. The OWM attempts to preserve as much benchmark data as possible. For example, device channels can be added, deleted or modified after a benchmark has been generated. When reporting benchmarks from the CLI, any channel with no detected peak will report a wavelength with an asterisk ("*") preceding the wavelength value and will be reported as a negative wavelength (a wavelength in parenthesis; i.e. (1544.02)) in the GUI. If a channel does not have a benchmark associated with it (i.e. the channel was added subsequent to the benchmark), then the power, wavelength and OSNR will be reported as a dash ("-"). When graphing benchmarks in the GUI, any channel with no defined peak will be reported as a negative wavelength and plotted as the absolute value of the benchmark wavelength (negative wavelengths would be off the graph). If the channel does not have a benchmark, the graph will show a "hole" in the plot sequence.

Alarms/Events

Alarms and events are reported to provide notification of system performance issues. Active alarm issues are time-stamped and recorded in the alarm log along with a description of the alarm, the severity, and device, port and channel information. Only active alarms are displayed in the alarm log. When an alarm condition is no longer active, the alarm will no longer be displayed in the log. Cleared alarms cause an event to be generated.

Events are time-stamped and recorded in the event log along with a description of the event, the severity, and device, port and channel information.

Data Logs

Data logs are supported by the OWM to provide a mechanism for reporting a device history channel values. Data logs apply only to devices and serve as a repository for power, wavelength and OSNR samples collected from each device channel. A chronological history of these samples are maintained in the data log. The samples are periodically collected, time-stamped, and recorded in data logs for retrieval upon demand.

Tidemarks are also collected, time-stamped, and recorded in data logs. Tidemarks are the high and low values for each power, wavelength and OSNR measurement collected over the sampling period. The high tidemark reflects the highest value that occurred during the sampling period. Similarly, low tidemarks reflect the lowest value occurring during the sampling period. Each time a new sampling period begins, a new high and low tidemark is calculated. Consequently, these tidemarks only apply to the high and low measurements collected during the sampling period.

Tidemarks are a useful feature that provide an additional level of granularity to a sampling period. For instance, assume that the sampling period is one minute. Examining the high and low tidemarks

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may reveal fluctuations that occurred during the one minute sampling period that would otherwise go undetected looking exclusively at the log samples.

There are two types of data logs; memory data log and disk data log.

Memory Data Logs

Power, wavelength and OSNR samples from device channels are automatically collected and recorded in the memory data log. 60 one-minute samples are maintained as well as 10 days of 15-minute samples. These samples are used to generate a report or to graphically represent a chronological device history of power, wavelength and OSNR values.

The memory data log is stored in RAM. Consequently, if the system is rebooted, the data is lost and a new memory data log will be generated. A report containing information stored in the memory data log can be displayed on the Command Line Interface or saved to a source file. Saving the memory data log to a source file creates a permanent record of channel activity that can then be viewed or printed for further examination. A report can be generated for all defined devices or a specific device. For convenience, the report can be sorted by channel or time in full or terse format.

Memory data logs are used by SNMP and GUI applications. SNMP and the GUI have access to the memory data log for the purpose of saving reports to a file or displaying historical graphs of optical activity.

Disk Data Logs

Data logs stored on an ATA style card are called disk data logs. The OWM is equipped with two PCMCIA slots to accommodate ATA style cards. Data is only recorded when the disk log is enabled. Disk logs provide a permanent record of the one minute memory data log by storing a history of channel values in files on the hard disk drive. Data written to the disk data log will be recorded exactly as it appears in the memory data log to maintain sampling consistency between the two logs. Disk data log files can be utilized by a customer's external application program to support such features as statistical analysis and graphical interpretations.

Power, wavelength and OSNR samples and tidemarks taken from device channels are collected every minute from the memory data log and recorded in the disk data log. Recording does not begin until the disk log is enabled and the slot containing the hard drive is specified. Once the disk log is "readied", samples are collected every minute and recorded in terse format in a file on the hard drive. The file continues to collect one minute samples until a new calendar day begins. When a new day begins, a new file is created and the previous day's file is compressed. These files are automatically generated by the OWM in a root directory called "log". The files generated use the following name format:

log_yy_mm_dd.csv

where yy=year; mm=month; dd=day

example: log_02_09_30.csv

Compressed files are stored in standard gzip format with the following format:

log_yy_mm_dd.csv.gz

where yy=year; mm=month; dd=day

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example: log_02_09_30.csv.gz

If disk capacity is reached, the oldest file in the log directory is deleted. The disk log should be disabled prior to removing the disk. Disabling can be achieved by issuing a disable command or by enabling the other PCMCIA slot.

Files stored on the PCMCIA cards may be retrieved using FTP.

Reports

Generating reports provide a convenient method for analyzing power, wavelength and OSNR measurements with respect to ports and devices. The reporting feature is a useful tool for customer application programs to parse and analyze signal activity. The OWM provides the following types of reports:

- **Spectrum** - provides pixel wavelength (nm) or pixel frequency (THz), pixel count and power for all ports. (GUI only feature)
- **Peaks** - provides wavelength or frequency of peak, power and OSNR for all ports. (GUI only feature)
- **Datalog** - reports are generated for all devices or a specific device.
  - Memory Data Log: provides minute and quarterly (15 minute) samples of power, wavelength and OSNR measurements and timestamps. (See "Memory Data Logs" on page -20.)
- **Alarms** - provides a list of generated alarms and their type, severity, device/port and timestamp information.
- **Events** - provides a list of generated events and their type, severity, device/port and timestamp information.
- **Benchmarks** - provides a snapshot of channel values.
- **Tidemarks** - provides the high and low values for each power, wavelength and OSNR measurement collected over a sampling period.

These reports can be generated with a variety of options. Datalog, alarm and event reports can be output in full or terse format. Terse format is a subset of full format. Some of these reports also have the option of reporting all devices or a specific device. Sorting by channel or time is another option available for easy data analysis.

Email Event Notification

An Email can be generated when an event occurs. The Email is sent using Simple Mail Transfer Protocol (SMTP). The OWM Email Notification System (ENS) has the following features:

- Up to 10 recipients can receive an Email when an event occurs.
- Only one Email is generated per device for all events. No additional Emails are generated for that device until an **Alarm Acknowledge** is issued.
- Only one Email is generated for the OWM system for all events. No additional Emails are generated for the OWM until an **Alarm Acknowledge** is issued.

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- The default "from" account is "owm name" + "owm IP address".
- Events are filtered by severity level. If the event has less severity than the Email Level setting, then the event is ignored.

When an alarm occurs, the Email notification system (ENS) checks several things. First, has Email been set up and enabled. If not, then the ENS will ignore any alarms/events that come in. Next, the ENS checks the severity level of the event. If the severity level is less than what has been configured, (see Email Level) then the event is ignored. Finally, the ENS checks to see if an Email has all ready been sent for that device. Only one Email can be sent for each device.

Message Format

Two types of messages are generated. The first is for a device event. The second is for a system event. Both message types are comma delimited for easy parsing. The formats for the two are:

```
<IP address of OWM>, <OWM Name>, <severity>, <Device name>
<IP address of OWM>, <OWM Name>, <severity>, <System event description>
```

Example: 10.2.1.203, joe, ADMIN, local: configuration mode

Email Configuration



Configuration of Email Notification is a CLI function only. Configuration is not supported in the GUI.

There are several parameters that need to be set for Email Notification to work. The first to set is the Email Server address. This is the address where all Emails are initially sent. The next is the "Address From" setting. In SMTP terms, this is the reverse-path for Emails sent. The default "Address From" is the OWM's name and it's IP address. On some Email servers, the "Address From" must be have a valid Email account. Next, the "Address To" must be set. In SMTP terms, the "forward-path." Up to ten addresses can be added. Once again, these should be valid Email accounts on the server. If the account is invalid, Email Notification will continue but an error will be generate on that account. Next, the "Alarm Severity Level" needs to be set. The "Alarm Severity Level" limits the notification to only that severity of alarm or greater. For example, if the level were set to major, alarms with levels of major or critical will be trigger an Email. Minor alarms would not trigger an Email. The default level is critical. Running the "email test" command can test the Email notification. This command will generate a test message to all email accounts. After the test has been successfully run, Email notification must be enabled.

Example configuration:

```
% show email
email server 172.16.1.88
email from "joe@terrapin"
```


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```
email enable
alarm level critical
recipient: "joe" <1>
%
```

GUI Port Settings

When the GUI communicates with the OWM, an IP address is used. The end user sees part of the address that typically looks like 172.16.1.10. However, there is another part of the address that needs to be supplied which is the port address. The port address allows multiple connections between two IP addresses. For example, FTP uses port 21, Telnet uses port 23 and the GUI uses port 57005. In some networks, the GUI (57005) port might be blocked. The OWM and GUI have the ability to change this setting.



This is an advanced setting and should only be run by your Network Administrator.

To change the setting, you must have Administrator rights. From the CLI, run the **"gui port <number>"** command. Once this command has been successfully run, the OWM must be rebooted. The OWM will not start listening on the new port until a reboot. Once the OWM has been rebooted, it will no longer accept connections from GUIs on the old port unless the port number has been reset. Also, earlier versions of the GUI will not be able to connect with an OWM that uses a new port number.

Next, the GUI must have its port number changed. From a MSDOS command prompt, change into the directory where the GUI is installed. From the command prompt, start the GUI with the port parameter. The command syntax is:

```
owmview -p???
```

where ??? is the new port number. Note that no space exists between the -p and the port number. For example:

```
owmview -p5000
```

You will only have to start the GUI in this mode once because the new port number will be stored in a local file called **"system.xml"**. An alternate way to change the port number is to manually edit **"system.xml"**. Edit the guiport value in the settings section. Remember that the port value is stored as a quoted string. For example:

```
<settings>
   <guiport val="5001" />
</settings>
```

Fast Data Logging

Fast Data Logging (FDL) is the process of capturing channel data directly to a disk. FDL should be used when all channel data values need to be captured.



This is an advanced function and should only be run by an Administrator. The use of this feature will cause unexpected results with the OWM CLI and GUI.

When the FDL is running, only the channel data (power, wavelength, and OSNR) is written to the disk and that data is not sent to the reset of the system. All other data from the spectrometer is ignored meaning that no other features of the OWM will be receiving data. Alarms, data logging, spectrum data, and displayed channel data will not be correct. The Sequencer will also be turned off. FDL is a CLI function only.

To understand what is being logged to the disk, a better understanding of the communication between the controller and the spectrometer is needed. First, the controller connects to the spectromer using a USB connection. This provides us with a high speed data path and also supports multiple data streams for communication. One of the data streams are for commands to and from the spectrometer (command stream). All commands issued to the spectrometer occur on this stream. This includes commands to get spectrum data, configuration data for devices, and spectrometer controll. All commands issued receive a response from the spectrometer. All of the responses are then passed on to the controller to be processed.

Another data stream is the “push” stream. If the spectometer is configured correctly, any new values for channel data are “pushed“ back to the controller. Only when a change occurs will the new data be sent. The minimum speed for the “push“ data is 10ms for power, 100ms for wavelength, and 100ms of OSNR. By only sending data when a change has occurred, overall system performance is increased. When the “push“ data arrives, it is then passed on to the controller to be processed.

What happens when FDL is running? a) The Sequencer is stopped. The current device remains active and any new measurements are taken against that channel plan. b) Any command issued to the spectromer in the command stream is still sent. However, the responses from the spectrometer are ignored. This is important to remember: all responses to the command stream are ignored. c) any “push“ data received from the spectrometer is written out to the disk. This data is the power, wavelength, and OSNR readings. After the disk write, the data is ignored. Again, the data is thrown away at this point. At this point in time, the controller values are incorrect.

To run the FDL, first make a device active.

```
% show devices
devices
"DeviceA" "" <1>
```


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```
port "PORT 1" 100.0 <1>
"DeviceB" "" <2>
port "PORT 2" 100.0 <1>
%
% device active "DeviceA"
%
```

Next, make sure that a disk is placed into PCMCIA slot 1. Use the "show files" command.

```
%
% show files
Listing of: /ram/
     11007 2004-07-23 14:48:02 system.cfg
     11007 bytes
   7821312 bytes free
Listing of: /ata1/
     32768 2004-07-23 14:48:12 log/
     32768 bytes
2012053504 bytes free
%
```

Finally, start the FDL. The data will be written to a file called specx.log where x is a sequenctial number from 0 to 100. Each time the log is started, the number will be increased.

```
%
% spectrometer log on
turning off the sequencer.
starting log to </ata1/spec0.log>.
%
```

Next, turn off the FDL. The file size is dependant on the number of channels the device has and the rate of change for the values. This file can become very large very quickly.

```
%
% spectrometer log off
%
% show files
Listing of: /ram/
     11007 2004-07-23 14:48:02 system.cfg
     11007 bytes
   7821312 bytes free
Listing of: /ata1/
     32768 2004-07-23 14:48:12 log/
    894714 2004-07-23 15:25:02 spec0.log
    927482 bytes
2010415104 bytes free
```

```
%
```

If you start the FDL again, the file number will be increased by 1.

```
% spectrometer log on
turning off the sequencer.
starting log to </ata1/spec1.log>.
%
%
% spectrometer log off
%
% show files
Listing of: /ram/
     11007 2004-07-23 14:48:02 system.cfg
     11007 bytes
   7821312 bytes free
Listing of: /ata1/
     32768 2004-07-23 14:48:12 log/
    894714 2004-07-23 15:25:02 spec0.log
   1508316 2004-07-23 15:26:28 spec1.log
   2435798 bytes
2008842240 bytes free
%
```

Finally, to retrieve the FDL file, use FTP. The following is a typical sample FTP session.

```
$ !ftp
ftp 10.2.1.207
Connected to 10.2.1.207.
220 FTP server (OWM_Controller 2.1.0-X 2004-06-23 085116) ready.
Name (10.2.1.207:Administrator): admin
331 Password required
Password:
230 User logged in
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> cd /ata1
250 Changed directory to "/ata1"
ftp> ls
200 Port set okay
150 Opening ASCII mode data connection
drw-rw-rw-  1 admin admin        32768 Jul 23 14:48 log
-rw-rw-rw-  1 admin admin       894714 Jul 23 15:25 spec0.log
-rw-rw-rw-  1 admin admin      1508316 Jul 23 15:26 spec1.log
226 Transfer complete
```


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```
ftp> get spec0.log
200 Port set okay
150 Opening BINARY mode data connection
226 Transfer complete
894714 bytes received in 1.96 seconds (455789 bytes/s)
ftp> quit
221 Bye...see you later
```

The logged data is in the following form:

```
!command "tag", timestamp, # of channels, value, value, ...
```

This format is used for the power, wavelength, and OSNR records. The timestamp is in microseconds. For example:

```
!POWER "1 1",495818236,40,-71.50,-69.40,-69.93,-69.40, ...
!POWER "1 1",495828323,40,-71.79,-69.07,-70.12,-69.93, ...
!POWER "1 1",495838389,40,-71.79,-69.74,-70.32,-69.40, ...
!POWER "1 1",495848460,40,-72.08,-69.74,-71.50,-69.40, ...
```

Total Power Alarms

Total power is measured from the OWM by using the CLI command "!total power". Alarms can be triggered from this valued. These alarms are called Total Power Alarms (TPA). Each TPA alarm consists of a trigger and a clear value with critical, major, and minor alarm levels being supported. TPAs are only defined as minimum alarms. This means that the critical values must be less than the major which is less than the minor. The alarm definitions are very similar to minimum channel power alarms.

$$Crit_{trigger} < Crit_{clear} < Major_{trigger} < Major_{clear} < Minor_{trigger} < Minor_{clear}$$

TPAs are defined for a device. TPAs values are checked approximately once a second for the active device. If no device is active, then no alarms will be generated. By having the TPA defined with a device, the sequencer can be used to monitor the TPA.

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CHAPTER

Configuration

This chapter describes the procedures necessary to set up the Optical Wavelength Manager (OWM) to perform day-to-day operations. The configuration procedures described in this chapter are meant to be a one-time initial setup of the OWM. Typically, the configuration process would be performed by a user with **Admin** or **Config** security level.

All configuration information is stored in non-volatile flash memory which allows the Optical Wavelength Manager (OWM) to continue to function correctly when the unit is rebooted or if the power is lost.

This chapter covers the following topics:

Topic	Description
Installing and Upgrading OWM OS Software	Install or upgrade controller application software.
Install the Graphical User Interface	Configure the OWM to operate using a Graphical User Interface.
Configure System Parameters	-Configure general OWM properties (name, description, location, contact information and global alarm broadcast). -Configure Disk Logging. -Configure user accounts (usernames, security level, passwords). -Configure date/time (date, time, timezone) and SNTP.
Configure Ports	Tap power, OSNR, port activate.
Configure Devices	Tap power, channel map (channel definitions, alarms and port assignment).
Alarm Management	Configuration of alarms
Configure SNMP	Configure SNMP settings, Community Entries and Trap Destinations.
Managing Stored Configurations	apply, save, quit

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Installing and Upgrading OWM OS Software

The following instructions show how to install or upgrade the The OWM Controller Application software with new software stored on the Digital Lightwave OWM Java GUI Application CD. OWM Controller Application software can be found in a directory called "Software".

The procedure for installing this software shows you how to use File Transfer Protocol (FTP) to start an FTP client and download the new software from CDROM to the OWM's RAM disk. Once the software is in the OWM RAM, it is then downloaded to one of the OWM's software image slots. Assigning the software image slot containing the new software to be the default will cause the OWM to load the software version in the default image slot during reboot.

The example shown assumes your computer's CDROM drive is "D:", the OWM's IP address is "172.16.1.222" and the source file containing the OWM Controller Application software is called "owm_ctlr_app_210.srec". Use "admin" for the user and password values.

- Power up and boot the OWM.
- Load the OWM CDROM into your computer's CDROM drive. If the "InstallAnywhere" or "Optical Wavelength Manager" installation window appears on your computer after loading the CDROM, press the "Cancel" button to cancel installation of the GUI application.
- Select "**Start** > **Run**"; a "Run" window will appear.
- In the "Run" window's "Open:" text field, type "**ftp 172.16.1.222**" and select "OK".
- Type in the user name and password.
- Next, change the current directory to "d:\software" using **lcd**.
- Using the "put" command, copy the OWM application software to the OWM.
- When copying is finished, exit from FTP.
- The following is an example of the FTP session:

```
Connected to 172.16.1.222.
220 FTP server (OWM_Controller 2.1.0 2002-09-03 111331) ready.
User (172.16.1.222:(none)): admin
331 Password required
Password:
230 User logged in
ftp> lcd d:\software
Local directory now D:\software.
ftp> put owm_ctlr_app_210.srec
200 Port set okay
150 Opening BINARY mode data connection
226 Transfer complete
ftp: 4879872 bytes sent in 8.83Seconds 552.46Kbytes/sec.
ftp> bye
```

- Review the available software image slots on the OWM with the Show Software CLI command at the Craft port by initiating a telnet session:

```
Microsoft Telnet> open 172.16.1.222
```


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```
login: admin
password: *****
% show software

Slot  State Description
----- ----- -----------
 boot ok    OPM_Controller_Boot 1.1.0 2002-06-13 151819
 0    ok    OWM_Controller 2.1.0 2002-08-30 154503
*1    clear
 2    clear
%
```

- Clear an available software image slot (slot 1 or 2) with the Software Clear CLI command at the Craft port. Note that software cannot be cleared from slot 0, new software must be loaded into slot 1 or 2. If the slot to be cleared is the default slot (indicated by an asterisk ("*") preceding the slot number), it is necessary to change the software default slot before using the software clear command.

```
% software default 2
% software clear 1
WARNING: Permanently erase software image 1 (yes/no)? yes
%
```

- Download the software image from the OWM's RAM disk to the cleared software image slot with the Software Download CLI command at the Craft port:

```
% software download 1 "owm_ctlr_app_210.srec"
%
```

- Make the new software image the default image (to be run by default when the OWM is booted) with the Software Default CLI command.

```
% software default 1
% show software
Slot  State Description
----- ----- -----------
 boot ok    OPM_Controller_Boot 1.1.0 2002-06-13 151819
 0    ok    OWM_Controller 2.1.0 2002-08-30 154503
*1    ok    OPM_Controller 2.1.1 2002-09-17 154718
 2    clear
%
```

- Reboot the OWM with the new software at the Craft port:

```
% reboot
!SYSTEM: reboot
```

After rebooting, the OWM will be running the new controller software.

- Confirm the new software is running by typing the Show Id command at the Craft port telnet session:

```
Microsoft Telnet> open 172.16.1.222
login: admin
password: *****
% show id

  manufacturer: Digital Lightwave, Inc.
       product:  OWM Optical Wavelength Manager
   part number: ENGINEERING-ONLY
```


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```
serial number: ENGINEERING-ONLY
     software: OWM_Controller 2.1.1 2002-09-17 154718

Copyright (c) 2000-2002 Digital Lightwave, Inc. All Rights Reserved.
```


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Install the Graphical User Interface

There are two ways to communicate and operate the OWM. The first way is through the Command Line Interface (CLI) and the second way to communicate is through the Graphical User Interface (GUI). Command Line Interface communication is performed by using the keyboard to send and receive strings of text. The Graphical User Interface allows the user to operate the OWM using the PC mouse to navigate through a series of menus that control the OWM. The GUI displays icons, buttons, dialog boxes, menus and text that the user controls by using the mouse to point-and-click.

This section describes the installation process of the GUI.

System Requirements

The OWM graphical interface is a Java application program which is designed to operate on an IBM compatible personal computer with the following requirements:

- 450 MHz Pentium processor or equivalent
- 128 Mb of RAM memory
- 40 Mb of free hard disk space
- CDROM drive
- Workstations:
  - Microsoft Windows XP Operating system
  - Microsoft Windows 2000 Professional with Service Pack 2 Operating System
  - Microsoft Windows NT 4.0 Workstation with Service Pack 6 Operating System
  - Microsoft Windows Millennium Edition Operating System
  - Microsoft Windows 98, Second Edition Operating System
  - Linux Operating System
- 802.2 Ethernet interface

The OWM graphical interface will also operate on:

- Solaris/SPARC Operating System



The Internet Protocol (IP) settings must be established using the CLI before the GUI can be used.

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Installing the Interface

To install the Graphical User Interface using automatic start (autorun), follow the steps below:

1. Insert the Digital Lightwave OWM Java GUI Application CD into the CD-ROM drive. The InstallAnywhere Program (Figure -1) will guide you through the installation process.

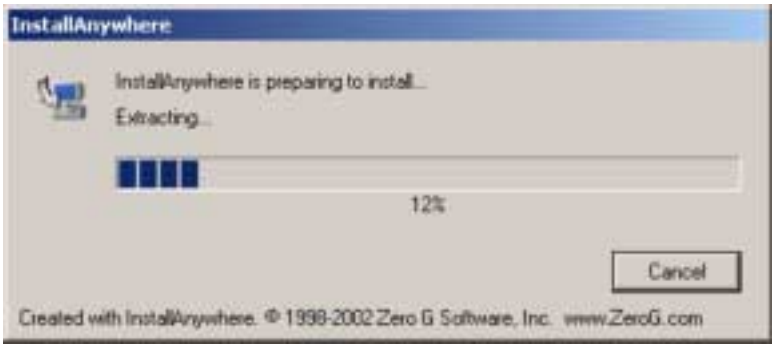


FIGURE -1. InstallAnywhere Program

2. Click **Next** (Figure -2) to continue.

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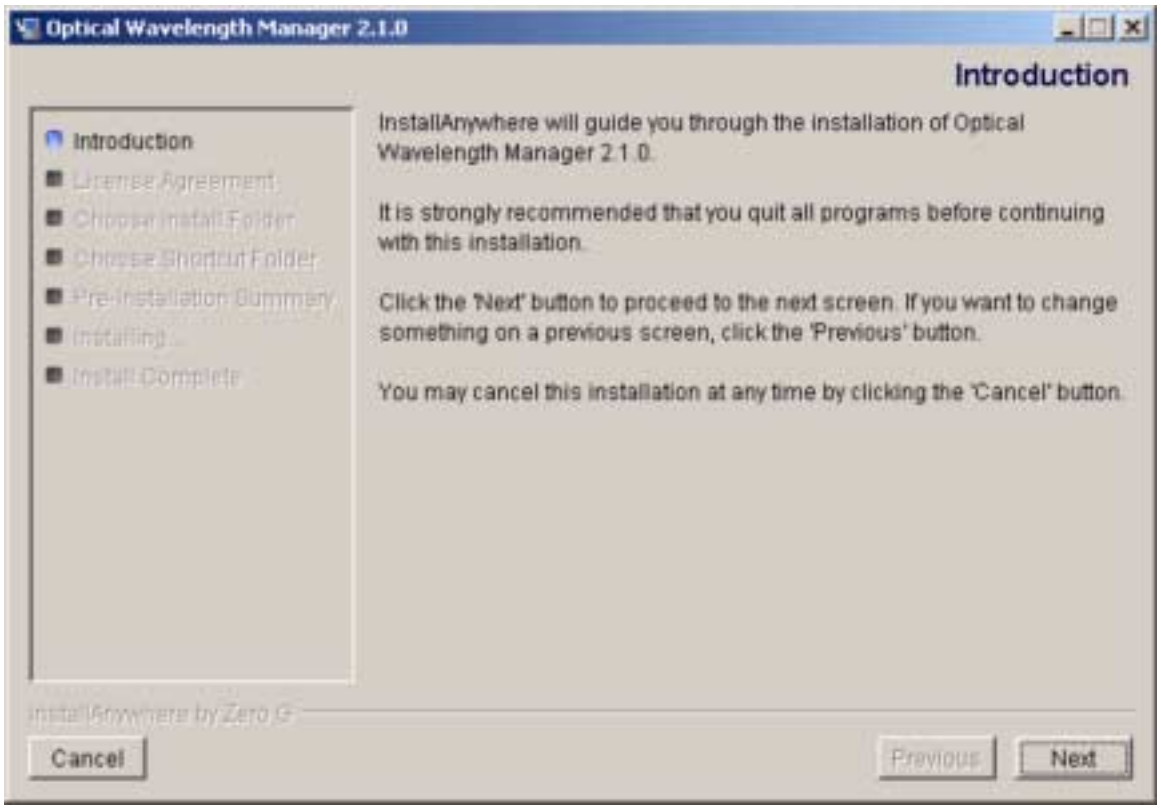


FIGURE -2. Introduction Screen

The License Agreement (Figure -3) screen is displayed.

3. Click the radio button to accept the terms of the License Agreement.
4. Click **Next** to accept the terms of the licensing agreement.



FIGURE -3. License Agreement Screen

The Choose Install Folder (Figure -4) screen is displayed.

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FIGURE -4. Choose Install Folder Screen

5. Click **Next** to install the files into the default folder.

   Or:

   Click **Choose** to install the files into the directory of your choice. Click on the location to store the install files and click **OK**. Upon returning to the Choose Install Folder screen, clicking on **Restore Default Folder** will select the default location in which to store the install files. Click **Next** to advance to the Choose Shortcut Folder.

6. The Choose Shortcut Folder is displayed (Figure -5).

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FIGURE -5. Choose Shortcut Folder Screen

7. Click **Next** to accept the default for the location of the product icons.
   The Pre-Installation Summary screen is displayed.

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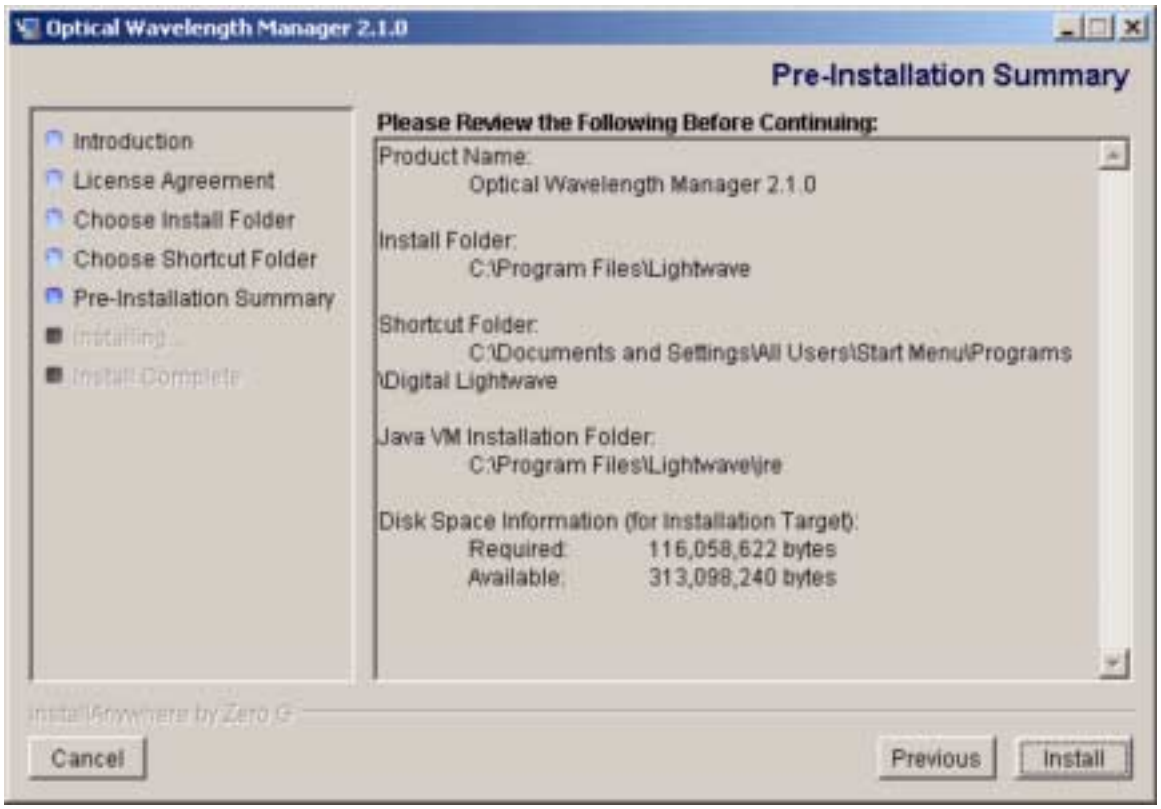


FIGURE -6. Pre-Installation Summary

8. Check **Install** to accept the default installation settings.
   The OWM GUI installation program begins.

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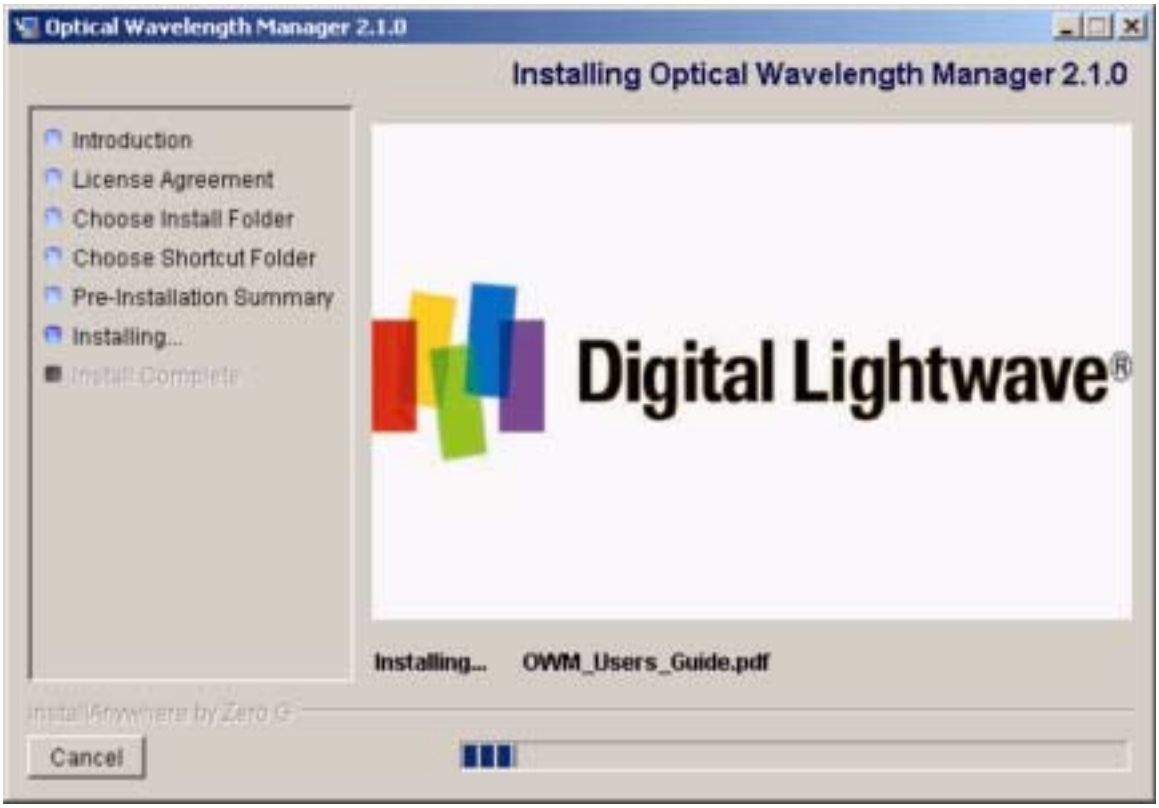


FIGURE -7. Installing Optical Wavelength Manager

A confirmation message is displayed at the end of the installation program.

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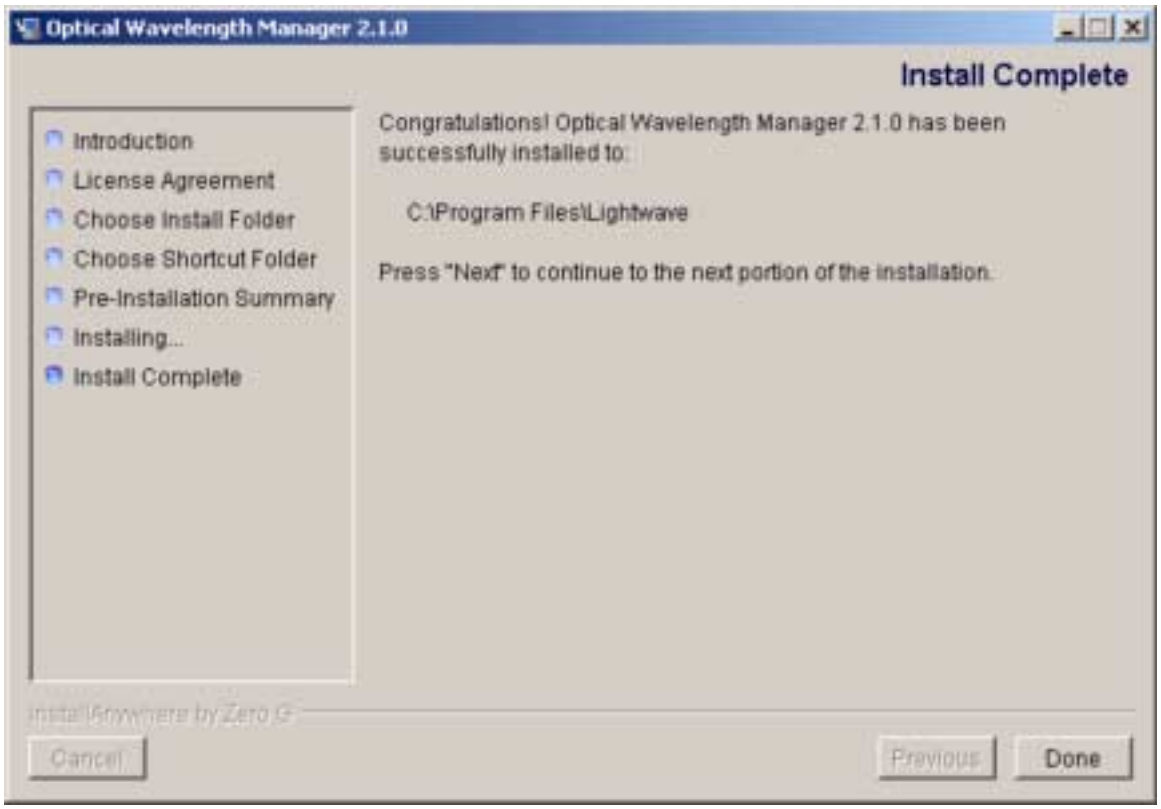


FIGURE -8. Install Complete

9. Click **Done** to acknowledge the install completion message. It is now safe to remove the installation CD. The installer has created the following menu items:
   - Firmware
   - Optical Wavelength Manager
   - SNMP Mibs
   - Uninstall Optical Wavelength Manager
   - User Guides

The Firmware, SNMP Mibs, and User Guides menu options opens an Explorer window in the appropriate directories.

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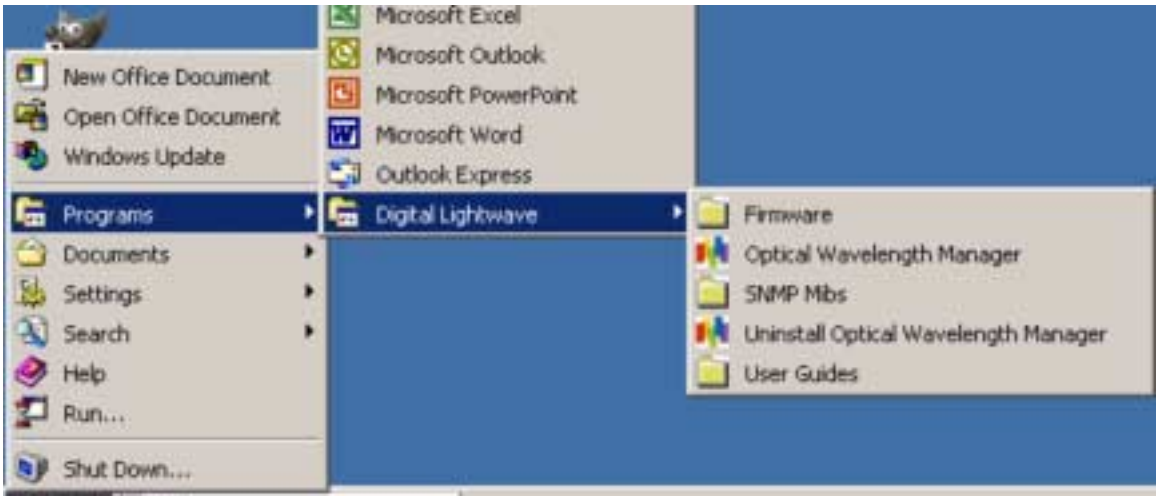


FIGURE -9. Created Menus

10. At this time, you will be prompted to install the Adobe Acrobat Reader. The Adobe Acrobat Reader is used to display all documentation. If you need to install the reader, click **Install Acrobat** and follow the instructions on the screens.



FIGURE -10. Adobe Acrobat Reader Installation

Launch the GUI

To log into the GUI using the default user name and password, perform the following:

- Click Start > Programs > Digital Lightwave > Optical Wavelength Manager
- When the Login dialog box appears, enter the OWM's IP address and use "***admin***" as the default username and password as follows:

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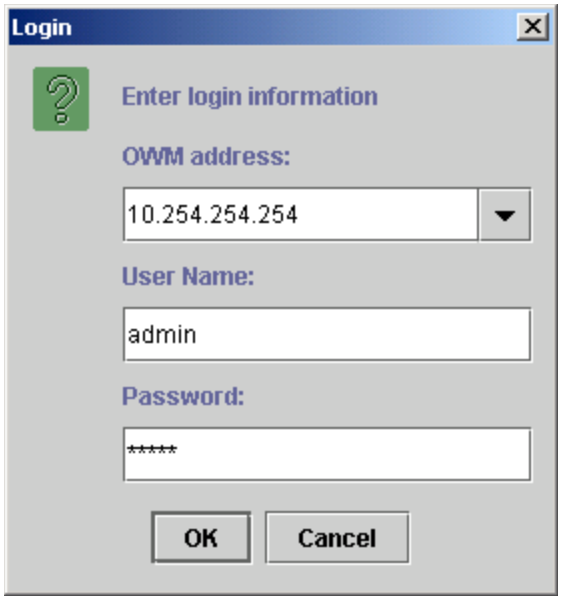


FIGURE -11. GUI Login

-
- Click OK.
- Once connected, the OWM will display the Spectrum View graph. It is important to note that the Spectrum View graph will not be accurate until the port tap power is defined in the "Configure System Parameters" section.

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Configure System Parameters

This section describes the procedures necessary to configure user accounts, general OWM settings and date/time settings.

General OWM Settings

This section describes the procedures necessary to configure all the parameters on the General Tab screen; Settings, Disk Log Control and User Accounts.

Configure Settings

This section describes the procedures necessary to configure the OWM Name, Description, Location, Contact and Global Alarm Broadcast.

From the GUI interface perform the following:

- Click on **View** in the main menu bar.
- Click on **System Details** to display the OWM System dialog screen.
- Click on the **General** tab.
- In the **Name** field, enter an alphanumeric string to assign a name to the OWM.
- In the **Description** field, enter an alphanumeric string describing what the OWM is monitoring.
- In the **Location** field, enter an alphanumeric string identifying where the OWM is physically located.
- In the **Contact** field, enter an alphanumeric string identifying a contact name, phone number or web address.
- Click in the **Global Alarm Broadcast** check box to enable/disable the automatic notification of an alarm event. This setting only applies to the command line interface and has no effect when operating the OWM from the GUI. When using the CLI and having the Global Alarm Broadcast enabled, users will automatically get an alarm event message every time an alarm occurs.
- Click the **Update** button to accept the setting changes or **Cancel** to cancel the action and revert to the original settings.

Configure Disk Log Control

- **Disk Log Control** is used to enable/disable the PCMCIA device to write to when saving reports. Click **Disable** if users will not be writing to either PCMCIA device. Click **Enable** if writing to a PCMCIA device and click on which device will be written to. **ata1** writes to the device in PCMCIA slot 1 and **ata2** writes to the device in PCMCIA slot 2. Click the **Update** button to accept the disk log control setting changes or **Cancel** to cancel the action and revert to the original setting.

Configure User Accounts

The OWM supports a maximum of ten user accounts including one Administrator account. The Administrator is the only user with an *"admin"* security level. Only the Administrator can add or delete user accounts. Each user account is established by defining a username, security access level and

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password. Usernames and passwords are case sensitive. For example, username "Carl" is different from username "carl".

There are four security access levels for accounts; *guest*, *operate*, *config* and *admin*. These access levels are listed in hierarchal order such that the *admin* access level-1 supports the highest authorization to operate the OWM and *guest* access level-4 supports the lowest authorization. For example, the *admin* access level supports all admin level functions plus all functions at the *config*, *operate* and *guest* levels. *Config* access level supports all config level functions plus all functions at the *operate* and *guest* levels. The following table summarizes what functions are supported at each security access level.

Access Level	Function
admin (level 1)	Install and upgrade software
	Add and delete user accounts and passwords
	Configure SNMP
	Configure SNTP
	Configure network settings
config (level 2)	Configure and modify devices, channels and alarms
	Set OSNR and port tap power
operate (level 3)	View connected users
	Acknowledge alarms
	Toggle the sequencer
	Refresh alarms and events
	Activate ports/devices
guest (level 4)	View device, channel, alarm and event information
	Save reports
	View OWM properties
	Edit OWM connections
	Connect/disconnect to/from the OWM
	Display graphic properties using wavelength or frequency
	Monitor port/device view
	View channel span tilt
	View channel average power level

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To establish a new user account:

- Click on **View**
- Click on **System Details**
- Click on the **General** Tab
- Click on the **New** button and enter the username in the Account field
- Click in the Security Level field and select one of the security access levels from the drop down box (**config**, **operate** or **guest**)
- Click the **Update** button
- Enter a password in the **New Password** field
- Enter the same password in the **Confirm New Password** field
- Click **OK**

Configure Date/Time

This section describes the procedures necessary to set the date and time clock, set the timezone from which the clock will operate and set the source from which the clock will sync up to (SNTP).

From the GUI interface perform the following:

- Click on **View** in the main menu bar.
- Click on **System Details** to display the OWM System dialog screen.
- Click on the **Date/Time** tab.

The Date/Time tab is divided into three sub-screens; Date/Time, Timezone and SNTP.

Date/Time

The Date/Time sub-screen allows the user to set the date and time clock manually. This section also displays the on/off status of daylight savings time. The date is set using the format YYYY/MM/DD where YYYY is a four digit year, MM is a two digit month and DD is a two digit day. The time operates on a 24 hour clock and is set using the format HH/MM/SS where HH is a two digit hour, MM is a two digit minute and SS is a two digit second.

To manually set the OWM date/time clock, you must first disable SNTP by clicking on the **Disable** radio button in the SNTP sub-screen. For information on Simple Network Time Protocol, refer to "SNTP" on page -19.

The procedure to set the date and time is the same. There are three ways to manually set the date and time.

1. **Up and Down Arrows** - clicking on the up/down arrows associated with the date/time fields changes the day/min field. Scrolling these fields causes the day/min to automatically roll over to the next month/hour. Similarly, the month will eventually roll over to display a new year and the hour will wrap based on a 24 hour clock.
2. **Select the field to be changed** - use the mouse to select or highlight the field to be modified and enter a new value.
3. **Up and Down Arrows on the Keyboard** - use the mouse to click in the field to be modified and use the up/down arrow keys on the keyboard to scroll to the desired value.

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Once all desired changes have been made to the date and time, click on the **Update** button at the bottom of the screen to enforce the changes.



Note that the changes made in the Date/Time sub-screen will eventually be overridden if SNTP is not disabled.

Timezone

The Timezone sub-screen allows the user to set the timezone that the date/time clock will be operating in and to enable/disable automatic adjusting for daylight savings time.

Coordinated Universal Time (UTC) is the system default. When UTC is selected, Coordinated Universal Time is in effect and all other timezone parameters are disabled except for enabling/disabling auto adjust for daylight savings time. Auto adjust daylight savings time is toggled on/off by checking/unchecking its associated checkbox. After the update has been made by clicking the **Update** button, the daylight savings status (on/off) is displayed in the Date/Time sub-screen. Note that it may take several seconds to reflect this change.

The Continent/Ocean field is always enabled. If anything other than Universal time is selected in the Continent/Ocean field, the Country field is enabled. Once a Country has been selected, the Region field is enabled. All three of these fields each have a drop down box from which a value can be selected. Only when all three of these fields have been supplied values, the **Update** button at the bottom of the screen can be invoked to enforce the changes. Clicking the **Cancel** button causes the system to revert to the last set of values defining the Timezone. The **Reset to UTC** button can be invoked at any time to revert to Coordinated Universal Time.

Once all desired changes have been made to the Timezone, click on the **Update** button at the bottom of the screen to enforce the changes.

SNTP

The Simple Network Time Protocol (SNTP) sub-screen allows the user to select the source for obtaining clock synchronization. There are two ways to obtain clock synchronization.

1. Broadcast - in broadcast mode, the OWM clock is maintained by receiving periodic time updates broadcast from a time server.
2. IP - by suppling the IP address of a time server, the OWM periodically polls the time server for the current time.

Click on the radio button that reflects the desired clock source. Note that Broadcast and IP mode will override a manually entered date/time in the date/time sub-screen. Click the **Disable** radio button to disable clock synchronization. With SNTP disabled, the date and time manually input from the date/time sub-screen supplies the OWM clock

Once all desired changes have been made to the SNTP, click on the **Update** button at the bottom of the screen to enforce the changes.

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Configure Ports

Before activating a port, you need to configure the port by assigning port tap power and optical signal to noise ratio (OSNR) width.

Port Tap Power

The port tap power must be defined to coincide with the tap percentage of the splitter on the incoming fiber. Failure to set the port tap power parameter correctly will adversely affect the power measurement accuracy of the OWM.

The "tap power" parameter corresponds to the power splitting ratio of the optical tap used to separate a small portion of light from a main communication fiber for analysis by the OWM. In order to report the power levels in the main fiber being monitored, it is necessary to know the tap power ratio.

For example, a 1% tap passes 99% of optical power through the main fiber and splits off 1% (-20 dB) of power to the OWM. A signal with a power level 3 dBm in the main fiber appears at a -17 dBm level at the OWM input port. Setting the tap power ratio to 1% permits the OWM to report this signal as 3 dBm referred to the main fiber, by correcting for the 20 dB power reduction at the coupler.

The OWM has tap power entries for "ports" and also for "devices". The port tap power is the default value used. When devices are activated, the tap power settings of the devices override the port tap power parameters. For more information about devices see "Configure Devices" on page -21.

To assign port tap power for each connected port:

- Click on **Admin** in the main menu bar to display a drop down menu.
- Click on **Manage Configuration.**
- Click on the **Admin** tab.
- In the Port sub-screen, use the mouse to select the current tap power for each connected port and enter the tap power value of the incoming fiber. Tap power values are expressed as a percentage and must be >= 0.1 and <= 100.0.

Optical Signal to Noise Ratio (OSNR) Width

To assign OSNR:

- In the OSNR sub-screen, click to reveal a drop down box of OSNR values. Click on the desired OSNR value.

To permanently save port tap power and OSNR width values:

- Click **Apply.**
- Click **Save.**
- Click **Quit.**

To activate a port for monitoring or managing:

- Click on **Commands** in the menu bar to display a drop down box.
- Click on **Port Activate** to display a drop down box.
- Click on the port that is connected to the OWM.

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Configure Devices

An OWM can have a series of defined devices. A device has an associated port, tap power and channel map.

Channel Validations

A channel is validated before being added to a device channel map. Wavelength validation is performed in the following sequence:

- The minimum wavelength is greater than the system minimum wavelength.
- The maximum wavelength is less than the system maximum wavelength.
- The minimum wavelength must be less than the center wavelength and the center must be less than the maximum.
- The center wavelength is added to the existing channel map which is sorted by the center wavelength.
- The minimum and maximum wavelengths are checked against the previous channel and the next channel. The minimum wavelength must be greater than the previous maximum wavelength. The maximum wavelength must be less than the next minimum wavelength. If the channel fails either of these tests, then it is removed from the channel map.

Create a Device

1. Click on **Admin** in the Main Menu Bar.
2. Click on **Manage Configuration**.
3. Follow the instructions for "Adding a Device" on page -81.

Define Channel Definitions, Alarms and Port Assignment

- To automatically define channels, alarms and port assignment for the device, follow the instructions for "Configuring a Device Automatically" on page -82.
- To manually define channels, alarms and port assignment for the device, follow the instructions for "Configuring a Channel Manually" on page -85.

At this step, alarms have been defined on channels, however, defining alarms does not enable them. To enable alarms proceed to the section entitled "Alarm Management".

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Alarm Management

Once alarms are defined on channels they can then be activated by enabling the alarm. This section describes how to enable or activate alarms. "To Enable Alarms" follow the instructions on page -87.

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Configure SNMP

This section describes the procedures necessary to install the MIBs and configure the SNMP agent on the OWM. Configuring the SNMP agent involves configuring SNMP settings, Community Entries and Trap Destinations.

To install the MIBs:

- Insert the Digital Lightwave OWM Java GUI Application CD into your CDROM drive.
- The MIBs are located in the "INSTALL_DIR/SNMP" directory.

```
INSTALL_DIR/SNMP
INSTALL_DIR/SNMP/SMIv1
INSTALL_DIR/SNMP/SMIv1/DIGL_GLOBAL_REG_MIB.mib
INSTALL_DIR/SNMP/SMIv1/DIGL-OWM-GLOBAL-REGISTRY.mib
INSTALL_DIR/SNMP/SMIv1/DIGL-OWM-MIB.mib
INSTALL_DIR/SNMP/SMIv2
INSTALL_DIR/SNMP/SMIv2/DIGL_GLOBAL_REG_MIB.mib
INSTALL_DIR/SNMP/SMIv2/DIGL-OWM-GLOBAL-REGISTRY.mib
INSTALL_DIR/SNMP/SMIv2/DIGL-OWM-MIB.mib
```

- Follow the instructions from your third-party SNMP management software to install the MIBs in the MIBs in the client.

From the GUI interface, perform the following:

- Click on **View** in the main menu bar.
- Click on **System Details** to display the OWM System dialog screen.

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- Click on the **SNMP** tab (Figure -12).

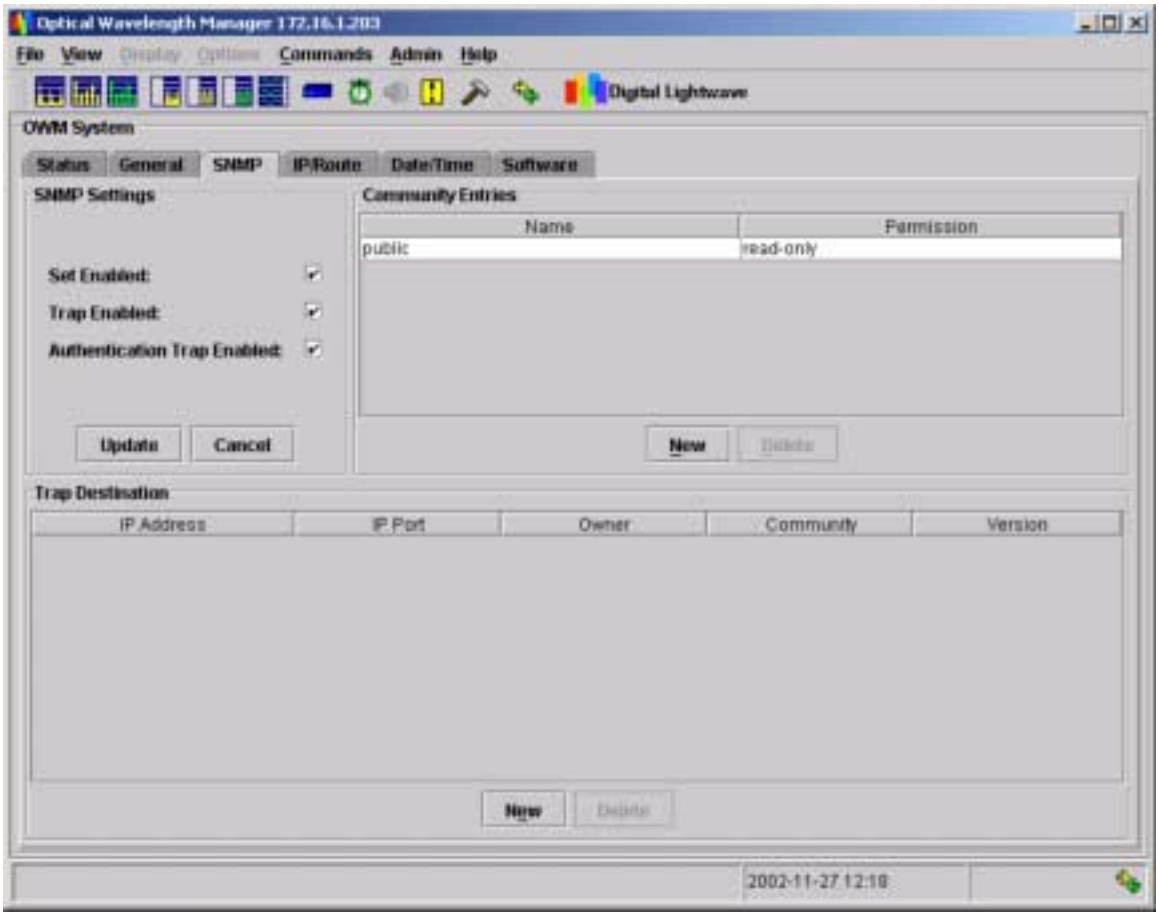


FIGURE -12. SNMP Tab

SNMP Settings

The SNMP Settings sub-screen allows the user to configure how the SNMP agent (within the OWM) behaves with respect to SNMP clients and management stations.

- Click the **Set Enabled** checkbox to allow an authorized SNMP client or manager to perform SNMP sets. This setting allows the authorized SNMP client to modify OWM settings and configuration.
- Click the **Trap Enabled** check box to enable the OWM SNMP agent to send SNMP traps. This setting sends all traps, such as OWM alarms and events. This does not enable authentication traps.
- Click the **Authentication Trap Enabled** check box to enable the OWM SNMP agent to send authentication traps. This setting sends a trap to SNMP clients when a client without proper authorization is attempting access the SNMP agent or is attempting a write operation with read-only access.
- Click the **Update** button at the bottom of the sub-screen to enforce the changes.

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Community Entries

The Community Entries sub-screen allows the user add and delete community names. The community is an alphanumeric case-sensitive string that gives the SNMP client or manager access to the agent (OWM) for receiving information or changing configurations.

The default community is "public" with read-only access.

To add a community:

- Click on **New** at the bottom of the sub-screen.
- In the **Name** field, enter the alphanumeric case-sensitive name of the community.
- Click on the **Permission** field, and select read-only or read-write from the drop down box. This controls the level of access allowed by the client or manager. The client cannot perform SNMP sets without read-write access.
- Click on the **Update** button at the bottom of the sub-screen to enforce the changes.

To delete a community:

- Select the community name to be deleted.
- Click on **delete** at the bottom of the sub-screen.
- A confirmation screen will appear. Click on **Yes** to delete the community or **No** to cancel the operation.



To change the access level of a community, it must be deleted and then re-added.

Trap Destination

The Trap Destination sub-screen allows the user to add the information that the agent (OWM) needs to send SNMP traps to an SNMP client or management station.

To add a new trap destination:

- Click on **New** at the bottom of the sub-screen.
- In the IP Address field, enter the IP address (in the form 255.255.255.255) of the SNMP client to receive the traps.
- The IP port defaults to the conventional SNMP port, 162. Click on the field to type a new value in this field if using something other than the default.
- In the Owner field, enter a descriptive text string, such as the name or function of the SNMP client. This field is not included in the SNMP packet sent to the trap destination.
- In the Community field, enter the alphanumeric case-sensitive community name. This community name is encoded in the SNMP packet sent to the management station.
- Click on the Version field to select the SNMP version that is supported by the SNMP client or manager. The default SNMP version is 2, which means the packets are encoded with SNMPv2C style traps. Selecting 1 from the drop down box means the packets are encoded with SNMPv1 style traps.
- Click on the **Update** button at the bottom of the sub-screen to enforce the changes.

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To delete a trap destination:

- Select the trap destination to be deleted.
- Click on **delete** at the bottom of the sub-screen.
- A confirmation screen will appear. Click on **Yes** to delete the trap destination or **No** to cancel the operation.

Managing Stored Configurations

Configuring the OWM to perform basic operations on devices, channels, alarms, and ports requires data input. Specifically, the data input refers to any changes that are made while in Configuration Mode. The data changed in Configuration Mode can be "applied" and or "saved" to the OWM.

Applied data is stored locally and affects the current OWM operation. If, however, the OWM is rebooted, data that has been applied will be lost and the OWM will operate using a stored configuration database.

Saved data is stored in persistent memory (disk) and is retained and utilized after an OWM reboot procedure. Saved data is only stored in persistent memory in a configuration database and does not affect the current OWM operation. To save the changes and affect the current OWM operation, you must "apply" the data first and then "save".

In Configure Mode, click **Apply** to put configuration changes into running memory and/or **Save** to permanently save the running configuration to a file. If you only "**Apply**" changes, these changes will be lost when the system is rebooted. If you exit Configure Mode (**Quit**) after applying the changes, a confirmation screen will appear asking if you would like to "Save" the changes.

If you only "**Save**" changes, the changes will be saved to a configuration file but will not have any affect on OWM operation. The saved file generated by the **Save** command is used to establish configuration during reboot. When you reboot the system, data from the configuration file is used to operate the OWM. If you exit Configure Mode (**Quit**) after saving the changes, a confirmation screen will appear asking if you would like to "**Apply**" the changes.

If you "Apply" and then "Save" changes, the changes will be saved to a configuration file and will also affect the current OWM operation.

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CHAPTER

Command Line Interface

The Digital Lightwave Optical Wavelength Manager (OWM) Command Line Interface (CLI) allows you to monitor, manage and configure OWM optical and system tasks. You use CLI commands to:

- Define channel and alarm settings
- Obtain power, wavelength and OSNR measurements
- List devices and channel plans of devices
- Query events and log data information
- Install software updates
- Create and delete user accounts

You connect to the CLI from either a serial port (RS232) or a Telnet session (LAN).

The Help command lists all the commands and shows the command syntax to execute these commands. To get online help for these commands, type **?, h,** or **help** at the User Mode prompt. For a complete description of all the CLI commands including examples, refer to the "CLI Commands" on page -14.

Operating Modes

The CLI has two operating modes:

- User Mode
- Configure Mode

User Mode

User Mode provides read-only privileges and allows you to perform basic operations like:

- Displaying operations information
- Displaying configuration data such as peak detection, spectrum values, power, wavelength and OSNR data from the OWM system
- Copying and deleting files
- Pinging and displaying IP address information
- Acknowledging alarms
- Configuring non-optical settings such as an IP address, IP routes, and user configuration
- Viewing data log information
- Setting date and time
- Setting IP addresses
- Setting passwords
- Creating and deleting user accounts

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- Rebooting and software loading
- Executing SNMP commands
- Executing OWM software commands
-

Online Help in User Mode displays the basic operator commands. To get online help for these commands, type **?, h** or **help** at the User Mode prompt.

Configure Mode

Configure Mode is the advanced level that you enter as a CLI user to attain read/write privileges. Read/Write privileges are access rights granted to users who have *admin* and *config* privileges. Configure Mode is indicated by the "<name>%" (brackets and percent sign) prompt.

For more details about the Configure command, refer to "Configure" on page -17.

In Configure Mode, you can perform both basic operations (User Mode) and advanced management configuration functions (Configure Mode) like:

- Configuring of optical devices. This includes adding and deleting information about devices, channels, and alarms
- Configuring ports

You can change parameters and settings in Configure Mode, as Configure Mode provides read-write access. All configuration changes are first written to memory. To make your changes persistent to disk, use the Apply command and then the Save command.

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Request and Reply Messages

Request and reply messages consist of commands, responses to commands, alarms, error messages and information that is obtained from a request by a command. To use the CLI, you must learn the following rules, explanations and requirements:

- Command protocol
- Command message format
- Command description
- Command syntax
- Measurement range values

Command Protocol

The command protocol is comprised of request and reply messages. Command protocol explanations include the following information:

- Request messages are sent from you to the OWM and reply messages are sent from the OWM to you.
- Solicited reply messages are sent in response to request messages.
- Unsolicited reply messages are sent in response to asynchronous events; for example, the detection of alarm events.
- Syntax errors result in a reply message beginning with the string "!SYNTAX".
- Unsolicited reply messages begin with the string "!ALARM".

Command Message Format

Formatting rules for request and reply messages include the following information:

- Requests can be in mixed upper and lower case.
- Case is meaningful only for character strings.
- Requests terminate with a new line (ASCII 0x0a) character.
- Space characters are ignored on input, except in character strings which appear between quotation marks.
- Any sequence of one or more white space characters are treated as a single space. White space includes using the horizontal bar, vertical bar, form feed key and space (ASCII 0x09, 0x0B, 0x0C and 0x20) characters.
- Blank lines are ignored.
- Numbers conform to standard programming format rules for integers and floating point values. All numbers are either an unsigned integer (16 bits) or a floating point number.
- Successful command completion generally results in a reply message from the system prompt %. Some command replies generate one or more lines of output, followed by a new line and the system prompt %.
- Solicited reply messages end on the following line with the system prompt %.

- Unsolicited reply messages begin with a ! (ASCII 0x21) character and end with a system prompt %.
- The system prompt is the %.
- In Configure Mode, the system prompt is changed from % to <name>% where *name* is the OWM system name.
- Access to Configure Mode depends on what access level you are assigned.

Command Description

A command description is provided for each CLI command. The command description provides:

- Command Name
- Command Syntax
- Command Description, including a description of parameters and outputs
- Command Access Level
- Command Examples

Value Type	Description
keyword	A command keyword you must type exactly as specified. Example: **show**
string	A sequence of characters between a pair of double quotation marks. Example: "*The quick brown fox*"
integer	A whole number. Example: 123
float	A rational number, with or without a decimal point. Example: 1552.52

Measurement Range Values

Some commands require that you set either wavelength (spectral) measurement range values, power measurement range values or OSNR measurement range values. When you specify measurement range values, consider the following technical specification requirements:

- Specify wavelength measurement values inside the range displayed by the Show OWM command by 0.01 nm at both the high end and the low end.
  For example, if the Show OWM command displays a minimum wavelength of 1530.33 nm and a maximum wavelength of 1561.42 nm, the valid wavelength measurement range is from 1530.34 nm to 1561.41 nm.
- Specify power measurement values inside the range of 23.0 dBm to -73.0 dBm by 0.1 dBm at both the high end and the low end.

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- Specify OSNR measurement values inside the range of 5.0 dB and 30.0dB by 0.1 dB at both the high end and the low end.



For best results, stay within the measurement range of the OWM. See "Unit Specifications" on page A-1.

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Summary of Commands

The following table summarizes CLI commands and syntax in alphabetical order and the access levels associated with each command. When an access level is associated with a command, the users that are assigned with that access level can execute that command.

Online Help in User Mode displays the basic operator commands. To get online help for these commands, type **help**, **?** or **h** at the User Mode prompt.

To see the full command description and syntax with examples and error messages:

- Click on the desired command in the Command column if you are viewing online. Or,
- Refer to "CLI Commands" on page -14 if you are viewing the hard copy manual.

Table -1. CLI Command Syntax and Access Levels

Command	Access Levels a - *admin* c - *config* o - *operate* g - *guest*	Syntax
Account Add	a	**account add** *"username" "level"*
Account Delete	a	**account delete** *"username"* [**force**]
Alarm Acknowledge	a, c, o	**alarm** { **ack** | **acknowledge** }
Alarm Broadcast	a, c	**alarm broadcast** { **enable** | **disable** }
Apply	*Configure Mode*	**apply**
Benchmarks	*Configure Mode*	**benchmarks** { **clear** | **device** *"device"* | **all** }
Configure	a, c	**configure**
Contact	a, c	**contact** *"contact"*
Date	a, c	**date** *yyyy-mm-dd*
Description	a, c	**description** *"description"*
Device Active	a, c, o	**device active** "*device*"
Device Add	*Configure Mode*	**device add** "*device*" "*description*" "*port*" *tapPower*
Device Add Channel	*Configure Mode*	**device add** "*device*" **channel** *minWavelength centerWavelength maxWavelength* [*"description"*]
Device Alarms	*Configure Mode*	**device** "*device*" **alarms** { **critical | major | minor** } { **min | max** } { **power | osnr** } *trigger clear*

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Command	Access Levels a - *admin* c - *config* o - *operate* g - *guest*	Syntax
Device Alarms Wavelength Offset	*Configure Mode*	**device** "*device*" **alarms** { **critical** | **major** | **minor** } { **min** | **max** } **wavelength offset** *trigger clear*
Device Channel	*Configure Mode*	**device** "*device*" **channel** *number* { **min | center | max** } ***value***
Device Channel Alarm Enable	*Configure Mode*	**device** "*device*" **channel** *channel* **alarm** { **critical | major | minor** } { **min | max** } { **wavelength | power | osnr** } { **enable | disable** }
Device Channel Alarm Set	*Configure Mode*	**device** "*device*" **channel** *channel* **alarm** { **critical | major | minor** } { **min | max** } { **wavelength | power | osnr** } { **enable | disable** } *trigger clear*
Device Channel Alarms	*Configure Mode*	**device** "*device*" **channel** [*channel*] **alarms** { **enable | disable** }
Device Channel Alarm Multiple Peaks (Individual)	*Configure Mode*	**device** "*device*" **channel** *channel* **alarm multiple peaks** { **enable** | **disable** }
Device Channel Alarms Multiple Peaks (All)	*Configure Mode*	**device** "*device*" **channel alarms multiple peaks** { **enable** | **disable** }
Device Channel Description	*Configure Mode*	**device** "*device*" **channel** *channel* **description** "*description*"
Device Channels From CBand	*Configure Mode*	**device** "*device*" **channels from cband**
Device Channels From Peaks	*Configure Mode*	**device** "*device*" **channels from peaks** [{ **50** | **100** | **200** } [**with alarms**]]
Device Delete	*Configure Mode*	**device delete** "*device*"
Device Delete Channel	*Configure Mode*	**device delete** "*device*" **channel** *channel*
Device Delete Channels	*Configure Mode*	**device delete** "*device*" **channels**

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Command	Access Levels a - *admin* c - *config* o - *operate* g - *guest*	Syntax
Device Delete Channel Alarm	*Configure Mode*	**device delete** "*device*" **channel** *channel* **alarm** { **critical** | **major** | **minor** } { **min** | **max** } { **wavelength** | **power** | **osnr** }
Device Delete Total Power Alarm	*Configure Mode*	**device delete** "*device*" **total power alarm {critical | major | minor}**
Device Description	*Configure Mode*	**device** "*device*" **description** "*description*"
Device Port	*Configure Mode*	**device** "*device*" **port** "*port*"
Device Rename	*Configure Mode*	**device** "*device*" **rename** "*new name*"
Device Total Power Alarm	*Configure Mode*	**device** "device" **total power alarm {critical | major | minor}** *trigger clear*
Device Tap Power	*Configure Mode*	**device** "*device*" **tappower** "*tapPower*"
Disk Log	*a, c*	**disk log** { **enable** | **disable** }
Disk Log Mount	*a, c*	**disk log mount** { "**/ata1**" | "**/ata2**" }
Email Add	*a*	**email add** "*recipient*"
Email Delete	*a*	**email delete** "*recipient*"
Email Enable	*a*	**email** { **enable** | **disable** }
Email From	*a*	**email from** "*from account*"
Email Level	*a*	**email** { **critical** | **major** | **minor** }
Email Server	*a*	**email server** *ipaddr*
Email Test	*a*	**email test**
Exit	*Configure Mode*	**exit**
File Copy	a, c, o	**file copy** "*sourcefile*" "*destfile*"
File Delete	a, c, o	**file delete** "*filename*"
Global Alarm Broadcast	a, c	**global alarm broadcast** { **enable** | **disable** }
GUI Port	a	**gui port** {**<number>** | **default**}
Help	a, c, o, g	{ **help** | **h** | **?** }
IP	a	**ip** { *ipaddr* [*netmask*] | **disable** }

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Command	Access Levels a - *admin* c - *config* o - *operate* g - *guest*	Syntax
Location	a, c	**location** "*location*"
Logout	a, c, o, g	**logout**
Name	a, c	**name** "*name*"
OSNR Width	*Configure Mode*	**osnr width** *resolutionBandwidth*
Password (All)	a	**password** "*username*"
Password (owner)	a, c, o	**password**
Ping	a, c, o, g	**ping** *ipAddr*
Port Active	a, c, o	**port active** "*port*"
Port Tap Power	*Configure Mode*	**port** "*port*" *tapPower*
Reboot	a, c, o	**reboot**
Reload	*Configure Mode*	**reload** [**default** | "*filename*"]
Route Add	a	**route add** *destination* [*netmask*] *gateway*
Route Add Default	a	**route add default** *gateway*
Route Delete	a	**route delete** *destination* [*netmask*]
Route Delete Default	a	**route delete default**
Route Flush	a	**route flush**
Save	*Configure Mode*	**save**
Sequencer	a, c, o	**sequencer** { **on** | **off** }
Show Account Levels	a, c, o, g	**show account levels**
Show Accounts	a	**show accounts**
Show Alarm Broadcast	a, c, o, g	**show alarm broadcast**
Show Alarm Status	a, c, o, g	**show alarm status**
Show Alarms	a, c, o, g	**show alarms** [**device** "*device*"] [**save** ["*filename*"]] [**terse**]

Command	Access Levels a - *admin* c - *config* o - *operate* g - *guest*	Syntax
Show Benchmarks	a, c, o, g	**show benchmarks** [**device** *"device"*] [**save** [*"filename"*]]
Show Composite Power	a, c, o, g	**show composite power**
Show Configuration Status	*Configure Mode*	**show configuration status**
Show Contact	a, c, o, g	**show contact**
Show Data Log	a, c, o, g	**show data log** [**device** "*device*" [**channel** *channel*]] [**save** ["*filename"*]] [**terse**] [**time**]
Show Date	a, c, o, g	**show date**
Show Description	a, c, o, g	**show description**
Show Device	a, c, o, g	**show device** "*device*"
Show Device Active	a, c, o, g	**show device active**
Show Devices	a, c, o, g	**show devices**
Show Device Channel	a, c, o, g	**show device** "*device*" **channel** *channel*
Show Device Values	a, c, o, g	**show device** "*device*" **values**
Show Disk Log	a, c, o, g	**show disk log**
Show Email	a, c, o, g	**show email**
Show Event Last	a, c, o, g	**show event last**
Show Events	a, c, o, g	**show events** [**device** "*device*"] [*count*] [**save** ["*filename*"]] [**terse**]
Show Events From	a, c, o, g	**show events from** *fromNumber* [**to** *toNumber*]
Show Files	a, c, o, g	**show files** ["*directory*"]
Show Global Alarm Broadcast	a, c, o, g	**show global alarm broadcast**
Show GUI Port	a, c, o, g	**show gui port**
Show ID	a, c, o, g	**show id**

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Command	Access Levels a - *admin* c - *config* o - *operate* g - *guest*	Syntax
Show IP	a, c, o, g	**show ip**
Show LEDs	a, c, o, g	**show leds**
Show Location	a, c, o, g	**show location**
Show MAC Address	a, c, o, g	**show macaddr**
Show Name	a, c, o, g	**show name**
Show New Device	*Configure Mode*	**show new device** "*device*"
Show New Devices	*Configure Mode*	**show new devices**
Show New Device Channel	*Configure Mode*	**show new device** "*device*" **channel** *channel*
Show New OSNR Width	*Configure Mode*	**show new osnr width**
Show New System	*Configure Mode*	**show new system**
Show New Total Power Alarms	*Configure Mode*	**show new total power alarms**
Show OSNR Width	a, c, o, g	**show osnr width**
Show Peaks	a, c, o, g	**show peaks**
Show Pixel Wavelength	a, c, o, g	**show pixel wavelength**
Show Port	a, c, o, g	**show port** "*port*"
Show Port Active	a, c, o, g	**show port active**
Show Ports	a, c, o, g	**show ports**
Show Relays	a, c, o, g	**show relays**
Show Routes	a, c, o, g	**show routes**
Show Sequencer	a, c, o, g	**show sequencer**
Show SNMP Authentication Trap	a, c, o, g	**show snmp authentication trap**
Show SNMP Community	a, c, o, g	**show snmp community**

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Command	Access Levels a - *admin* c - *config* o - *operate* g - *guest*	Syntax
Show SNMP Set	a, c, o, g	**show snmp set**
Show SNMP Trap	a, c, o, g	**show snmp trap**
Show SNMP Trap Destination	a, c, o, g	**show snmp trap destination**
Show SNTP	a, c, o, g	**show sntp**
Show Software	a, c, o, g	**show software**
Show Spectrum	a, c, o, g	**show spectrum**
Show Spectrum Power	a, c, o, g	**show spectrum power**
Show System	a, c, o, g	**show system**
Show Temperature	a, c, o, g	**show temperature**
Show Tidemarks	a, c, o, g	**show** { **high** | **low** } **tidemarks** [**device** "*device*" [**channel** *channel*]] [**save** ["*filename*"]] [**terse**] [**time**]
Show Time	a, c, o, g	**show time**
Show Timezone	a, c, o, g	**show timezone**
Show Total Power	a, c, o, g	**show total power**
Show Total Power Alarms	a, c, o, g	**show total power alarms**
Show Uptime	a, c, o, g	**show uptime**
Show User	a, c, o, g	**show user**
Show Users	a, c, o	**show users**
SNMP Add Community	a	**snmp add community** "*community*" { **read-only** | **read-write** }
SNMP Add Trap Destination	a	**snmp add trap destination** *ipAddr ipPort* "*owner*" "*community*" { ***1*** | ***2*** }
SNMP Authentication Trap	a	**snmp authentication trap** { **enable** | **disable** }
SNMP Delete Community	a	**snmp delete community** "*community*"

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Command	Access Levels a - *admin* c - *config* o - *operate* g - *guest*	Syntax
SNMP Delete Trap Destination	a	**snmp delete trap destination** *ipAddr ipPort*
SNMP Set	a	**snmp set** { **enable** | **disable** }
SNMP Trap	a	**snmp trap** { **enable** | **disable** }
SNTP	a	**sntp** { *ipAddr* | **disable** | **broadcast** }
Software Clear	a	**software clear** *slot* [**force**]
Software Default	a	**software default** *slot*
Software Download	a	**software download** *slot* "*filename*"
Software Run	a	**software run** [***slot***]
Spectrometer Log	a	**spectrometer log {enable | disable}**
Spectrometer Log	a	**time** *hh*:*mm*:*ss*
Timezone	a	**timezone**
Timezone Reset	a	**timezone reset**
Timezone Daylight Savings Time (DST)	a	**timezone dst** { **enable** | **disable** }
Total Power Alarms	*Configure Mode*	**total power alarms {enable | disable}**

CLI Commands

This section describes each CLI command.

Account Add

Syntax **account add** *"username" "level"*

Description Creates a user account with the specified username and access level. A maximum of 10 user accounts can be created. The "admin" account is automatically created and can not be deleted. Only the "admin" account can have the "admin" account level.

Parameter	Value	Description
"username"	string	A unique username that is case sensitive and has a maximum length of 32 characters.
"level"	string	Account levels include "*admin*", "*config*", "*operate*" and "*guest*".

Access Level Requires *admin* access level privileges.

Command Example

```
% account add "gary" "guest"
password: *******
repeat: *******
%
```

Account Delete

Syntax **account delete** "*username*" [**force**]

Description Deletes the account with the specified username. You are prompted to confirm your deletion request, unless you use the **force** parameter in the command syntax.
.

Parameter	Value	Description
"*username*"	string	A valid username.
force	keyword	(Optional) Suppresses the confirmation prompt.

Access Level Requires *admin* access level privileges.

Command Example

```
% account delete "gary"
WARNING: Permanently delete account "gary" <4> (yes/no)? yes
%
```


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Alarm Acknowledge

Syntax **alarm** { **ack** | **acknowledge** }

Description Acknowledges all alarms and turns off the audible alarm. This command generates a message to the Event Log.

Access Level Requires *admin*, *config* or *operate* access level privileges.

Command Example

```
% alarm ack
% alarm acknowledge
%
```

Alarm Broadcast

Syntax **alarm broadcast** { **enable** | **disable** }

Description Enables or disables the broadcast of alarms on the current command line interface.

Parameter	Value	Description
enable	keyword	Non-persistent setting that enables broadcast of alarms.
disable	keyword	Non-persistent setting that disables broadcast of alarms.

Access Level Requires *admin* or *config* access level privileges.

Command Example

```
% alarm broadcast enable
%
```

Apply

Syntax **apply**

Description Saves your changes to memory within the current system configuration. Since Apply only saves the changes to volatile memory, you must use the Save command to make the changes persistent by saving them to non-volatile flash memory. When you Apply the change, all users on the OWM system see an immediate change. If you make a change before using Apply or Save, only *you* see the immediate change by using the appropriate Show New... command.

The Apply command allows you to quickly make several changes to the current system configuration and then at the end of a session, make these changes persistent with the Save command.



If you Apply your changes but do not Save them when you exit Configure Mode, you will lose all your changes unless you reenter Configure Mode and use the Save command. If you Apply your changes and do not Save before the OWM experiences a power failure, you will lose your applied changes.

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Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% apply
<owm>%
```

Benchmarks

Syntax **benchmarks** { **clear** | **device** *"device"* | **all** }

Description Enables benchmarking on all devices or a specified device; or disables benchmarking on all devices. All changes must be Applied before benchmarks can be run. After benchmarks are created, the Save command must be run to make the benchmarks permanent.

Parameter	Value	Description
clear	keyword	Clears or erases all benchmarks on all defined devices.
"device"	string	Unique name for the device; if the device does not exist, an error is returned.
all	keyword	Takes a benchmark reading on all defined devices.

Access Level Requires *admin or config* access level privileges.

Command Example

```
<Salem>% benchmarks device "Boston"
<Salem>%
```


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Configure

Syntax **configure**

Description Allows you to enter Configure Mode from User Mode to make changes to the system configuration. When you make changes, only you can see the changes. These changes are made to a temporary copy. When you Apply the changes, the temporary copy is placed into the running system. All users will be able to see the changes at this point. When you Save the changes, the running system is written out and made permanent.

If you try to enter Configure Mode without the proper access level, you receive the following error message:

```
% configure
!ERROR: [0x80000900] invalid access rights
%
```



Only one user is allowed in Configure Mode at a time. If you have access rights, you have the capability to enter Configure Mode and "bump" the previous user.

When you try to enter Configure Mode while another user is in Configure Mode, you receive the following warning message:

```
WARNING:
Do you want to take configuration mode from <carl> (yes/no)?
```

Type *yes* to enter Configure Mode. When you enter Configure Mode, the previous user is exited into User Mode and receives the following status message:

```
<owm>%
!ERROR: [0x80000303] write permission has been taken by another user <"admin">
%
```

Type *no* to remain in User Mode. When you decline to enter Configure Mode, you receive the following status message:

```
% configure
WARNING:
Do you want to take configuration mode from <carl> (yes/no)? no
configure mode lock not taken
%
```

To leave Configure Mode, use the Exit command.

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Access Level Requires *admin* or *config* access level privileges.

Command Example

```
% configure
<owm>%
```

Contact

Syntax **contact** "*contact*"

Description Sets the contact information of the OWM device. This command also sets the MIB-II "*system.sysContact"* contact description for the SNMP agent.

Parameter	Value	Description
"*contact*"	string	Contact information, up to 80 characters.

Access Level Requires *admin* or *config* access level privileges.

Command Example

```
% contact "support"
%
```

Date

Syntax **date** *yyyy-mm-dd*

Description Sets the date on the OWM device. It is recommended that the date and time not be set during the one hour overlap from daylight savings time to standard time in autumn and during the hour lost when switching from standard to daylight savings time in the spring.

Parameter	Value	Description
yyyy	integer	Four digits representing the year (1970 - 2100).
mm	integer	Two digits representing the month (01-12).
dd	integer	Two digits representing the day (01-31).

Access Level Requires *admin* access level privileges.

Command Example

```
% date 2002-06-17
%
```


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Description

Syntax **description** *"description"*

Description Sets the description of the OWM device. This command also sets the MIB-II "system.sysDescr" description for the SNMP agent.

.

Parameter	Value	Description
"*description*"	string	A description for the OWM device. The description has a maximum length of 80 characters.

Access Level Requires *admin* or *config* access level privileges.

Command Example

```
% description "OWM Salem"
%
```

Device Active

Syntax **device active** "*device*"

Description Activates the specified device. Sends the channel information to the Spectrometer to be monitored. This command will disable the sequencer.

Parameter	Value	Description
"*device*"	string	Unique name for the device. If the device does not exist, an error is returned.

Access Level Requires *admin*, *config* or *operate* access level privileges.

Command Example

```
% device active "Manchester"
%
```


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Device Add

Syntax **device add** "*device*" "*description*" *"port" tapPower*

Description Creates a new device for the specified port.

Parameter	Value	Description
"device"	string	Name for the device, which has a maximum length of 32 characters. The name must be unique to the OWM.
"description"	string	Description of the device, which has a maximum length of 80 characters. Device descriptions do not have to be unique to the OWM but it is recommended.
"port"	string	A valid port name (case sensitive -- see Show Ports). If the port does not exist, an error is returned.
tapPower	float	Tap power for the device with a maximum of one decimal place. Tap power range is from 0.1 to 100.0 and is a percentage.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device add "Manchester" "CO in Manchester" "PORT 1" 10.0
<owm>%
```

Device Add Channel

Syntax **device add** "*device*" **channel** *minWavelength centerWavelength maxWavelength* ["*description*"]

Description Creates a new channel definition for the specified device. When the channel is added, the channels for that device are resorted base on center wavelength. Also, a unique ID and channel number are generated. Channel numbers are assigned based on the position of the channel in the sorted channel plan.

Modifications to the channel plan need to be applied before those modifications are used.

Before a channel is added, the Minimum, Center and Maximum wavelengths are validated in the following sequence:

- Minimum wavelength must be less than Center wavelength.
- Center wavelength must be less than the Maximum wavelength.
- Center wavelength is added to the existing channel plan, which is sorted by Center wavelength.
- Minimum and Maximum wavelengths are checked against the previous and next channels.
- The Minimum wavelength must be greater than the previous Maximum wavelength.

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– The Maximum wavelength must not overlap the next Minimum wavelength.

Parameter	Value	Description
"*device*"	string	Unique name for the device. If the device does not exist, an error is returned.
"*port*"	string	Unique name for the port. If the port does not exist, an error is returned.
minWavelength	float	Minimum wavelength (nm) for the channel, with a maximum of two decimal places.
centerWavelength	float	Center wavelength (nm) for the channel, with a maximum of two decimal places
maxWavelength	float	Maximum wavelength (nm) for the channel, with a maximum of two decimal places
"*description*"	string	Optional. Modifies the channel description for the specified device and the new channel with a maximum length of 80 characters.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device add "Manchester" channel 1532.91 1533.30 1533.69
<owm>%
```


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Device Alarms

Syntax **device** "*device*" **alarms** { **critical** | **major** | **minor** } { **min** | **max** } { **power** | **osnr** } *trigger clear*

Description For a given device, all channels will have their alarms set to the trigger and clear values. The alarms are filtered based on the alarm severity level and whether it is a minimum or maximum. This command applies to Power and OSNR alarms.

Parameter	Value	Description
"device"	string	Unique name for the device. If the device does not exist, an error is returned.
critical	keyword	Channel alarm severity is critical (CR).
major	keyword	Channel alarm severity is major (MJ).
minor	keyword	Channel alarm severity is minor (MN).
min	keyword	Sets minimum values.
max	keyword	Sets maximum values.
power	keyword	Sets Power (dBm) alarms.
osnr	keyword	Sets OSNR (dB) alarms.
trigger	float	Sets alarm trigger values with a maximum of one decimal.
clear	float	Sets alarm clear values with a maximum of one decimal.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" alarms critical max power -20 -20.5
<owm>%
```


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Device Alarms Wavelength Offset

Syntax **device** "*device*" **alarms** { **critical** | **major** | **minor** } { **min** | **max** }
wavelength offset *trigger clear*

Description Sets the trigger and clear values to relative values specified for each channel alarm severity and for each channel alarm minimum or maximum values for the specified device. This command provides a wavelength offset for each channel. The offset is taken from the minimum and maximum bandwidths for the channel.

Parameter	Value	Description
"*device*"	string	Unique name for the device. If the device does not exist, an error is returned.
critical	keyword	Channel alarm severity is critical (CR).
major	keyword	Channel alarm severity is major (MJ).
minor	keyword	Channel alarm severity is minor (MN).
min	keyword	Sets minimum values.
max	keyword	Sets maximum values.
offset	keyword	Sets wavelength offset values for each channel.
trigger	float	Sets alarm wavelength offset (nm) trigger values, with a maximum of two decimal places
clear	float	Sets alarm wavelength offset (nm) clear values, with a maximum of two decimal places.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" alarms major min wavelength offset -20 -20.5
<owm>%
```


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Device Channel

Syntax **device** "*device*" **channel** *channel* { **min** | **center** | **max** } *wavelength*

Description Modifies a channel wavelength definition for the specified device. All validation rules are applied. See Device Add Channel.

Parameter	Value	Description
"name"	string	Unique name for the device; if the device does not exists, an error is returned.
channel	Integer	Channel number
min	keyword	Set minimum wavelength.
center	keyword	Set center wavelength.
max	keyword	Set maximum wavelength.
wavelength	float	Wavelength (nm) for the channel, with a maximum of two decimal places

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" channel 1 center 1540.00
<owm>%
```


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Device Channel Alarm Enable

Syntax **device** "*device*" **channel** *channel* **alarm** { **critical** | **major** | **minor** } { **min** | **max** } { **wavelength** | **power** | **osnr** } { **enable** | **disable** }

Description Enables or disables a channel alarm for the specified device.

Parameter	Value	Description
"device"	string	Unique name for the device. If the device does not exist, an error is returned.
channel	integer	Channel number (as displayed by the Show Device command).
critical	keyword	Alarm severity is critical (CR).
major	keyword	Alarm severity is major (MJ).
minor	keyword	Alarm severity is minor (MN).
min	keyword	Set minimum value.
max	keyword	Set maximum value. (Does not apply to **osnr**.)
wavelength	keyword	Set a wavelength (nm) alarm with a maximum of two decimal paces.
power	keyword	Set a power (dBm) alarm with a maximum of one decimal pace.
osnr	keyword	Set an OSNR (dB) alarm with a maximum of one decimal pace. (Not valid in combination with **max**.)
enable	keyword	Enable this alarm.
disable	keyword	Disable this alarm.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" channel 1 alarm critical min power enable
<owm>%
```


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Device Channel Alarm Set

Syntax **device** "*device*" **channel** *channel* **alarm** { **critical** | **major** | **minor** } { **min** | **max** } { **wavelength** | **power** | **osnr** } { **enable** | **disable** } *trigger clear*

Description Sets a channel alarm definition for the specified device.

Parameter	Value	Description
"device"	string	Unique name for the device. If the device does not exist, an error is returned.
channel	integer	Channel number (as displayed by the Show Device command).
critical	keyword	Alarm severity is critical (CR).
major	keyword	Alarm severity is major (MJ).
minor	keyword	Alarm severity is minor (MN).
min	keyword	Set minimum value.
max	keyword	Set maximum value. (Does not apply to **osnr**.)
wavelength	keyword	Set a wavelength (nm) alarm with a maximum of two decimal paces.
power	keyword	Set a power (dBm) alarm with a maximum of one decimal pace.
osnr	keyword	Set an OSNR (dB) alarm with a maximum of one decimal pace. (Not valid in combination with **max**.)
enable	keyword	Enable this alarm.
disable	keyword	Disable this alarm.
trigger	float	Alarm trigger value.
clear	float	Alarm clear value.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" channel 1 alarm critical min power enable –40.0 -38.5
<owm>%
```


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Device Channel Alarms

Syntax **device** *"device"* **channel** [*channel*] **alarms** { **enable** | **disable** }

Description Enables or disables alarms on all channels or a specific channel for the specified device.

Parameter	Value	Description
"device"	string	Unique name for the device. If the device does not exist, an error is returned.
channel	integer	Channel number.
enable	keyword	Enables the alarm on all channels or the specified channel for the designated device.
disable	keyword	Disables the alarm on all channels or the specified channel for the designated device.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" channel alarms enable
<owm>%
```

Device Channel Alarm Multiple Peaks (Individual)

Syntax **device** *"device"* **channel** *channel* **alarm multiple peaks** { **enable** | **disable** }

Description This command enables or disables zero and multiple peaks alarms on the specified channel for the specified device.

Parameter	Value	Description
"device"	string	Unique name for the device. If the device does not exist, an error is returned.
channel	integer	Channel number.
enable	keyword	Enables zero and multiple peaks on each channel.
disable	keyword	Disables zero and multiple peaks on each channel.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" channel 5 alarm multiple peaks enable
<owm>%
```


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Device Channel Alarms Multiple Peaks (All)

Syntax **device** *"device"* **channel alarms multiple peaks** { **enable** | **disable** }

Description This command enables or disables zero and multiple peaks alarms on all channels for the specified device.

Parameter	Value	Description
"device"	string	Unique name for the device. If the device does not exist, an error is returned.
enable	keyword	Enables zero and multiple peaks on each channel.
disable	keyword	Disables zero and multiple peaks on each channel.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" channel alarms multiple peaks enable
<owm>%
```

Device Channel Description

Syntax **device** "*device*" **channel** *channel* **description** "*description*"

Description Modifies the channel description for the specified device and channel.

Parameter	Value	Description
"device"	string	Unique name for the device. If the device does not exist, an error is returned.
channel	integer	Channel number
"description"	string	Description for the channel. The maximum string length is 80 characters.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" channel 1 description "Channel 1"
<owm>%
```


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Device Channels From CBand

Syntax **device** "*device*" **channels from cband**

Description Defines the channels from the CBand for the specified device. Then number of channels defined and the bandwidth for each channel is dependent on the type of OWM being used. This command defines the first 50/100 valid channels beginning with the lowest value. Each value represents the center wavelength of a channel.The maximum bandwidth for each channel is 0.8/0.4 nm. This command does not define alarms for any of the channels. A channel is not defined, unless its center wavelength falls between the OWM system wavelength limits

Parameter	Value	Description
"name"	string	Unique name for the device; if the device does not exist, an error is returned.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" channels from cband
<owm>%
```

Device Channels From Peaks

Syntax **device** "*device*" **channels from peaks** [{ **50** |**100** | **200** } [**with alarms**]]

Description For each peak found on the device's port, this command defines a channel with the specified maximum bandwidth. 100 GHz is the default bandwidth if no bandwidth is specified. This command also defines all the alarms, if you specify the option with alarms.

Parameter	Value	Description
"device"	string	Unique name for the device; if the device does not exists, an error is returned.
50	keyword	Sets maximum bandwidth of a channel to 50 Gigahertz (GHz).
100	keyword	Sets maximum bandwidth of a channel to 100 Gigahertz (GHz).
200	keyword	Sets maximum bandwidth of a channel to 200 Gigahertz (GHz).
with alarms	keyword	(Optional) Defines alarms.

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Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" channels from peaks 50 with alarms
<owm>%
```

Device Delete

Syntax **device delete** "*device*"

Description Deletes the specified device.

Parameter	Value	Description
"*device*"	string	Unique name for the device; if the device does not exist, an error is returned.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device delete "Manchester"
<owm>%
```

Device Delete Channel

Syntax **device delete** "*device*" **channel** *channel*

Description Deletes a channel for the specified device.

Parameter	Value	Description
"*device*"	string	Unique name for the device; if the device does not exist, an error is returned.
channel	integer	Channel number.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device delete "Manchester" channel 5
<owm>%
```


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Device Delete Channels

Syntax **device delete** "*device*" **channels**

Description Deletes all channels for the specified device.

Parameter	Value	Description
"*device*"	string	Unique name for the device; if the device does not exist, an error is returned.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device delete "Manchester" channels
<owm>%
```

Device Delete Channel Alarm

Syntax **device delete** "*device*" **channel** *channel* **alarm** { **critical** | **major** | **minor** } { **min** | **max** } { **wavelength** | **power** | **osnr** }

Description Deletes a channel alarm definition for the specified device.

Parameter	Value	Description
"device"	string	Unique name for the device. If the device does not exist, an error is returned.
channel	integer	Channel number.
critical	keyword	Delete critical (CR) alarm.
major	keyword	Delete major (MJ) alarm.
minor	keyword	Delete minor (MN) alarm.
min	keyword	Delete minimum alarm.
max	keyword	Delete maximum alarm.
wavelength	keyword	Delete a wavelength alarm.
power	keyword	Delete a power alarm.
osnr	keyword	Delete an OSNR alarm.

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Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device delete "Manchester" "PORT 1" channel 1 alarm critical min power
<owm>%
```

Device Delete Total Power Alarm

Syntax **device** delete "*device*" **total power alarm {critical | major | minor}**

Description Deletes a Total Power Alarm for a device.

Parameter	Value	Description
"device"	string	Unique name for the device. If the device does not exist, an error is returned.
critical	keyword	Define a critical level TPA.
major	keyword	Define a major level TPA.
minor	keyword	Define a minor level TPA.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device delete "Manchester" total power alarm critical
<owm>%
```

Device Description

Syntax **device** "*device*" **description** "*description*"

Description Creates a new description for the specified device.

Parameter	Value	Description
"device"	string	Unique name for the device; if the device does not exist, an error is returned.
"*description"*	string	Unique name for the new device description.

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Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" description "CO in Manchester"
<owm>%
```

Device Port

Syntax **device** "*device*" **port** "*port*"

Description This command allows you to change the port associated with an existing device.

Parameter	Value	Description
"device"	string	Unique name for the device; if the device does not exist, an error is returned.
"*port"*	string	Unique name for the OWM port device.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" port "PORT 1"
<owm>%
```

Device Rename

Syntax **device** "*device*" **rename** "*new name*"

Description This command allows you to change the name associated with an existing device.

Parameter	Value	Description
"device"	string	Unique name for the device; if the device does not exist, an error is returned.
"*new name"*	string	The new unique name for the OWM device.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" rename "Salem"
<owm>%
```


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Device Tap Power

Syntax **device** "*device*" **tappower** *tapPower*

Description Changes the tap power for the specified device.

NOTE: Alarms defined using a previously defined tap power are not automatically adjusted when a new device tap power is defined. Consequently, alarms may be triggered when changing device tap power. It may be desirable to re-define device alarms whenever the device tap power changes.

Parameter	Value	Description
"device"	string	Unique name for the device. If the device does not exist, an error is returned.
tapPower	float	The tap power for the port with a maximum of one decimal place. Tap power range is from 0.1 to 100.0 and is a percentage.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" tappower 10.0
<owm>%
```

Device Total Power Alarm

Syntax **device** "*device*" **total power alarm {critical | major | minor}** *trigger clear*

Description Adds or changes a Total Power Alarm for a device.

Parameter	Value	Description
"device"	string	Unique name for the device. If the device does not exist, an error is returned.
critical	keyword	Define a critical level TPA.
major	keyword	Define a major level TPA.
minor	keyword	Define a minor level TPA.
Alarm trigger	float	Alarm trigger value.
Alarm clear	float	Alarm clear value.

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Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% device "Manchester" total power alarm critical -40.0 -39.0
<owm>%
```

Disk Log

Syntax **disk log** { **enable** | **disable** }

Description Enables/disables Disk Logging. You must also mount a disk to finish configuration of the Disk Log.

Parameter	Value	Description
enable	keyword	Enables the PCMCIA device.
disable	keyword	Disables the PCMCIA device.

Access Level Requires *admin* or *config* access level privileges.

Command Example

```
% disk log enable
%
```

Disk Log Mount

Syntax **disk log mount** { *"***/ata1**" | *"***/ata2**" }

Description Sets which PCMCIA slot to use for Disk Logs.

Parameter	Value	Description
/ata1	string	Enables PCMCIA slot 1.
/ata2	string	Enables PCMCIA slot 2.

Access Level Requires *admin* or *config* access level privileges.

Command Example

```
% disk log mount "/ata1"
%
```

Email Add

Syntax **email add** *"recipient"*

Description Add an email notification recipient. Email notification can be sent to a maximum of ten accounts.

Parameter	Value	Description
recipient	string	Email address to send a notification to.

Access Level Requires *admin* access level privileges.

Command Example

```
% email add "joe"
```

Email Delete

Syntax **email delete** *"recipient"*

Description Delete an email notification recipient.

Parameter	Value	Description
recipient	string	Email recipient address to delete.

Access Level Requires *admin* access level privileges.

Command Example

```
% email delete "joe"
```

Email Enable

Syntax **email** { **enable** | **disable** }

Description Enable or disable email notification.

Parameter	Value	Description
enable	keyword	Enables the Email notification.
disable	keyword	Disables the Email notification.

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Access Level Requires *admin* access level privileges.

Command Example

```
% email enable
```

Email From

Syntax **email from** "from account"

Description Specifies the local Email address account from which the OWM will send event notifications. This must be a valid account on the SMTP server. If no "from account" is given, a default of "owm name" + ip address is used.

Parameter	Value	Description
"from account"	String	Local Email address account from which the OWM will send event notifications.

Access Level Requires *admin* access level privileges.

Command Example

```
% email from "owm-Concord"
```

Email Level

Syntax **email level** { **critical** | **major** | **minor** }

Description Specifies the event level for Email notification. If the new event does not have a severity of at least the specificed level, then email notification is not generated. Only one Email is generated for each device and one for the OWM system. The system will stay in this state until an **alarm acknowledge** command resets the Email notification system. The default level is critical.

Parameter	Value	Description
critical	keyword	Send Emails on critical (CR) alarms.
major	keyword	Send Emails on major (MJ) alarms.
minor	keyword	Send Emails on minor (MN) alarms.

Access Level Requires *admin* access level privileges.

Command Example

```
% email level critical
```


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Email Server

Syntax **email server** *ipAddr*

Description Specifies the IP address of your SMTP server. The SMTP server must be reachable by the OWM.

Parameter	Value	Description
ipAddr	IP address or dot notation	Valid IP address. Example: 192.168.1.1

Access Level Requires *admin* access level privileges.

Command Example

```
% email server 10.2.0.1
```

Email Test

Syntax **email test**

Description Generate an Email notification test message. The message is sent to all Email recipients. Any SMTP errors are displayed on the CLI. The test will display all invalid recipients. The

Parameter	Value	Description
ipAddr	IP address or dot notation	Valid IP address. Example: 192.168.1.1

Email test does not affect the notification status. In other words, an **alarm acknowledge** does not have to be issued to clear the Email notification status after the test is run.

Access Level Requires *admin* access level privileges.

Command Example

```
% email test
```

Exit

Syntax **exit**

Description Exits you from Configure Mode to User Mode. You are prompted to apply and save your configuration changes, if you made modifications and did not save them. If you are in User Mode, typing Exit logs you out of the CLI.

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Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% exit
%
```

Command Example

```
<owm>% exit
WARNING: Configuration changes not saved, 'save' now (yes/no)? yes
WARNING: Configuration changes not applied, 'apply' now (yes/no)? yes
%
```

File Copy

Syntax **file copy** "*sourcefile*" "*destfile*"

Description Copies the source file to the destination file. You must specify both the directory name and the file name for the destination, for example, "/ata1/myfile.txt"

Parameter	Value	Description
"*sourcefile*"	string	Unique file name for the source file that is located in the directory of a PCMCIA card or RAM disk. You can specify up to 260 characters. You can rename the source file by providing a different destination file name.
"*destfile*"	string	Unique file name for the destination file that is located in the directory of a PCMCIA card or RAM disk. You can specify up to 260 characters.

.



See the Show Files command for detailed information regarding filenames.

Description Requires *admin*, *config* or *operate* access level privileges.

Command Example

```
% file copy "system.cfg" "/ata1/system.cfg"
%
```

File Delete

Syntax **file delete** "*filename*"

Description Deletes the specified file -- but only after you confirm the deletion.

Parameter	Value	Description
"filename"	string	Unique name of the file to delete. If the file is nonexistent or misspelled, an error is returned.



See the Show Files command for detailed information regarding filenames.

Access Level Requires *admin*, *config* or *operate* access level privileges.

Command Example

```
% file delete "/ata2/readme.txt"
WARNING: Permanently delete file "/ata2/readme.txt" (yes/no)? yes
%
```

Global Alarm Broadcast

Syntax **global alarm broadcast** { **enable** | **disable** }

Description Enables or disables the broadcast of alarms and saves the default alarm broadcast setting to all new CLI sessions.

Parameter	Value	Description
enable	keyword	Enables broadcast alarm.
disable	keyword	Disables broadcast alarm.

Access Level Requires *admin* or *config* access level privileges.

Command Example

```
% global alarm broadcast enable
%
```

GUI Port

Syntax **gui port** {**<number>** | **default** }

Description Changes the TCP/IP port that the OWM GUI uses. This is an advanced feature and should only be used by the network administrator. This number must match with the port number that the GUI client application uses. If problems exist, reset the port number to the default value. The OWM must be rebooted for the changes to take affect.

Parameter	Value	Description
number	integer	Valid TCP/IP port number for communication with the GUI. The number must be between 0 and 65536.
default	keyword	Sets the GUI port to the default value of 57005.

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Access Level Requires *admin* access level privileges.



The system must be rebooted for the GUI port changes to take affect.

Command Example

```
% gui port 5000
%
```

Help

Syntax { **help** | **h** | **?** }

Description Displays the command syntax of the OWM CLI commands that are available to you. Help information is displayed by access level type. For example, if you are an *admin***,** you receive help for the *admin* access level. If you are a *guest*, you receive only help for the *guest* access level. There are four different types of access level help:

- *admin*
- *config*
- *operate*
- *guest*

For example, if you possess the *admin* access level, Help displays all the CLI commands. If you possess the *guest* access level, Help displays only the basic user commands like the Show commands. Show commands only require read-only access, while the *admin* access level has both read-only and read-write capability. Read-only allows you to only read information about the OWM system and read-write allows you to create new information, set parameters and make changes to existing information regarding the OWM system.

Help commands include the command syntax listed in Help under the following sections: Commands, Configuration commands, SNMP commands, OWM Software commands.

The following command example shows the Help Commands that are listed in the *admin* access level for Configure Mode.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
<Salem>% help

Commands:
   {h|help|?}

   account add "username" "level"
   account delete "username" [force]
   alarm {ack|acknowledge}
   alarm broadcast {enable|disable}
   configure
   contact "contact"
```


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```
date <yyyy>-<mm>-<dd>
description "description"
device active "device"
disk log {enable|disable}
disk log mount {"/ata1"|"/ata2"}
exit
file copy "sourcefile" "destfile"
file delete "filename"
global alarm broadcast {enable|disable}
ip {<ipaddr> [<netmask>]|disable}
location "location"
logout
name "name"
password
password "username"
ping <ipaddr>
port active "port"
reboot
route add <dest> [<netmask>] <gateway>
route add default <gateway>
route delete <dest> [<netmask>]
route delete default
route flush
sequencer {on|off}
show account levels
show accounts
show alarm broadcast
show alarm status
show alarms [device "device"] [save ["filename"]] [terse]
show benchmarks [device "device"] [save ["filename"]]
show composite power
show contact
show data log [device "device" [channel <number>]]
   [save ["filename"]] [terse] [time]
show date
show description
show device active
show device "device"
show device "device" channel <number>
show device "device" values
show devices
show disk log
show event last
show events [device "device"] [<number>] [save ["filename"]] [terse]
show events from [<number>] [to <number>]
show files ["directory"]
show global alarm broadcast
show {high|low} tidemarks [device "device" [channel <number>]]
   [save ["filename"]] [terse] [time]
show id
show ip
show leds
show location
show macaddr
show name
```


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```
   show osnr width
   show peaks
   show pixel wavelength
   show port "port"
   show port active
   show ports
   show relays
   show routes
   show sequencer
   show sntp
   show software
   show spectrum
   show spectrum power
   show system
   show temperature
   show time
   show timezone
   show total power
   show uptime
   show user
   show users
   sntp {<ipaddr>|disable|broadcast}
   time <hh>:<mm>:<ss>
   timezone
   timezone dst {enable|disable}
   timezone reset

SNMP commands:
   show snmp community
   show snmp set
   show snmp trap destination
   show snmp trap
   show snmp authentication trap
   snmp add community "community" {read-only|read-write}
   snmp add trap destination <ipaddr> <ipport> "owner" "community" {1|2}
   snmp authentication trap {enable|disable}
   snmp delete community "community"
   snmp delete trap destination <ipaddr> <ipport>
   snmp set {enable|disable}
   snmp trap {enable|disable}

Software commands:
   software clear <slot> [force]
   software default <slot>
   software download <slot> "file"
   software run [<slot>]


Configuration Commands:
   apply
   benchmarks {clear|device "name"|all}
   osnr width <resolutionbandwidth>
   port "port" <tappower>
   reload [default|"file"]
   save
```

```
   show configuration status
   show new osnr width
   show new system

   Device Configuration Commands:
      device add "device" "description" "port" <tappower>
      device delete "device"
      device "device" port "port"
      device "device" tappower <tappower>
      device "device" description "description"
      show new devices
      show new device "device"

   Device Channel Configuration Commands:
      device "device" channel <number> description "description"
      device "device" channel <number> {min|center|max} <value>
      device "device" channels from cband
      device "device" channels from peaks [{50|100|200} [with alarms]]
      device add "device" channel <min> <center> <max> ["description"]
      device delete "device" channels
      device delete "device" channel <number>
      device delete "device" channel <number> alarm
             {critical|major|minor} {min|max} {wavelength|power|osnr}
      show new device "device" channel <number>

   Device Channel Alarm Configuration Commands:
      device "device" alarms {critical|major|minor} {min|max}
             {power|osnr} <trigger> <clear>
      device "device" alarms {critical|major|minor} {min|max}
             wavelength offset <trigger> <clear>
      device "device" channel <number> alarm {critical|major|minor}
             {min|max} {wavelength|power|osnr} {enable|disable}
      device "device" channel <number> alarm {critical|major|minor}
             {min|max} {wavelength|power|osnr} {enable|disable}
             <trigger> <clear>
      device "device" channel <number> alarms {enable|disable}
      device "device" channel <number> alarm multiple peaks
             {enable|disable}
      device "device" channel alarms {enable|disable}
      device "device" channel alarms multiple peaks {enable|disable}
<Salem>%
```

IP

Syntax **ip** { *ipAddr* [*netmask*] | **disable** }

Description Sets the Internet Protocol address and network mask of the device. If the netmask is not specified, it is set to the appropriate default value based on whether the IP address is:

Class A - 255.0.0.0
Class B - 255.255.0.0
Class C - 255.255.255.0

The IP address and netmask are applied immediately.

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The IP stack can be disabled by using the **ip disable** format of the command.

Parameter	Value	Description
ipAddr	IP address or dot notation	Valid IP address. Example: 192.168.1.1
netmask	IP address, dot notation or hexadecimal format	Subnet mask. Examples: 255.255.255.0 or 0xffffff00
disable	keyword	Disables networking and flushes the route table.

Access Level Requires *admin* access level privileges.

Command Example

```
% ip 192.168.1.1 0xffffff00
%
```

Location

Syntax **location** *"location"*

Description Sets the MIB-II "*system.sysLocation"* location description for the SNMP agent.

Parameter	Value	Description
"*location*"	string	Value description up to 80 characters

Access Level Requires *admin* or *config* access level privileges.

Command Example

```
<Salem>% location "Salem NOC - Rack 7 - Shelf 3"
<Salem>%
```

Logout

Syntax **logout**

Description Exits you from the CLI. If your session is through the CRAFT port, you are returned to the login prompt. If your session is via Telnet, you are disconnected.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% logout
login:
```


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Name

Syntax **name** *"name"*

Description Assigns the name to the OWM unit and sets the MIB-II "*system.sysName"* name description for the SNMP agent.

The OWM name is displayed as part of the command line prompt when in Configure Mode.

Parameter	Value	Description
"*name*"	string	Value description up to 32 characters

Access Level Requires *admin* or *config* access level privileges.

```
% name "OWM Salem"
<OWM Salem>%
```

OSNR Width

Syntax **osnr width** *resolutionBandwidth*

Description Sets the resolution bandwidth for optical signal-to-noise ratio measurements.

Parameter	Value	Description
resolutionBandwidth	float	Resolution bandwidth (nm). The allowed values are 0.1, 0.2, 0.3 and 0.4 (nm). Default is 0.1.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% osnr width 0.2
<owm>%
```

Password (All)

Syntax **password** "*username*"

Description This command is used by the administrator to change the password for any specified user.

The old password must be entered correctly and the new password must be entered twice for verification. The password is case sensitive and alphanumeric with a maximum of 32 characters. Do not use special characters.

Parameter	Value	Description
"*username*"	string	A valid username.

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Access Level Requires *admin* access level privileges.

Command Example

```
% password
old password: ******
new password: *****
repeat: *****
%
```

Password (owner)

Syntax **password**

Description This command is used by users with *operate* or *config* access level to change only their own password. Users with *guest* privileges may not change their password.

The old password must be entered correctly and the new password must be entered twice for verification. The password is case sensitive and alphanumeric with a maximum of 32 characters. Do not use special characters.

Parameter	Value	Description
"*username*"	string	A valid username.

Access Level Requires *admin*, *config* or *operate* access level privileges.

Command Example

```
% password
old password: ******
new password: *****
repeat: *****
%
```

Ping

Syntax **ping** *ipAddr*

Description Pings the IP address of the specified host. A successful Ping displays an "*ipAddr* is alive" message and an unsuccessful Ping displays a "request timed out" error message.

Parameter	Value	Description
ipAddr	IP address	Valid IP address or dot notation

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% ping 192.168.3.225
192.168.3.225 is alive
% ping 192.168.3.226
```


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```
!ERROR: [0x80000008] request timed out
%
```

Port Active

Syntax **port active** *"port"*

Description Activates the specified port. This command stops the sequencer and clears all device information on the Spectrometer.

Parameter	Value	Description
"*port*"	string	A valid port name

Access Level Requires *admin*, *config* or *operate* access level privileges.

Command Example

```
<Salem>% port active "PORT 2"
<Salem>%
%
```

Port Tap Power

Syntax **port** *"port" tapPower*

Description Sets the global tap power for the specified port.

Parameter	Value	Description
"port"	string	A valid port name.
tapPower	float	Tap power for the device with a maximum of one decimal place. Tap power range is from 0.1 to 100.0 and is a percentage.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% port "PORT 1" 100.0
<owm>%
```

Reboot

Syntax **reboot**

Description Reboots the OWM system.

Access Level Requires *admin*, *config* or *operate* access level privileges.

Command Example

```
% reboot
!ALARM: rebooting system
```


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```
%

 manufacturer: Digital Lightwave, Inc.
      product: WM-100-C-32C-8-1
  part number: 5-0001-05467-60
serial number: OWM02120003
     software: OPM_Controller_Boot 1.0.2 2001-11-28 11018

Copyright (c) 2000-2002 Digital Lightwave, Inc. All Rights Reserved.

Hit [Enter] to boot immediately or any other key for command prompt.
Booting [OPM_Controller 2.0.0 2002-06-07 153024]...

 manufacturer: Digital Lightwave, Inc.
      product: WM-100-C-32C-8-1
  part number: 5-0001-05467-60
serial number: OWM02120003
     software: OWM_Controller 2.1.0 2002-09-05 134831

Copyright (c) 2000-2002 Digital Lightwave, Inc. All Rights Reserved.

login:
```

Reload

Syntax **reload** [**default** | "*filename*"]

Description Reloads the current configuration file; e.g., "system.cfg". If no arguments are specified, the configuration file is loaded from non-volatile flash memory. If **default** is specified, the configuration file is restored to factory default settings. If "*filename*" is specified, the configuration file is loaded from the specified file.

Use Save if you wish to preserve your settings between reboots.

Parameter	Value	Description
default	keyword	The configuration file is loaded from factory default settings.
"*filename*"	string	The configuration file is loaded from the specified file in the OWM "/ram/" directory.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% reload
<owm>% reload default
<owm>% reload "system.cfg"
<owm>%
```


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Route Add

Syntax **route add** *destination* [*netmask*] *gateway*

Description Adds an IP route on the OWM device.

Parameter	Value	Description
destination	IP address in dot notation	Destination network.
netmask	IP address in dot notation or hexadecimal format	Subnet mask.
gateway	IP address in dot notation	Gateway address.

Access Level Requires *admin* access level privileges.

Command Example

```
% route add 192.168.8.0 0xffffff00 192.168.1.10
%
```

Route Add Default

Syntax **route add default** *gateway*

Description Sets the default IP gateway on the OWM device.

Parameter	Value	Description
gateway	IP address in dot notation	Gateway address

Access Level Requires *admin* access level privileges.

Command Example

```
% route add default 172.16.0.1
%
```

Route Delete

Syntax **route delete** *destination* [*netmask*]

Description Removes the IP route destination on the OWM device.

Parameter	Value	Description
destination	IP address in dot notation	Destination network.
netmask	IP address in dot notation or hexadecimal format	Subnet mask.

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Access Level Requires *admin* access level privileges.

Command Example

```
% route delete 192.168.8.10
%
```

Route Delete Default

Syntax **route delete default**

Description Removes the default IP gateway on the OWM device.

Access Level Requires *admin* access level privileges.

Command Example

```
% route delete default
%
```

Route Flush

Syntax **route flush**

Description Flushes the IP routing table on the OWM device.



Use with caution, as this command can cause existing network connections to disconnect.

Access Level Requires *admin* access level privileges.

Command Example

```
% route flush
%
```

Save

Syntax **save**

Description Saves the configuration file. The OWM system configuration is saved in the file named "system.cfg", which is located in the OWM "/ram/" directory. The "system.cfg" file is also stored in the OWM system non-volatile flash memory. When you make changes in Configure Mode and Apply these changes, the changes are stored temporarily in volatile memory. Once you Save the changes, the changes are stored in non-volatile flash memory and become persistent.

You can use FTP to download the "system.cfg" file to your workstation to keep a backup copy of the system configuration.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% save
<owm>%
```


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Sequencer

Syntax **sequencer** { **on** | **off** }

Description Sets the sequencer to the *on* or *off* condition. The sequencer cycles between devices.

Parameter	Value	Description
on	keyword	Sets the sequencer on.
off	keyword	Sets the sequencer off.

Access Level Requires *admin* access level privileges.

Command Example

```
% sequencer on
%
```

Show Account Levels

Syntax **show account levels**

Description Displays the existing user accounts and levels, which include username, user ID, access level and access ID.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show account levels
 "admin" <1>
 "config" <2>
 "operate" <3>
 "guest" <4>
%
```

Show Accounts

Syntax **show accounts**

Description Displays the existing user accounts and levels, which include username, user ID, access level and access ID.

Access Level Requires *admin* access level privileges.

Command Example

```
% show accounts
 "admin" <1>, "admin" <1>
 "carl" <2>, "config" <2>
 "ozzie" <3>, "operate" <3>
 "gary" <4>, "guest" <4>
%
```


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Show Alarm Broadcast

Syntax **show alarm broadcast**

Description Shows the state of alarm broadcast messages to all active CLI sessions.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show alarm broadcast
alarm broadcast enable
%
```

Show Alarm Status

Syntax **show alarm status**

Description Displays a summary of current alarm and event counts.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show alarm status
alarm status:
   current critical alarms  : 0
   current major alarms     : 0
   current minor alarms     : 0
   current local alarms     : 2
   current remote alarms    : 0
   current equipment faults : 0

events since last acknowledge : 10

%
```

Show Alarms

Syntax **show alarms** [**device** "*device*"] [**save** ["*filename*"]] [**terse**]

Description Displays all current alarms for the device specified, which includes ID number, date, time, time offset, device name, port name, channel number, alarm ID and number of peaks detected in each channel. The output can be saved to a file in normal or terse formats.

Parameter	Value	Description
"device"	string	Unique name for the device; if the device does not exist, an error is returned.
"filename"	string	Unique file name for the source file that is located in the directory of a PCMCIA card or RAM disk. You can specify up to 260 characters.
terse	keyword	Display output in terse format. Device names and channel numbers are not displayed.

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Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show alarms
2002-06-19 10:21:12 -0400, 14, lc-set, eqt, 320, -, -, -, -, -, -, slot-1, <5>,
"local: PCMCIA ATA card inserted"
2002-06-19 10:21:16 -0400, 15, lc-set, eqt, 320, -, -, -, -, -, -, slot-2, <6>,
"local: PCMCIA ATA card inserted"
%
```

Show Benchmarks

Syntax **show benchmarks** [**device** *"device"*] [**save** [*"filename"*]]

Description Reports the measured spectrum values for power, wavelength and OSNR for all channels on a specified device(s) at a given point in time. Also reports the measured spectrum pixel wavelength, raw spectrum value and spectrum power at the same given point in time.

Parameter	Value	Description
"device"	string	Unique name for the device; if the device does not exist, an error is returned.
"filename"	string	Unique file name for the source file that is located in the directory of a PCMCIA card or RAM disk. You can specify up to 260 characters.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show benchmarks device "Boston"
benchmark
device "Boston" <3> "PORT 1" 0.5 2002-09-11 15:38:48 +0000
    1, <1>, -19.0, 1532.15,  22.1
    2, <2>, -17.0, 1533.24,  26.1
    3, <3>, -15.1, 1534.33,  29.8
    4, <4>, -12.6, 1535.44,  30.0
    5, <5>, -10.6, 1536.54,  30.0
    6, <6>,  -7.7, 1537.64,  30.0
    7, <7>,  -5.8, 1538.74,  30.0
    8, <8>,  -4.6, 1539.85,  30.0
    9, <9>,  -1.4, 1540.96,  30.0
    10, <10>,   0.5, 1542.06,  30.0

...omitted remaining "channel" detail from example...

spectrum "Boston" <3> "PORT 1" 0.5
  1529.57,       19, -38.9
  1529.70,       23, -38.0
  1529.83,      203, -28.6
  1529.97,      598, -23.9
  1530.10,      205, -28.5
```


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```
  1530.24,       41, -35.5
  1530.37,       20, -38.6
  1530.51,       15, -39.9
  1530.64,       23, -38.0

...omitted remaining "spectrum" detail from example...

  1564.06,       12, -40.9
  1564.19,        1, -45.6
  1564.32,       14, -40.2
  1564.46,       48, -34.8
%
```

Show Composite Power

Syntax **show composite power**

Description Reports the total signal power over all wavelengths in dBm, which is the sum of the power of all the discovered peaks.

Value	Description
totalSignalPower	Sum of the power of all discovered peaks

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show composite power
composite power 5.7
%
```

Show Configuration Status

Syntax **show configuration status**

Description Displays the status of the configuration.

Value	Description
configure status <not modified>	No changes have been made.
configure status <modified>	Changes have been made but not applied.
configure status <applied>	Changes have been applied but not saved.
configure status <saved>	Changes have been saved.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% show configuration status
```


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```
configuration status: not modified
<owm>%
```

Show Contact

Syntax **show contact**

Description Displays the contact information for the OWM system. This is the MIB-II "*system.sysContact"* contact description for the SNMP agent.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show contact
contact "support@digital lightwave.com (603) 894-4820"
%
```

Show Data Log

Syntax **show data log** [**device** "*device*" [**channel** *channel*]] [**save** ["*filename*"]] [**terse**] [**time**]

Description Displays the data log for the entire OWM, for a specified device or for a specified device and channel.

The data log can be saved to a file on the OWM. The file can be on the RAM drive or on a drive in a PCMCIA slot. You can use FTP to transfer the saved data log files to your laptop computer or workstation.

The data log can be displayed in verbose (default) or terse mode.

The data log can be displayed in device and channel (default) sequence or by time.

This command generates a report heading identifying the report name, version number, OWM system name and IP address and time the report was generated. Column headings identify the datalog data in the report.

Column heading information:

Log_Time: This is the time at which the data was written to the data log.

Sample_Time: This is the time the data sample was acquired.

Sample_Type: Up to 60 minute (M) and 10 days of 15 minute (Q) samples are logged.

Record_Id: This is a numeric identifier, reset to 1 when the OWM is booted, that identifies each data sample.

Device: The name of the monitored device.

Device_UID: A unique numeric identifier for this device, inside <> symbols.

Port: The name of the optical port associated with the monitored device.

Port_UID: A unique numeric identifier for this port, inside <> symbols.

Channel_Number: The channel number for the monitored channel.

Channel_UID: A unique numeric identifier for this channel, inside <> symbols; this identifier need not be the same as the channel number.

Power: A floating point number describing the sampled power level, in dBm; the power level is displayed to one decimal place.

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Wavelength: A floating point number describing the sample wavelength, in nm; the wavelength is displayed to two decimal places.

OSNR: A floating point number describing the optical signal-to-noise ration, in dB; the OSNR value is displayed to one decimal place.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show data log save "datalog.txt"
%
```

After uploading "datalog.txt" to your computer using FTP, this is what the "datalog.txt" might look like:

```
#Report_Name: "Data Log - By Device"
#Version: 1
#System: "owm"
#IP_Address: 192.168.2.208
#Time: 2002-06-21 10:25:01 -0400

#Parameters:
#ColumnHeader: Log_Time, Sample_Time, Sample_Type, Record_Id, Device, Device_UID,
Port, Port_UID, Channel_Number, Channel_UID, Power, Wavelength, OSNR, Peak_Count

2002-06-21 09:25:14 -0400, 2002-06-21 09:24:59 -0400, M, 1081, "Manchester", <1>,
"PORT 1", <1>, 1, <1>, -40.2, 1533.22, 22.2, 1
2002-06-21 09:26:14 -0400, 2002-06-21 09:25:59 -0400, M, 1082, "Manchester", <1>,
"PORT 1", <1>, 1, <1>, -40.2, 1533.23, 22.2, 1
2002-06-21 09:27:14 -0400, 2002-06-21 09:26:59 -0400, M, 1083, "Manchester", <1>,
"PORT 1", <1>, 1, <1>, -40.2, 1533.23, 22.2, 1

...omitted remaining "minutes" detail from example...

2002-06-21 10:24:14 -0400, 2002-06-21 10:23:59 -0400, M, 1140, "Manchester", <1>,
"PORT 1", <1>, 1, <1>, -40.7, 1533.28, 20.1, 1
2002-06-20 16:24:14 -0400, 2002-06-20 16:23:59 -0400, H, 1, "Manchester", <1>, "PORT
1", <1>, 1, <1>, -41.0, 1533.41, 21.3, 1
2002-06-20 17:24:14 -0400, 2002-06-20 17:23:59 -0400, H, 2, "Manchester", <1>, "PORT
1", <1>, 1, <1>, -41.3, 1533.42, 21.1, 1
2002-06-20 18:24:14 -0400, 2002-06-20 18:23:59 -0400, H, 3, "Manchester", <1>, "PORT
1", <1>, 1, <1>, -41.4, 1533.42, 20.6, 1

...omitted remaining lines from example...

#End of report: "Data Log - By Device"
```


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Show Date

Syntax **show date**

Description Shows the current date on the OWM device.

Reply Argument	Value	Description
YYYY	integer	Four digits representing the year.
mm	integer	Two digits representing the month (01-12).
dd	integer	Two digits representing the day (01-31).

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show date
date 2002-06-19
%
```

Show Description

Syntax **show description**

Description Displays the description string for the OWM. This is the MIB-II "system.sysDescr" description for the SNMP agent.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show description
description "OWM - Northeast Region"
%
```

Show Device

Syntax **show device** "*device*"

Description Displays the device definition. This command displays the device name, description, port settings and channel definitions for the specified device.

Parameter	Value	Description
"*device*"	string	The unique name for the device. If the device does not exist, an error is returned.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show device "Manchester"
device definition
"Manchester" "CO in Manchester" <1>
  port "PORT 1" 10.0 <1>
```


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```
    channel definition: <1> "Channel One" 1532.89 1533.29 1533.69 <1>
    channel definition: <2> "Channel Two" 1534.00 1534.40 1534.80 <2>
    channel definition: <3> "Channel Three" 1535.10 1535.50 1535.90 <3>
    channel definition: <4> "Channel Four" 1536.21 1536.61 1537.01 <4>
    channel definition: <5> "Channel Five" 1537.32 1537.72 1538.12 <5>
    channel definition: <6> "Channel Six" 1538.43 1538.83 1539.23 <6>
    channel definition: <7> "Channel Seven" 1539.54 1539.94 1540.34 <7>
    channel definition: <8> "Channel Eight" 1540.65 1541.05 1541.45 <8>
    channel definition: <9> "Channel Nine" 1541.76 1542.16 1542.56 <9>
    channel definition: <10> "Channel Ten" 1542.88 1543.28 1543.68 <10>
    channel definition: <11> "Channel Eleven" 1544.01 1544.41 1544.81 <11>
    channel definition: <12> "Channel Twelve" 1545.14 1545.54 1545.94 <12>
%
```

Show Device Active

Syntax **show device active**

Description Returns the current active device. The active device is the device currently being monitored by the spectrometer.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show device active
active "Salem" "CO in Salem" "PORT 2"
%
```

Show Devices

Syntax **show devices**

Description Displays all devices defined on the OWM.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show devices
devices
"Manchester" "CO in Manchester" <1>
  port "PORT 1" 10.0 <1>
"Salem" "CO in Salem" <2>
  port "PORT 2" 90.0 <1>
%
```


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Show Device Channel

Syntax **show device** "*device*" **channel** *channel*

Description Displays the device name, description, port settings and the channel description, minimum, center and maximum wavelengths, channel number and alarm settings for the specified channel.

Parameter	Value	Description
"device"	string	The unique name for the device. If the device does not exist, an error is returned.
channel	integer	Channel number.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show device "Manchester" channel 5
device channel definition
"Manchester" "CO in Manchester" <1>
  port "PORT 1" 10.0 <1>
    channel definition: <5> "Channel Five" 1537.32 1537.72 1538.12 <5>
      critical min wavelength disable 1537.42 1537.44
      major min wavelength disable 1537.47 1537.49
      minor min wavelength disable 1537.52 1537.54
      minor max wavelength disable 1537.92 1537.90
      major max wavelength disable 1537.97 1537.95
      critical max wavelength disable 1538.02 1538.00
      critical min power disable -50.1 -49.6
      major min power disable -48.1 -47.6
      minor min power disable -46.1 -45.6
      minor max power disable -34.1 -34.6
      major max power disable -32.1 -32.6
      critical max power disable -30.1 -30.6
      critical min osnr disable 21.7 22.2
      major min osnr disable 22.7 23.2
      minor min osnr disable 23.7 24.2
      multiple/zero peak alarms disable
%
```


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Show Device Values

Syntax **show device** "*device*" **values**

Description Displays the most recently acquired values for the specified device. If there are zero peaks or more than 1 peak for the channel, the wavelength will have an "*" displayed before the values and the number of peaks found is displayed. The information for each channel includes the channel number, power, wavelength and OSNR values.

Parameter	Value	Description
"device"	string	The unique name for the device. If the device does not exist, an error is returned.



Three dashes (---) displayed in the OSNR field indicates that the OSNR cannot be measured for that channel

The values displayed are:

Field	Description
Heading Line 1	Device Name
Heading Line 1	Port Name
Heading Line 2	Time of day the data was acquired
Heading Line 2	Number of channels
Column 1	Channel number
Column 2	Power (dBm)
Column 3	Wavelength (nm)
Column 4	OSNR (dB)
Column 5	Peak count (if more than 1 peak)

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show device "Manchester" values
device "Manchester" "PORT 1"
 channel values 2002-06-19 08:33:01 -0400 12
   1    -41.7  1533.17     20.3
   2    -41.4  1534.28     20.3
```


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```
   3    -40.5  1535.39     20.2
   4    -40.0  1536.49     20.3
   5    -38.3  1537.60     25.4
   6    -36.8  1538.71     29.8
   7    -17.5  1539.82     30.0
   8    -28.5  1540.93     30.0
   9    -37.2  1542.04     30.0
  10    -40.0  1543.17     22.3
  11    -41.5  1544.29     21.4
  12    -41.6  1545.43     21.9
%
```

Show Disk Log

Syntax **show disk log**

Description Displays the current mounted PCMCIA slot and the enable/disable status of that disk.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show disk log
disk log mount "/ata1"
disk log enable
%
```

Show Email

Syntax **show email**

Description Displays the current settings for Email event notification.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show email
email server 10.2.0.1
email from owm-Concord
email enable
alarm level critical
recipient: “kevin” <1>
recipient: “frank” <2>
%
```

Show Event Last

Syntax **show event last**

Description Displays the last (most recent) event.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show event last
2002-06-18 09:50:43 -0400, 45, lc-clr, adm, 250, -, -, -, storage, <29>, "local-
clear: Configure Mode"
%
```


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Show Events

Syntax **show events** [**device** "*device*"] [*number*] [**save** ["*filename*"]] [**terse**]

Description Displays all events or events for the specified device. You can also:

- display a specific number of events,
- save the events to a file on the OWM,
- display or save the events in a long (default) or terse format.

Parameter	Value	Description
"device"	string	A valid device name.
number	integer	Number of most recent events to display. The events are sorted so that the most recent events are printed first.
"filename"	string	Unique file name for the source file that is located in the directory of a PCMCIA card or RAM disk. You can specify up to 260 characters.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show events
2002-06-13 17:09:31 -0400, 1, lc-set, eqt, 320, -, -, -, -, -, -, slot-2, <6>, "
local: PCMCIA ATA card inserted"
2002-06-13 17:09:36 -0400, 2, lc-set, eqt, 320, -, -, -, -, -, -, slot-1, <5>, "
local: PCMCIA ATA card inserted"
2002-06-13 17:09:37 -0400, 3,  admin, adm, 280, -, -, -, -, -, -, snmp, <26>, "a
dmin: SNMP system table modified"
2002-06-13 17:09:37 -0400, 4,  admin, adm, 280, -, -, -, -, -, -, snmp, <26>, "a
dmin: SNMP system table modified"
2002-06-13 17:09:37 -0400, 5,  admin, adm, 280, -, -, -, -, -, -, snmp, <26>, "a
dmin: SNMP system table modified"
2002-06-13 17:09:39 -0400, 6,  admin, adm, 360, -, -, -, -, -, -, sntp, <27>, "a
dmin: SNTP set local time"
2002-06-13 17:09:50 -0400, 7,  admin, adm, 150, -, -, -, -, -, -, sequencer, <18
>, "admin: sequencer started"
%
```


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Show Events From

Syntax **show events from** *fromEvent* [**to** *toEvent*]

Description Displays events for the specified range.

Parameter	Value	Description
fromEvent	integer	Event number for the oldest event to display.
toEvent	integer	(Optional) Event number of the newest event to display.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show events from 35 to 40
2002-06-13 17:21:40 -0400, 35, lc-clr, adm, 250, -, -, -, storage, <29>, "local-
clear: Configure Mode"
2002-06-14 11:55:22 -0400, 36,  trans, sec, 100, -, -, -, ui, <31>, "transient:
multiple failed logins"
2002-06-14 11:56:22 -0400, 37, lc-set, adm, 250, -, -, -, storage, <29>, "local:
 Configure Mode"
2002-06-14 11:56:23 -0400, 38, lc-clr, adm, 250, -, -, -, storage, <29>, "local-
clear: Configure Mode"
2002-06-15 17:20:46 -0400, 39, mn-set, adm, 350, -, -, -, sntp, <27>, "minor: SN
TP server not responding"
2002-06-15 17:30:50 -0400, 40, mn-clr, adm, 350, -, -, -, sntp, <27>, "minor-cle
ar: SNTP server not responding"
%
```

Show Files

Syntax **show files** [*"directory"*]

Description Displays the file system directory information for all file systems or the specified directory, located in the internal RAM disk or ATA Flash Cards or PC Card Hard Drives inserted in PCMCIA Slot 1 or Slot 2. The root directory names are:

- "/ram/" (RAM disk)
- "/ata1/" directory (PCMCIA Slot 1)
- "/ata2/" directory (PCMCIA Slot 2)

Parameter	Value	Description
"directory"	string	Directory name. If the device does not exist, an error is returned.

The File Copy, File Delete and Show Files commands share the following characteristics:

- The RAM drive ("/ram/") is formatted as FAT16.

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- PCMCIA cards ("/ata1/" and "/ata2/") can be formatted FAT16 or FAT32; however, NTFS is *not* supported.
- Files must be accessed by full pathname. (Note: The maximum length of a fully qualified pathname is 260 characters.)
- Long filenames are supported (and *generally* support the same rules as Windows 98).
- Wildcards are not supported.
- Directories can be displayed but can not be created or deleted.



A internal Check Disk command is executed when you insert a PCMCIA card into the slot. If an error is detected, an alarm is generated. There are no functions provided to repair the disk and the disk may still operate with the errors.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show files
Listing of: /ram/
      17175 2002-06-19 14:09:04 system.cfg
      17175 bytes
    7815168 bytes free
Listing of: /ata1/
    4616330 2002-06-07 15:32:02 opm_ctlr_app_200.srec
    4616330 bytes
   43552768 bytes free
Listing of: /ata2/
       1024 2002-06-12 15:02:04 My Documents/
       1024 bytes
   16232448 bytes free
%
```

Show Global Alarm Broadcast

Syntax **show global alarm broadcast**

Description Shows the state of the global alarm broadcast of messages.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show global alarm broadcast
global alarm broadcast disable
%
```

Show GUI Port

Syntax **show gui port**

Description Displays the TCP/IP port number that the GUI will use for communication.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show gui port
```

```
gui port 57005
%
```

Show ID

Syntax **show id**

Description Displays the identification information for the OWM.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show id

  manufacturer: Digital Lightwave, Inc.
       product: WM-100-C-32C-8-1
   part number: 5-0001-05467-60
 serial number: OWM02120003
      software: OWM_Controller 2.1.0 2002-09-05 134831

 Copyright (c) 2000-2002 Digital Lightwave, Inc. All Rights Reserved.

%
```

Show IP

Syntax **show ip**

Description Displays the Internet Protocol (IP) address of the OWM.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show ip
ip 192.168.2.208 0xfffffc00
%
```

Show LEDs

Syntax **show leds**

Description Displays the status of the ACTIVE, ALARM and FAIL LEDs.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show leds
led "FAIL" off
led "ACTIVE" on
led "ALARM" on
%
```

Show Location

Syntax **show location**

Description Displays the OWM location string. This is the MIB-II "*system.sysLocation"* location description for the SNMP agent.

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Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show location
location "Salem NOC - Rack 7 - Shelf 3"
%
```

Show MAC Address

Syntax **show macaddr**

Description Displays the Media Access Control (MAC) address for the OWM.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show macaddr
00016b-0001e2
%
```

Show Name

Syntax **show name**

Description Displays the OWM name string. This is the MIB-II "*system.sysName"* name description for the SNMP agent.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show name
name "Salem"
%
```

Show New Device

Syntax **show new device** "*device*"

Description Displays the new values for the device definition. This command displays the most recent changes to the device name, description, port settings and channel definitions. This command shows the "un-Applied" changes.

Parameter	Value	Description
"*device*"	string	The unique name for the device. If the device does not exist, an error is returned.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% show new device "Manchester"
device definition
"Manchester" "CO in Manchester" <1>
  port "PORT 1" 10.0 <1>
    channel definition: <1> "Channel One" 1532.89 1533.29 1533.69 <1>
```


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```
    channel definition: <2> "Channel Two" 1534.00 1534.40 1534.80 <2>
    channel definition: <3> "Channel Three" 1535.10 1535.50 1535.90 <3>
    channel definition: <4> "Channel Four" 1536.21 1536.61 1537.01 <4>
    channel definition: <5> "Channel Five" 1537.32 1537.72 1538.12 <5>
    channel definition: <6> "Channel Six" 1538.43 1538.83 1539.23 <6>
    channel definition: <7> "Channel Seven" 1539.54 1539.94 1540.34 <7>
    channel definition: <8> "Channel Eight" 1540.65 1541.05 1541.45 <8>
    channel definition: <9> "Channel Nine" 1541.76 1542.16 1542.56 <9>
    channel definition: <10> "Channel Ten" 1542.88 1543.28 1543.68 <10>
    channel definition: <11> "Channel Eleven" 1544.01 1544.41 1544.81 <11>
    channel definition: <12> "Channel Twelve" 1545.14 1545.54 1545.94 <12>
<owm>%
```

Show New Devices

Syntax **show new devices**

Description Displays the new values for all devices defined on the OWM system. This command shows the "un-Applied" changes.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% show new devices
devices
"Manchester" "CO in Manchester" <1>
  port "PORT 1" 10.0 <1>
"Salem" "CO in Salem" <2>
  port "PORT 2" 90.0 <1>
<owm>%
```

Show New Device Channel

Syntax **show new device** "*device*" **channel** *channel*

Description Displays the new values for the device name, description, port setting and the channel definition, minimum, center and maximum wavelengths, channel number and alarm settings for the specified channel. This command shows the "un-Applied" changes.

Parameter	Value	Description
"*device*"	string	The unique name for the device. If the device does not exist, an error is returned.
channel	integer	Channel number.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% show new device "Manchester" channel 5
device channel definition
"Manchester" "CO in Manchester" <1>
  port "PORT 1" 10.0 <1>
```


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```
    channel definition: <5> "Channel Five" 1537.32 1537.72 1538.12 <5>
      critical min wavelength disable 1537.42 1537.44
      major min wavelength disable 1537.47 1537.49
      minor min wavelength disable 1537.52 1537.54
      minor max wavelength disable 1537.92 1537.90
      major max wavelength disable 1537.97 1537.95
      critical max wavelength disable 1538.02 1538.00
      critical min power disable -50.1 -49.6
      major min power disable -48.1 -47.6
      minor min power disable -46.1 -45.6
      minor max power disable -34.1 -34.6
      major max power disable -32.1 -32.6
      critical max power disable -30.1 -30.6
      critical min osnr disable 21.7 22.2
      major min osnr disable 22.7 23.2
      minor min osnr disable 23.7 24.2
      multiple/zero peak alarms disable
<owm>%
```

Show New OSNR Width

Syntax **show new osnr width**

Description Displays the new values for the resolution bandwidth setting, in nanometers, for optical signal-to-noise ratio measurements. This command shows the "un-Applied" changes.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% show new osnr width
osnr width 0.10
<owm>%
```

Show New System

Syntax **show new system**

Description Displays the new OWM tap power and wavelength characteristics. It also displays the Spectrometer serial number and date of its software version. This command shows the "un-Applied" changes.

Note that minimum and maximum power fields will be empty because the new configuration has not yet been applied. These fields are displayed during a show system command.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<Salem>% show new system
name "Salem"
description "Optical Performance Manager - Northeast Region"
location "Salem NOC - Rack 7 - Shelf 3"
contact "John Doe - Ext. 221"
osnr width 0.10
port "PORT 1" tap power: 0.5
port "PORT 2" tap power: 0.5
```

```
minimum wavelength: 1531.12
maximum wavelength: 1562.22
minimum power:
maximum power:

Spectrometer
   serial number: 01-31-09
   build: OPM_Spectrometer 1.4.0 2002-07-23 094529
   status: operational
<Salem>%
```

Show New Total Power Alarms

Syntax **show new total power alarms**

Description Displays the new values for the device total power alarms. This command shows the "un-Applied" changes.

Access Level Requires *admin* or *config* access level privileges.
You must be in Configure Mode to use this command.

Command Example

```
<owm>% show new total power alarms
total power disable
device "dev-a"
   critical    -40.0    -39.0
device "dev-b"
   critical    -38.0    -37.0
   minor       -20.0    -19.0

<owm>%
```

Show OSNR Width

Syntax **show osnr width**

Description Displays the resolution bandwidth setting, in nanometers, for optical signal-to-noise ratio measurements.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show osnr width
osnr width 0.10
%
```

Show Peaks

Syntax **show peaks**

Description Displays the number of peaks found, wavelength, power and OSNR values as reported by the Spectrometer.

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The values displayed are:

Field	Description
Heading Line 1	Port that is being monitored and its status
Heading Line 2	Time stamp that peak data was acquired and number of peaks.
Column 1	Peak number
Column 2	Wavelength (nm).
Column 3	Power (dBm).
Column 4	OSNR (dB).



Three dashes (---) displayed in the OSNR field indicates that the OSNR cannot be measured for that channel

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show peaks
port "PORT 1" active
peaks 2002-06-19 11:48:09 -0400 16
   1  1531.09    -42.6     17.8
   2  1532.19    -41.8     19.6
   3  1533.29    -40.8     18.8
   4  1534.39    -39.9     19.9
   5  1535.49    -36.6     23.3
   6  1536.59    -36.6     22.6
   7  1537.70    -36.4     23.7
   8  1538.82    -39.2     22.1
   9  1539.94    -37.5     26.8
  10  1541.05    -35.4     30.0
  11  1542.17    -32.2     30.0
  12  1543.28    -17.6     30.0
  13  1544.40    -37.1     27.4
  14  1545.53    -40.5     22.0
  15  1546.66    -42.1     24.5
  16  1547.78    -42.4     20.4
%
```


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Show Pixel Wavelength

Syntax **show pixel wavelength**

Description Displays the wavelength assignments for each of the photodiode sensors in the Spectrometer. The pixel wavelength is temperature dependent.

Reply Argument	Value	Description
timestamp	time	The time that the reading was taken
num	integer	Number of samples
val	float	Wavelengths for the spectrum readings

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show pixel wavelength
pixel wavelength 2002-06-19 11:50:31 -0400 256
1528.36 1528.50 1528.64 1528.77 1528.91
1529.05 1529.18 1529.32 1529.45 1529.59
1529.73 1529.86 1530.00 1530.14 1530.27
1530.41 1530.55 1530.68 1530.82 1530.96
1531.09 1531.23 1531.37 1531.50 1531.64
1531.78 1531.92 1532.05 1532.19 1532.33
1532.47 1532.60 1532.74 1532.88 1533.02

...omitted lines from example...

1562.74 1562.87 1563.00 1563.14 1563.27
1563.40
%
```

Show Port

Syntax **show port** "*port*"

Description Displays the status of the specified port.

Parameter	Value	Description
"*port*"	string	A valid port name.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show port "PORT 1"
port "PORT 1" active
%
```


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Show Port Active

Syntax **show port active**

Description Displays the active port.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show port active
port "PORT 1" active
%
```

Show Ports

Syntax **show ports**

Description Displays the states of all ports.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show ports
port "PORT 1" <1> active
port "PORT 2" <2> inactive
%
```

Show Relays

Syntax **show relays**

Description Displays the status of all relays.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show relays
relays "CRITICAL ALARM" on
relays "MAJOR ALARM" on
relays "MINOR ALARM" on
relays "INFORMATION ALARM" on
%
```

Show Routes

Syntax **show routes**

Description Displays the IP routing table for the OWM.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show routes
     destination    netmask         gateway
         0.0.0.0 0x00000000     192.168.0.1
       127.0.0.1 0xffffffff       127.0.0.1
    172.16.0.220 0xffffffff    192.168.0.16
     192.168.0.0 0xffffff00   192.168.2.208
%
```

Show Sequencer

Syntax **show sequencer**

Description Displays the status of the sequencer.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show sequencer
sequencer off
%
```

Show SNMP Authentication Trap

Syntax **show snmp authentication trap**

Description Displays the status of SNMP authentication trap reporting.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show snmp authentication trap
authentication disabled
%
```

Show SNMP Community

Syntax **show snmp community**

Description Display the SNMP community string definitions for the OWM. The default community string is "public" and has read-only permission.

- Users with *admin*, *config*, *operate* or *guest* privileges can view read-only community strings.
- Users with *admin* privileges can also view read-write community strings.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show snmp community
communities:
"public" read-only <1>
"rw" read-write <2>
%
```

Show SNMP Set

Syntax **show snmp set**

Description Displays the state of SNMP *set* operations.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show snmp set
snmp set disabled
%
```


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Show SNMP Trap

Syntax **show snmp trap**

Description Displays the state of SNMP trap reporting.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show snmp trap
trap enabled
%
```

Show SNMP Trap Destination

Syntax **show snmp trap destination**

Description Displays the SNMP trap destination table.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show snmp trap destination
trap destinations:
172.16.0.220 162 "Joe" "oneSixTwo" 2 <1>
172.16.0.220 7601 "Bill" "sevenSixOhOne" 1 <2>
172.16.0.220 7602 "Mike" "sevenSixOhTwo" 2 <3>
%
```

Show SNTP

Syntax **show sntp**

Description Displays the method of communication between the OWM and SNTP (Simple Network Time Protocol) time server.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show sntp
sntp 192.168.1.10
%
```


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Show Software

Syntax **show software**

Description Displays the software application image table. An asterisk (*) denotes the current default slot for the OWM software.

Field	Description
slot	Slot number.
check	Checksum status.
description	OWM software version string.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
<Salem>% show software
Slot  State Description
----- ----- -----------
 boot ok    OWM_Controller_Boot 1.1.0 2002-07-22 095044
*0    ok    OWM_Controller 2.1.0 2002-09-05 134831
 1    clear
 2    clear
<Salem>%
```

Show Spectrum

Syntax **show spectrum**

Description Displays the current spectrum values.

The first value displayed is the port that is being monitored. The next value is the timestamp for the sample. The next value is the number of subsequent values that will be returned. The remaining values are the spectrum values in acquired units.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show spectrum
port "PORT 1" active
spectrum 2002-06-19 12:21:52 -0400 256
          7          5         12         53        152
         43          9         12          7         10
         11         56        181         56          9

...omitted lines from example...

          4          1         10          8         26
         27         10          5          5          1
          9
%
```


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Show Spectrum Power

Syntax **show spectrum power**

Description Displays the current spectrum readings, converted to dBm.

The first value is the port that is monitored. The next value is the timestamp for the sample. The next value is the number of subsequent values that are returned. The final list of values are the spectrum power values in dBm.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show spectrum power
port "PORT 1" active
spectrum power 2002-06-19 12:23:14 -0400 256
      -61.0      -61.0      -57.2      -50.7      -46.2
      -51.7      -59.0      -57.2      -59.5      -58.0
      -57.6      -50.5      -45.4      -50.5      -58.4

...omitted lines from example...

      -62.0      -62.0      -58.4      -59.5      -53.8
      -53.8      -58.4      -62.0      -62.0      -62.0
      -58.4
%
```

Show System

Syntax **show system**

Description Displays the OWM system characteristics and the Spectrometer characteristics.

Description Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
<Salem>% show system
name "Salem"
description "Optical Performance Manager - Northeast Region"
location "Salem NOC - Rack 7 - Shelf 3"
contact "John Doe - Ext. 221"
osnr width 0.10
port "PORT 1" tap power: 0.5
port "PORT 2" tap power: 0.5
minimum wavelength: 1531.12
maximum wavelength: 1562.22
minimum power: -45.4
maximum power: 14.6

Spectrometer
   serial number: 01-31-09
   build: OPM_Spectrometer 1.4.0 2002-07-23 094529
   status: operational
<Salem>%
```


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Show Temperature

Syntax **show temperature**

Description Returns the ambient temperature inside the Spectrometer, in degrees celsius.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show temperature
temperature 36.0C
%
```

Show Tidemarks

Syntax **show** { **high** | **low** } **tidemarks** [**device** "*device*" [**channel** *channel*]] [**save** ["*filename*"]] [**terse**] [**time**]

Displays the high or low tidemarks for a device.

A tidemark is the highest/lowest value for a device during a given time period. The time periods are the same as the data log. Tidemarks are captured over 1 minute and 15 minutes periods. Tidemarks are stored for a channel's power, wavelength and OSNR values.

These values can be displayed for all channels on all defined devices, for all channels on a specified device or for a specified channel on a specific device.

Tidemarks can be saved to a file on the OWM. The file can be on the RAM drive or on a drive in a PCMCIA slot. If the file is stored on the RAM drive, FTP can be used to transfer the tidemark file to a laptop computer or workstation. Tidemarks can be displayed in verbose (default) or terse format and can be displayed in device and channel sequence (default) or by time.

This command generates a report heading identifying the report name, version number, OWM system name and IP address and time the report was generated. Column headings identify the tidemark data in the report.

Column heading information:

Log_Time: This is the time at which the data was written to the tidemark file.

Sample_Time: This is the time the data sample was acquired.

Sample_Type: Up to 60 minute (M) and 10 days of 15 minute (Q) samples are logged.

Record_Id: This is a numeric identifier, reset to 1 when the OWM is booted, that identifies each data sample.

Device: The name of the monitored device.

Device_UID: A unique numeric identifier for this device, inside <> symbols.

Port: The name of the optical port associated with the monitored device.

Port_UID: A unique numeric identifier for this port, inside <> symbols.

Channel_Number: The channel number for the monitored channel.

Channel_UID: A unique numeric identifier for this channel, inside <> symbols; this identifier need not be the same as the channel number.

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Power: A floating point number describing the sampled power level, in dBm; the power level is displayed to one decimal place.

Power_Sample_Time: This is the time the power data sample was acquired.

Wavelength: A floating point number describing the sample wavelength, in nm; the wavelength is displayed to two decimal places.

Wavelength_Sample_Time: This is the time the wavelength data sample was acquired.

OSNR: A floating point number describing the optical signal-to-noise ration, in dB; the OSNR value is displayed to one decimal place.

OSNR_Sample_Time: This is the time the OSNR data sample was acquired.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
%
% show low tidemarks device "Boston" channel 12 terse
Report_Name: "Data Log - By Device"
Version: 1
System: "Salem"
IP_Address: 172.16.1.214
Time: 2002-09-11 15:34:05 +0000
Parameters: device "Boston" , channel 12 #ColumnHeader: Log_Time , Sample_Time ,
Sample_Type , Record_Id , Device , Device_UID , Port , Port_UID , Channel_Number ,
Channel_UID , Power , Wavelength , OSNR
2002-09-07 03:00:00 +0000,2002-09-07 03:00:00 +0000,Q,131,<3>,<1>,<12>,1.7,2002-
09-07 02:45:04 +0000,1544.33,2002-09-07 02:49:12 +0000,30.0,2002-09-07 02:44:57
+0000
2002-09-07 03:15:00 +0000,2002-09-07 03:15:00 +0000,Q,132,<3>,<1>,<12>,-12.9,200
2-09-07 03:14:13 +0000,1544.34,2002-09-07 03:00:00 +0000,21.6,2002-09-07 03:14:1
3 +0000
2002-09-07 03:30:00 +0000,2002-09-07 03:29:59 +0000,Q,133,<3>,<1>,<12>,-12.7,200
2-09-07 03:15:10 +0000,1544.36,2002-09-07 03:15:25 +0000,26.7,2002-09-07 03:18:3
3 +0000

...omitted remaining "tidemark" detail from example...
```


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Show Time

Syntax **show time**

Description Displays the time of day setting for the OWM in hours, minutes, seconds and the hours and minutes offset from UTC.

Reply Argument	Value	Description
hh	integer	Hours (0 to 23).
mm	integer	Minutes (00 to 59).
ss	integer	Seconds (00 to 59).
+/- hhmm	integer	Hours and Minutes by East (+) or West (-) that are offset from Universal Time Coordinated (UTC).

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show time
time 12:26:35 -0400
%
```

Show Timezone

Syntax **show timezone**

Description Displays the current timezone settings.



Universal Time Coordinated (UTC) is the default timezone.

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show timezone
timezone EST -0400 DST
 Continent: "America"
   Country: "United States"
    Region: "Eastern Time"
automatic adjust for daylight saving time: enabled
%
```


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Show Total Power

Syntax **show total power**

Description Reports the total power over all wavelengths in dBm, which is the sum of the pixel data converted to dBm.

Value	Description
totalSignalPower	Sum of the pixel data converted to dB

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show total power
total power 5.7
%
```

Show Total Power Alarms

Syntax **show total power alarms**

Description Displays the status of the Total Power Alarm polling and all Total Power Alarm definitions. The alarm definitions are displayed for each device.

Reply Argument	Value	Description
Total Power Enable	keyword	Enable or Disable Total Power Alarms
Device name	string	Device with Total Power Alarm
Alarm Level	keyword	Critical, major, or minor alarm level
Alarm Trigger	float	Total Power Alarm trigger value
Alarm Clear	float	Total Power Alarm clear value

Access Level Requires *guest* access level privileges.

Command Example

```
%  show total power alarms
total power disable
device "dev-a"
   critical    -40.0    -39.0
device "dev-b"
   critical    -38.0    -37.0
   minor       -20.0    -19.0
%
```


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Show Uptime

Syntax **show uptime**

Description Displays the amount of time elapsed since the OWM software was booted.

Reply Argument	Value	Description
days	integer	Day (0 to a very large number).
hours	integer	Hour (0 to 23).
minutes	integer	Minute (00 to 59).

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show uptime
uptime 0 days 2 hours 21 minutes
%
```

Show User

Syntax **show user**

Description Displays the username and access level at this (your) CLI session.

Reply Argument	Value	Description
username	string	Unique username
username ID	integer	Unique identifier (assigned by system)
access level	string	*admin*, *config*, *operate* or *guest*
access level ID	integer	Unique identifier (assigned by system)

Access Level Requires *admin*, *config*, *operate* or *guest* access level privileges.

Command Example

```
% show user
 "ozzie" <3>, "operate" <3>
%
```


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Show Users

Syntax **show users**

Description Displays the user types and access levels for all currently connected users on the OWM system. This command will also display if the user is in configuration mode.

Reply Argument	Value	Description
username	string	Unique name
user ID	integer	Level of *admin* user; <1> indicates the highest level of use
connection type	integer	Telnet, FTP and Serial Port
connection address	IP dot notation	IP address, IP port, CRAFT interface and Telemetry.

Access Level Requires *admin*, *config* or *operate* access level privileges.

Command Example

```
% show users
 "ozzie" <1>, serial: craft
 "gary" <3>, telnet: 192.168.2.200.2729
 "carl" <1>, gui: 192.168.2.200.2728 ** in Configure Mode **
 "admin" <1>, ftp: 192.168.2.223.1898
%
```

SNMP Add Community

Syntax **snmp add community** "*community*" { **read-only** | **read-write** }

Description Adds an SNMP community string.

Parameter	Value	Description
"*community*"	string	A community string has a maximum length of 127 characters.
read-only	keyword	Add a read-only community string.
read-write	keyword	Add a read-write community string.

Access Level Requires *admin* access level privileges.

Command Example

```
% snmp add community "rw" read-write
%
```


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SNMP Add Trap Destination

Syntax **snmp add trap destination** *ipAddr ipPort* "*owner*" *"community"* { **1** | **2** }

Description Adds an entry to the SNMP Trap Destination Table

Parameter	Value	Description
ipAddr	integer	IP address or dot notation
ipPort	integer	UDP port number which ranges from 0 - 65535.
"owner"	string	Owner is an IP host name which has a maximum length of 64 characters.
"community"	string	Community string has a maximum length of 127 characters.
1	keyword	SNMP version number: Use 1 for SNMPv1.
2	keyword	SNMP version number: Use 2 for SNMPv2c.

Access Level Requires *admin* access level privileges.

Command Example

```
% snmp add trap destination 192.168.2.200 162 "manager" "public" 2
%
```

SNMP Authentication Trap

Syntax **snmp authentication trap** { **enable** | **disable** }

Description Enable or disable sending of SNMP authentication traps.

Parameter	Value	Description
enable	keyword	Enables sending of SNMP authentication traps.
disable	keyword	Disables sending of SNMP authentication traps.

Access Level Requires *admin* access level privileges.

Command Example

```
% snmp authentication trap enable
%
```


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SNMP Delete Community

Syntax **snmp delete community** "*community*"

Description Deletes an SNMP community string.

Parameter	Value	Description
"community"	string	Community string.

Access Level Requires *admin* access level privileges.

Command Example

```
% snmp delete community "rw"
%
```

SNMP Delete Trap Destination

Syntax **snmp delete trap destination** *ipAddr ipPort*

Description Deletes an entry from the SNMP Trap Destination Table.

Parameter	Value	Description
ipAddr	integer	IP address or dot notation
ipPort	integer	UDP port number which ranges from 0 - 65535.

Access Level Requires *admin* access level privileges.

Command Example

```
% snmp delete trap destination 192.168.2.200 162
%
```

SNMP Set

Syntax **snmp set** { **enable** | **disable** }

Description Enables or disables SNMP set processing.

Parameter	Value	Description
enable	keyword	Enables SNMP "set" processing.
disable	keyword	Disables SNMP "set" processing.

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Access Level Requires *admin* access level privileges.

Command Example

```
% snmp set enable
%
```

SNMP Trap

Syntax **snmp trap** { **enable** | **disable** }

Description Enable or disable sending of OWM Enterprise SNMP traps. MIB-II traps are always enabled.

Parameter	Value	Description
enable	keyword	Enables sending of SNMP traps.
disable	keyword	Disables sending of SNMP traps.

Access Level Requires *admin* access level privileges.

Command Example

```
% snmp trap enable
%
```

SNTP

Syntax **sntp** { *ipAddr* | **disable** | **broadcast** }

Description The Simple Network Time Protocol (SNTP) client allows the OWM to set its time from an external source. The external source ("time server") is identified by entering its IP address. If the OWM local time is between one to five seconds different from the server time, the OWM local time is changed and synchronized with the SNTP time server.
.

Parameter	Value	Description
ipAddr	integer	IP address or dot notation of the external source time server.
broadcast	keyword	Enables SNTP and awaits for an SNTP packet broadcast.
disable	keyword	Disables SNTP.



A minor alarm may also be generated. It occurs when the sntp server is not responding to requests. The alarm is cleared if sntp is disabled or the server recovers.

Access Level Requires *admin* access level privileges.

Command Examples

```
% sntp 192.168.0.10
```


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```
% sntp broadcast
% sntp disable
%
```

Software Clear

Syntax **software clear** *slot* [**force**]

Description Clears the specified slot in the OWM system non-volatile flash memory. If you do not use the **force** parameter in the command syntax, you are prompted to confirm that you want to permanently erase the software image. The prompt reply is case-insensitive; therefore, enter either *yes* or *no*.

Slot 0 is protected and can not be cleared.

Parameter	Value	Description
slot	integer	Slot number 1 or 2.
force	keyword	Optional. If supplied, suppresses the confirmation prompt.

Access Level Requires *admin* access level privileges.

Command Examples

```
% software clear 2
WARNING: Permanently erase software image 2 (yes/no)? no
software image 2 not erased
% software clear 1 force
%
```

Software Default

Syntax **software default** *slot*

Description Sets the software default version to the specified slot number in the OWM non-volatile flash memory. This command sets the slot that contains the application image that the OWM uses during startup.

Parameter	Value	Description
slot	integer	Slot number 0, 1 or 2.

Access Level Requires *admin* access level privileges.

Command Example

```
% software default 2
%
```


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Software Download

Syntax **software download** *slot "filename"*

Description Downloads a new software image and stores it in the OWM system non-volatile flash memory. The software image is copied from the specified file.

You can use FTP to upload the new software image from your workstation to the OWM system prior to using this command.

Parameter	Value	Description
slot	integer	Slot number 1 or 2.
"filename"	string	Software filename for download.

Access Level Requires *admin* access level privileges.

Command Example

```
% software download 2 "owm_ctlr_app_210.srec"
%
```

Software Run

Syntax **software run** [*slot*]

Description Restarts the OWM software application using the default or specified software image.

Parameter	Value	Description
slot	integer	Slot number 0, 1 or 2.

Access Level Requires *admin* access level privileges.

Command Example

```
% software run 0
!SYSTEM: reboot


manufacturer: Digital Lightwave, Inc.
      product: WM-100-C-32C-8-1
  part number: 5-0001-05467-60
serial number: OWM02120003
     software: OWM_Controller 2.1.0 2002-09-05 134831

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login:
```


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Spectrometer Log

Syntax **spectrometer log {enable | disable}**

Description Enables or disable the spectrometer log which is also know as "fast data logging." Data



This is an advanced function and should only be run by an Administrator. The use of this feature will cause unexpected results with the OWM CLI and GUI.

captured from the spectrometer is written directly to a disk.

Parameter	Value	Description
enable	keyword	System captures data directly to a disk
disable	keyword	System stops capturing data to a disk.

Access Level Requires *admin* access level privileges.

Command Example

```
% spectrometer log enable
%
```

Time

Syntax **time** *hh*:*mm*:*ss*

Description Sets the time of day for the OWM system. It is recommended that the date and time not be set during the one hour overlap from daylight savings time to standard time in autumn and during the hour lost when switching from standard to daylight savings time in the spring.



The default time is set to Universal Time Coordinated (UTC), which is equivalent to mean solar time at the prime meridian (0° longitude), formerly expressed in GMT. This allows the SNMP agent to correctly report the time in UTC format.

Access Level Requires *admin* access level privileges.

Command Example

```
% time 12:15:55
%
```

Timezone

Syntax **timezone**

Description Prompts you for timezone settings that include your Continent or Ocean, Country, Region and whether Daylight Savings Time adjustment should be observed.

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Access Level Requires *admin* access level privileges.

Command Example

```
% timezone

 0) Exit
 1) Africa
 2) America
 3) Antarctica
 4) Arctic
 5) Asia
 6) Atlantic
 7) Australia
 8) Europe
 9) Indian
10) Pacific

Select Continent or Ocean #: 2

 0) Exit
 1) Anguilla               2) Antigua & Barbuda      3) Argentina
 4) Aruba                  5) Bahamas                6) Barbados
 7) Belize                 8) Bolivia                9) Brazil
10) Canada                11) Cayman Islands        12) Chile
13) Colombia              14) Costa Rica            15) Cuba
16) Dominica              17) Dominican Republic    18) Ecuador
19) El Salvador           20) French Guiana         21) Greenland
22) Grenada               23) Guadeloupe            24) Guatemala
25) Guyana                26) Haiti                 27) Honduras
28) Jamaica               29) Martinique            30) Mexico
31) Montserrat            32) Netherlands Antilles  33) Nicaragua
34) Panama                35) Paraguay              36) Peru
37) Puerto Rico           38) St Kitts & Nevis      39) St Lucia
40) St Pierre & Miquelon  41) St Vincent            42) Suriname
43) Trinidad & Tobago     44) Turks & Caicos Is     45) United States
46) Uruguay               47) Venezuela             48) Virgin Islands (UK)
49) Virgin Islands (US)

Select Country #: 45

 0) Exit
 1) Eastern Time
 2) Eastern Time - Michigan - most locations
 3) Eastern Time - Kentucky - Louisville area
 4) Eastern Time - Kentucky - Wayne County
 5) Eastern Standard Time - Indiana - most locations
 6) Eastern Standard Time - Indiana - Crawford County
 7) Eastern Standard Time - Indiana - Starke County
 8) Eastern Standard Time - Indiana - Switzerland County
 9) Central Time
10) Central Time - Michigan - Wisconsin border
11) Central Time - North Dakota - Oliver County
12) Mountain Time
13) Mountain Time - south Idaho & east Oregon
14) Mountain Time - Navajo
```


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```
15) Mountain Standard Time - Arizona
16) Pacific Time
17) Alaska Time
18) Alaska Time - Alaska panhandle
19) Alaska Time - Alaska panhandle neck
20) Alaska Time - west Alaska
21) Aleutian Islands
22) Hawaii

Select Region #: 1
 Continent: "America"
   Country: "United States"
    Region: "Eastern Time"
Accept timezone (yes/no)? yes
Automatically adjust for daylight saving time (yes/no)? yes
%
```

Timezone Reset

Syntax **timezone reset**

Description Resets the timezone to Universal Time Coordinated (UTC).

Access Level Requires *admin* access level privileges.

Command Example

```
% timezone reset
%
```

Timezone Daylight Savings Time (DST)

Syntax **timezone dst** { **enable** | **disable** }

Description Allows automatic adjustment of the local time for daylight savings. When enabled, the system automatically adds an hour of time during the months of daylight savings. When disabled, the time is not adjusted for daylight savings.

Parameter	Value	Description
enable	keyword	System automatically adds an hour for Daylight Savings Time (DST).
disable	keyword	System never adjusts the time for DST.

Access Level Requires *admin* access level privileges.

Command Example

```
% timezone dst disable
%
```

Total Power Alarms

Syntax **total power alarms** { **enable** | **disable** }

Description Enables or disables Total Power Alarms (TPAs). TPA definintions are not deleted if TPAs are disabled.

Parameter	Value	Description
enable	keyword	System checks TPAs
disable	keyword	System does not use TPAs.

Access Level Requires *admin* or *config* access level privileges and must be in configuration mode.

Command Example

```
% total power alarms enable
%
```


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Controller Boot Loader CLI Commands

The OWM Controller Boot Loader Command Line Interface (CLI) provides:

- Boot Loader commands

The Boot Loader CLI commands are described by:

- Command name
- Syntax structure
- Command description
- Basic example

Summary of Boot Loader Commands

Table -2, "Controller Boot Loader CLI Commands Summary" summarizes the Boot Loader CLI commands and syntax in alphabetical order.

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Table -2. Controller Boot Loader CLI Commands Summary

Command	Category	Syntax
Help	Boot	**help** | **?**
IP	Boot	**ip** *ipAddress* [*netmask*]
Reboot	Boot	**reboot**
Route Add	Boot	**route add** *destination* [*netmask*] *gateway*
Route Add Default	Boot	**route add default** *gateway*
Route Delete	Boot	**route delete** *destination* [*netmask*]
Route Delete Default	Boot	**route delete default**
Route Flush	Boot	**route flush**
Serial	Boot	**serial** *baudrate*
Show ID	Boot	**show id**
Show IP	Boot	**show ip**
Show MAC Address	Boot	**show macaddr**
Show Route	Boot	**show route** [**table**]
Show Serial	Boot	**show serial**
Show Software	Boot	**show software**
Software Clear	Boot	**software clear** *slot* [**force**]
Software Default	Boot	**software default** *slot*
Software Download	Boot	**software download** *slot* ["*file*"]
Software Run	Boot	**software run** [*slot*] [**disable passwords**]

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Boot Loader Commands

The following information describes each Controller Boot Loader CLI command message in detail.

Help

Syntax { **help** | **?** }

Description Displays the command syntax help for the Boot Loader commands that are used in boot mode.

Command Example

```
boot% ?
Boot Loader Commands:
 help | h | ?
   ip <addr> [netmask]
   reboot
   route add <dest> [<netmask>] <gateway>
   route add default <gateway>
   route delete <dest> [<netmask>]
   route delete default
   route flush
   serial <baudrate>
   show id
   show ip
   show macaddr
   show route [table]
   show serial
   show software
   software clear <slot> [force]
   software default <slot>
   software download <slot> [filename]
   software run [<slot>] [disable passwords]
boot%
```

IP

Syntax **ip** *ipAddress* [*netmask*]

Description Sets the Internet Protocol (IP) address and a valid subnet mask in boot mode, which is represented in hexadecimal format or standard Internet dot notation format.

Parameter	Value	Description
ipAddress	IP address in dot notation	Valid IP address. Example: 192.168.1.1
netmask	dot notation or hexadecimal format	Netmask. Example: 0xffffff00

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If the netmask is not specified, the appropriate class netmask (A, B or C) is used by default. The A class netmask is represented as 255.0.0.0. The B class netmask is represented as 255.255.0.0. The C class netmask is represented as 255.255.255.0

Command Example

```
boot% ip 192.168.1.1 0xffffff00
ip 192.168.1.1    255.255.252.0
boot%
```

Reboot

Syntax **reboot**

Description Reboots the OWM.

Command Example

```
boot% reboot
rebooting...

 manufacturer: Digital Lightwave, Inc.
      product: WM-100-C-32C-8-1
  part number: 5-0001-05467-60
serial number: OWM02120003
     software: OPM_Controller_Boot 1.0.2 2001-11-28 11018

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Hit [Enter] to boot immediately or any other key for command prompt.
Booting [OPM_Controller 2.0.0 2002-06-07 153024]...


 manufacturer: Digital Lightwave, Inc.
      product: WM-100-C-32C-8-1
  part number: 5-0001-05467-60
serial number: OWM02120003
     software: OWM_Controller 2.1.0 2002-09-05 134831

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login:
```


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Route Add

Syntax **route add** *destination* [*netmask*] *gateway*

Description Adds a static route to the routing table. If the netmask is unspecified, destination is assigned to a host, otherwise destination is assigned to a network.

Parameter	Value	Description
destination	IP address in dot notation	Destination network.
netmask	IP address in dot notation or hexadecimal format	Netmask.
gateway	IP address in dot notation	Gateway address dot notation.

Command Example

```
boot% route add 192.168.8.0 0xffffff00 192.168.1.10
boot% route add 192.168.8.0 255.255.252.0 192.168.1.10
boot%
```

Route Add Default

Syntax **route add default** *gateway*

Description Adds a default route to the routing table.

Parameter	Value	Description
gateway	IP address in dot notation	Gateway address.

Command Example

```
boot% route add default 192.168.8.10
boot%
```


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Route Delete

Syntax **route delete** *destination* [*netmask*]

Description Removes a specific static route from the routing table. If the netmask is unspecified, destination is removed from the host, otherwise destination is removed from the network.

Parameter	Value	Description
destination	IP address in dot notation	Destination network address.
netmask	IP address in dot notation or hexadecimal format	Netmask address.

Command Example

```
boot% route delete 192.168.8.1
boot%
```

Route Delete Default

Syntax **route delete default**

Description Removes a default route from the routing table.

Command Example

```
boot% route delete default
boot%
```

Route Flush

Syntax **route flush**

Description Removes all static routes from the routing table.

Command Example

```
boot% route flush
boot%
```


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Serial

Syntax **serial** *baudrate*

Description Modifies the default baud rate at the Boot prompt.

Parameter	Value	Description
baudrate	number	Transmission speed of 9600 or 115200 bits per second

Command Example

```
boot% serial 9600
boot%
```

Show ID

Syntax **show id**

Description Displays the identification information which includes:

- Manufacturer
- Product name
- Part number
- Serial number
- Software description
- Copyright information

Command Example

```
boot% show id

  manufacturer: Digital Lightwave, Inc.
      product: WM-100-C-32C-8-1
  part number: 5-0001-05467-60
serial number: OWM02120003
     software: OPM_Controller_Boot 1.0.2 2001-11-28 11018

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boot%
```

Show IP

Syntax **show ip**

Description Displays the Internet Protocol (IP) address of the OWM.

Command Example

```
boot% show ip

ip 198.168.1.250 0xffffff00
```


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Show MAC Address

Syntax **show macaddr**

Description Displays the Media Access Control (MAC) Address of the OWM.

Command Example

```
boot% show macaddr
00016b-00017c
boot%
```

Show Route

Syntax **show route** [**table**]

Description Displays the static route configuration or dumps the contents of the routing table.

*Command Example*s

```
boot% show route
route add 192.168.2.0 0xffffff00 192.168.3.225
boot% show route table
destination    netmask         gateway
  127.0.0.1 0xffffffff         127.0.0.1
192.168.2.0 0xffffff00     192.168.3.225
192.168.3.0 0xffffff00     192.168.3.225
boot%
```


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Show Serial

Syntax **show serial**

Description Displays the configured serial baudrate of the OWM Craft port

Command Example

```
boot% show serial
serial 9600
boot%
```

Show Software

Syntax **show software**

Description Displays the software application image table

Reply Argument	Value	Description
slot	integer	Slot numbers 0, 1 and 2 for software default and boot version.
status	value	Software install status. OK - valid image, Clear - Erased slot, DIRTY - Not completely erased slot, BAD - Invalid slot
description	string	OWM software version and install date

Command Example

```
boot% show software
Slot  State Description
----- ----- -----------
 boot ok    OPM_Controller_Boot 1.0.2 2001-11-30 110118
*0    ok    OPM_Controller 2.0.0 2002-06-07 153024
 1    clear
 2    clear
boot%
```

Software Clear

Syntax **software clear** *slot* [**force**]

Description Clears the specified software image on the OWM. The software image in slot 0 is protected and can not be erased.

Parameter	Value	Description
slot	integer	Software image number in slot1 or 2.
force	keyword	(Optional) If supplied, suppresses the confirmation prompt.

Command Example

```
boot% software clear 1
WARNING: Permanently erase software image 1 (yes/no)? no
```


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```
operation aborted
boot%
```

Software Default

Syntax **software default** *slot*

Description Sets the default software image for launching by the boot loader.

Parameter	Value	Description
slot	integer	Slot numbers 0, 1 and 2 for software default version.

Command Example

```
boot% software default 1
boot%
```

Software Download

Syntax **software download** *slot* ["*file*"]

Description Downloads the software version from the system and stores it in non-volatile flash memory. When a filename is specified, the software image is copied from the specified file, which must reside in the "/ram/" directory. When a filename is not specified, the software image is downloaded over the OWM system CRAFT port.

Parameter	Value	Description
slot	integer	Software version for download in slot 1 or 2
"file"	string	Software filename for download

Command Example

```
<boot>% software download 2 "opmCtlr.app.srec"
<boot>%
```


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Software Run Disable Passwords

Syntax **software run** [*slot*] [**disable passwords**]

Description Launches or restarts the OWM application using the default software image or the specified software image. This command also disables user and password validation and allows you to use the OWM system when you forget the password. When you run the software in disable passwords mode, you do not need to enter a password to login to the Administrator account.

Parameter	Value	Description
slot	integer	Software image to run.
disable passwords	keywords	Passwords are disabled when the application starts. This parameter is used when the "*admin*" password is forgotten and you need a way to obtain *admin* privileges.

Command Example

```
boot% software run 1 disable passwords
boot%
```


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CHAPTER

Graphical User Interface

This chapter describes the Digital Lightwave Optical Wavelength Manager (OWM) Graphical User Interface (GUI) and includes the topics listed in the table below.

Topic	Location
Overview	page -2
Installing the Interface	page -3
Logging into the Interface	page -3
Introducing the Graphical User Interface	page -6
FILE Menu	page -7
View Menu	page -9
Display Menu	page -10
Options Menu	page -11
Commands Menu	page -12
Admin Menu	page -15
Help Menu	page -15
Toolbar	page -16
Status Bar	page -19
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DISPLAY	page -72
OPTIONS	page -73
COMMANDS	page -77
ADMIN	page -79
HELP	page -93

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Overview

The Digital Lightwave Graphical User Interface (GUI) is designed to control and monitor the OWM. The Digital Lightwave GUI provides a user-friendly, point-and-click graphical interface. It presents colored charts that make monitoring information easy to read and navigate.

System Requirements

The OWM graphical interface is a Java application program which is designed to operate on an IBM compatible personal computer with the following requirements:

- 450 MHz Pentium processor or equivalent
- 128 Mb of RAM memory
- 40 Mb of free hard disk space
- CDROM drive
- Workstations:
  - Microsoft Windows XP Operating system
  - Microsoft Windows 2000 Professional with Service Pack 2 Operating System
  - Microsoft Windows NT 4.0 Workstation with Service Pack 6 Operating System
  - Microsoft Windows Millennium Edition Operating System
  - Microsoft Windows 98, Second Edition Operating System
  - Linux Operating System
- 802.2 Ethernet interface

The OWM graphical interface will also operate on:

- Solaris/SPARC Operating System



The Internet Protocol (IP) settings must be established before the GUI can be used.

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Installing the Interface

For installation instructions on installing the Graphical User Interface, refer to the Configuration Chapter section entitled "Install the Graphical User Interface" on page -5.

Logging into the Interface

To log into the interface:

1. Click **Start>Programs>Digital Lightwave>Optical Wavelength Manager**.

   The Login dialog box (Figure -1) is displayed.

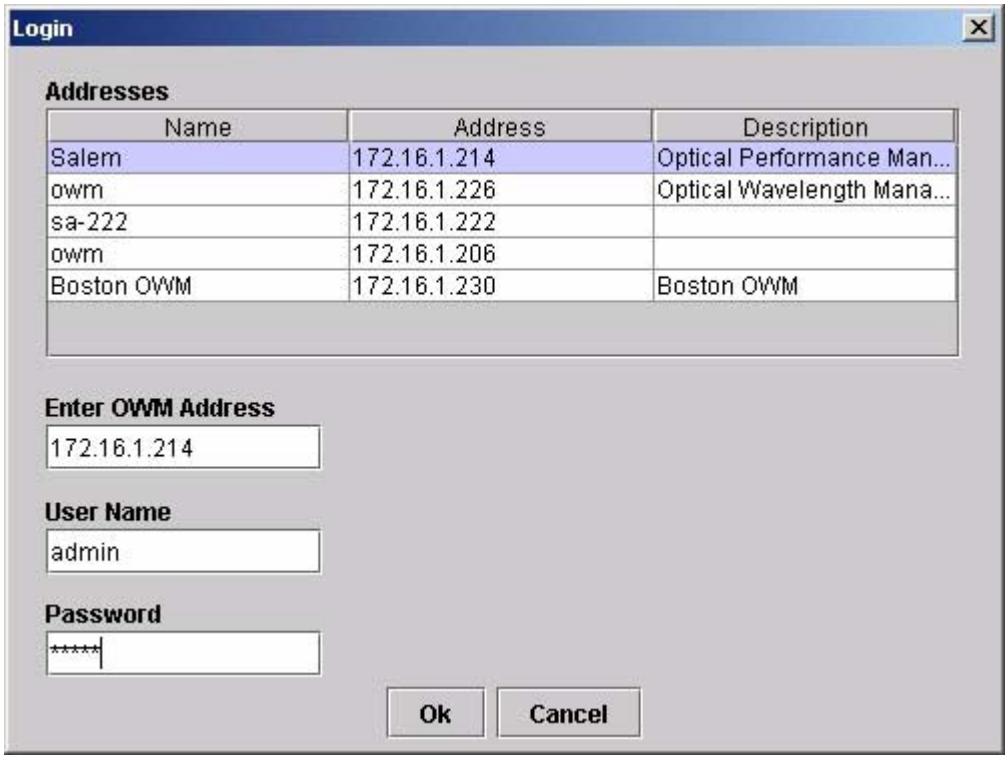


FIGURE -1. Login Dialog Box

2. An OWM address can be selected in two ways. The first is to click a name in the **Addresses** table. This will populate the **Enter OWM Address** field. Or you can type in the IP Address into the **Enter OWM Address** field. If you type in a new IP address, it is stored locally.
3. Failure to enter a valid IP address or failure of the OWM to communicate with a valid IP yields the following Connection Error dialog indicating unable to connect:



FIGURE -2. Connection Error - Unable to Connect

4. Type a valid user name in the **User Name** field.
5. Type a valid password ID in the **Password** field.

User names and passwords are case sensitive.

6. Failure to enter a valid user name or password yields the following Connection Error dialog indicating Login Invalid:



FIGURE -3. Connection Error - Invalid Login

7. Click **OK** to connect to the OWM.
8. Click **Cancel** to close the login dialog without connecting to the OWM.

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If, at any time, the OWM should become unexpectedly disconnected, the following Connection Error dialog indicating connection lost will be displayed:



FIGURE -4. Connection Error - Connection Lost

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Introducing the Graphical User Interface

Keyboard Conventions

The OWM provides a feature that allows access to OWM commands using keyboard shortcuts. Most commands in the GUI have an underlined letter associated with it (i.e. View). Holding down the **Alt** key while typing the underlined letter causes the command to be executed.

example: <Alt> v

This example causes the View menu to be displayed.

Keyboard shortcuts are case insensitive. This means that capital letters are treated the same as lowercase letters.

Title bar

The title bar (Figure -5) contains the OWM Product Name and either the IP address of the connected OWM or "<disconnected>" if the OWM is not currently connected.



FIGURE -5. Title Bar

Main Menu Bar

You can use either the Main Menu bar (Figure -6) or the Toolbar (Figure -6) to access and view the OWM information. The Main Menu bar consists of the menus listed in Table -1.



FIGURE -6. Main Menu Bar

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Table -1. Main Menu Bar:

Menu	Description
File	Performs general program and file functions
View	Changes the current view
Display	The option to change the display characteristics
Options	Provides the ability to view graphs by monitoring activity from the port or device and enables/disables the display of Channel Span Tilt and the Channel Average Power Level.
Commands	Commands to issue to the OWM
Admin	Contains administrative functions
Help	Contains help functions



Depending on your security level when signing on to the OWM, certain command options (for example, menus and buttons) may not be visible or will appear disabled.

FILE Menu

The File menu (Figure -7) is used for general program and file functions (Table -2).

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FIGURE -7. File Menu

Table -2. File Menu Options and Functions

Option	Description
Save Reports...	Generates reports for the Spectrum View, Peak View, datalog, alarms, event log, and benchmarks
Properties	Displays properties of the connected OWM
Users	Displays currently connected users
Reset Password...	Displays a Password Change Request Dialog
Edit OWM Connections...	Edits the IP connections for the Login Dialog
Connect to OWM...	Connects to an OWM
Disconnect from the OWM	Disconnects from the OWM
Exit	Exits the GUI

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View Menu

The View menu (Figure -8) allows you to show different views of the OWM information (Table -3).

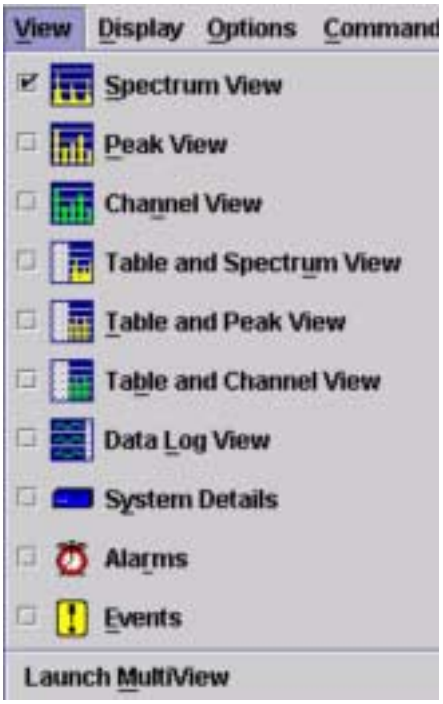


FIGURE -8. View Menu

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Table -3. View Menu and Functions

Option	Description
Spectrum View	Selects the Spectrum View
Peak View	Selects the Peak View
Channel View	Selects the Channel View
Table and Spectrum View	Selects the Table and Spectrum View
Table and Peak View	Selects the Table and Peak View
Table and Channel View	Selects the Table and Channel View
Data Log View	Selects the Data Log View
System Details	Displays and/or manages LED Relay Panel Display, General OWM Administration, SNMP Configuration, IP and route configuration, Date/Time configuration and software configuration
Alarms	Selects the Alarm View
Events	Selects the Events View
Launch MultiView	Displays multiple Spectrum, Peak and Channel Views within a single window frame

Display Menu

The Display menu (Figure -9) contains the functions listed in Table -4.

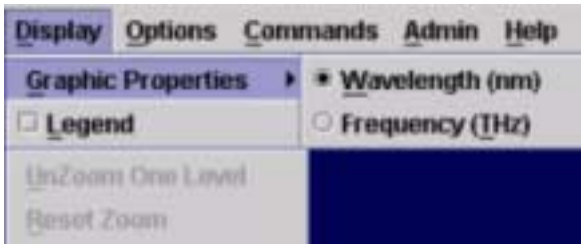


FIGURE -9. Display Menu

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Table -4. Display Menu Functions

Command	Description
Graphic Properties	Graphic properties can be set for Wavelength or Frequency
Legend	Provides an explanatory table or list of symbols describing what is being viewed on a graph
UnZoom One Level	Zooms out one level
Reset Zoom	Resets the zoom for normal viewing

Options Menu

The Options menu (Figure -11) contains the functions listed in Table -6.



FIGURE -10. Options Menu

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Table -5. Options Menu Functions

Command	Description
Monitor Port View	Used to display port activity in the Spectrum or Peak views
Monitor Device View	Used to display device activity in the Channel View and Datalog View
Spectrum Benchmarks	On/off toggle switch that displays benchmarks in Spectrum View and Table and Spectrum View
Channel Benchmarks	On/off toggle switch that displays benchmarks in Channel View and Table and Channel View
Channel Span-Tilt	On/off toggle switch that displays a linear regression calculation (slope) of the power value for two or more selected channels
Channel Average Power Level	On/off toggle switch that displays the logarithmic average of all channel power values for a specified device

Commands Menu

The Commands menu (Figure -11) contains the functions listed in Table -6.



FIGURE -11. Commands Menu

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Table -6. Commands Menu Functions

Command	Description
Alarm Acknowledge	Acknowledges all alarms.
Sequencer	Turns the Sequencer On and Off. The check box shows the state of the Sequencer. If checked, the Sequencer is On.
Refresh Alarms/Events	Causes the alarm and event logs to be cleared and repopulated with ALL the current alarms/events on the OWM.
Initialize Alarms/Events	Causes the alarm log to be cleared and repopulated with ALL the alarm events on the OWM. Additionally, the event log is cleared and populated with only those events that have occurred since the Initialize Alarms/Events command was issued.
Port Activate	Makes the designated port active so that spectrum and peak activity can be monitored.
Device Activate	Makes the designated device active so that channel activity can be monitored.

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Port Activate

An example of the port list is shown in Figure -12. When a port is selected from the list:

- The Sequencer is stopped.
- The port becomes active and marked by an asterisk.
- The previously active port is cleared.

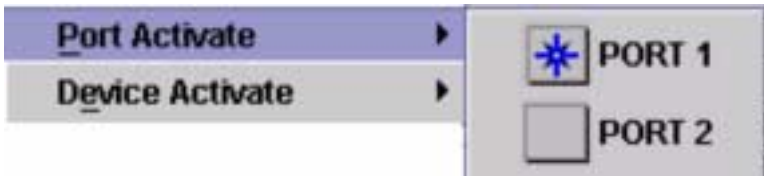


FIGURE -12. Port Activate

When using this option, the selection will deactivate all devices.

Device Activate

Device names change depending on the OWM definition. An example of the device list is shown in Figure -13. When a device is selected from the list:

- The Sequencer is stopped.
- The device becomes active.
- The active device is displayed with a star.

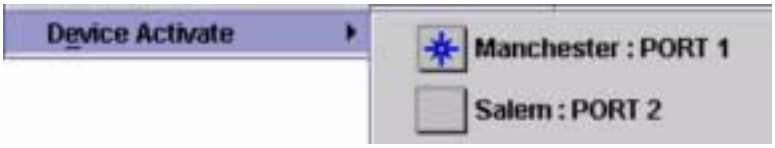


FIGURE -13. Device Activate

When any of the Command menu items are selected, that command is run immediately. If the command fails, the information is displayed on the status bar (Figure -17 on page -19).

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Admin Menu

The Admin Menu is shown in Figure -14. The Manage Configuration option is described in Table -7.

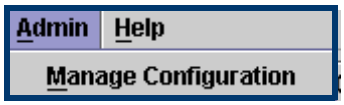


FIGURE -14. Admin Menu

Table -7. Admin Menu Option

Option	Description
Manage Configuration	Changes the OWM configuration settings.

Help Menu

The Help menu is a useful resource that provides information about the OWM. This menu is shown in Figure -15. Refer to Table -8 for Help options.



FIGURE -15. Help Menu

Table -8. Help Menu Options

Option	Description
Help	Displays Technical Support contact information.
About OWM	Displays the version information for the software for the interface.

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Toolbar

The Toolbar (Figure -16) is a quick and simplistic access method to the most popular and useful features in the graphical user interface. The following sections depict individual snapshots and descriptions of each icon that is displayed on the toolbar.



FIGURE -16. OWM Toolbar

Spectrum Icon



Spectrum view displays a point-by-point graph of the optical signal. Each point is plotted from power measurements made at regular intervals across the OWM measurement range.

Peaks Icon



Peak view displays peaks derived from the OWM spectrum. When Peak view is used, the OWM finds all the peaks within the unit range. Peak view displays peaks, wavelength and power.

Channels Icon



Channel View displays the currently defined device. For each channel defined, the current power, wavelength, and alarm state is displayed.

Table and Spectrum Icon



Table and Spectrum view displays spectrum and peak information in both tabulated and graphical formats.

Table and Peaks Icon



Table and Peak view displays peak information in both charted and tabulated formats.

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Table and Channel Icon



Table and Channel View shows the channel information in both charted and tabulated formats.

Data Log Icon



Data Log view displays the logged data for a device.

System Details Icon



System Details view displays and/or edits LED/relay status, OWM system settings, user accounts, SNMP configuration, IP and route configuration, date/time and system software settings for the OWM.

View Active Alarms Icon



Alarm view displays all of the active alarms for the OWM including the severity, description, record, date, device and channel information. If the alarm has been acknowledged, the icon is displayed as green. Unacknowledged alarms are displayed as red. If no alarms are active, the icon is disabled.

Acknowledge Alarm Icon



The Acknowledge alarm icon sends an Alarm Acknowledge command to the OWM. If the icon is enabled, it signals the user that there are alarms currently active that have not yet been acknowledged.

View Events Icon



The Events icon displays the last 2000 events that have occurred for the OWM including the severity, description, record, date, device and channel information.

Manage Configuration Icon



Manage Configuration allows users with Administrator or Configuration access to view and modify the OWM optical configuration settings.

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UnZoom One Level Icon



Zooms out one level. This icon is only enabled when zooming is in effect.

Reset Zoom Icon



Resets the zoom level to normal. This icon is only enabled when zooming is in effect.

Sequencer On/Off Icon



When the Sequencer is enabled (yellow and green arrows), the OWM cycles through the defined devices at various sampling rates. The sampling rate is determined by the number of monitor input ports on the OWM. For detailed information on the sampling rates see "Sequencer" on page 3-2.

This feature allows periodic monitoring of optical devices. When the Sequencer is disabled (red arrows), switching does not occur.

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Status Bar

The status bar (Figure -17) displays information about the OWM. Refer to Table -9.



FIGURE -17. Status Bar

Table -9. Status Bar

Component	Description
Status Message Area	Displays error and status messages
Date/Time Area	Displays the current date and time on the **connected** OWM
State Icons Area	Display the states of the OWM. Refer to Table -10 for supported icons.

State Icons

State icons appear in the lower right-hand side of the status bar. Upon the first occurrence of an event, the state icon will be displayed. Each state icon is added to the status bar in right to left order. The following state icons are supported:

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Table -10. Supported State Icons

Icon	Description
Configuration locked 	The Configure Mode on the OWM is in use.
Saturation 	The OWM spectrometer is saturated. Once saturation has normalized, this icon is no longer displayed.
Alarm Acknowledge 	This icon signals the user that there are active alarms that have not yet been acknowledged.
Gathering Alarms & Events 	This icon appears when the GUI is polling the controller to gather all alarm and event activity.
Sequencer Off 	The Sequencer is disabled and not switching between defined devices.
Sequencer On 	The Sequencer is enabled and switching at a pre-defined port sampling time interval between defined devices. See "Sequencer" on page 3-2 for time interval definitions.
Alarm/Event Refresh Required 	This icon is displayed as a result of an event storm that has begun to recover. It notifies the user that data may have been lost and initializing or refreshing alarms/events is recommended.
Performance Degradation 	This icon is displayed to notify the user that a large number of alarms/events were detected by the controller; however, no data was lost.
Event Storm 	This icon is displayed to notify the user of a catastrophic event that has caused alarm and event data to be lost. It remains in the status bar until the event storm has normalized.

FILE

Save Reports...

The OWM allows reports to be generated and saved in a user specified source file. Each report contains a header that identifies the Report Name, Version number, System, IP address, time report was generated, parameters and column titles. The OWM provides a default source filename to store the report, however, icons are provided to help navigate and view destination directories. The

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standard icons supported are: Up One Level, Desktop, Create New Folder, List and Details (). If you choose to use the default source filename and one already exists, you will be prompted to overwrite the existing file.

Table -11 lists all the reports supported by the OWM.

Table -11. Generated Reports

Report Name	Description
Spectrum	lists wavelength, count and power for a specific port or ports.
Peaks	lists wavelength, power and OSNR for a specific port or ports.
Datalog	provides a log time stamp, a sample time stamp, a sample type, record ID, device, device UID, port, port UID, channel number, channel UID, power, wavelength, OSNR and peak count for all devices or a specific device.
Alarms	provides a log time stamp, a sample time stamp, a sample type, record ID, device, device UID, port, port UID, channel number, channel UID, power, wavelength, OSNR and peak count for all devices or a specific device.
Events	provides an event time stamp, record ID, severity, type, event ID, device name, device UID, port name, port UID, channel number, channel UID, equipment, equipment UID and an event description for all devices or a specific device.
Benchmarks	provides a snapshot of device channel values (power, wavelength and OSNR) for each channel plus the spectral values (pixel wavelength, raw spectrum and spectrum power) on all devices or a specific device at the time the benchmark, snapshot, was taken.

Spectrum Report

To generate a Spectrum Report, perform the following:

- Click **File**.
- Click **Save Reports...** to display the Save Reports dialog box.
- In the Report Selection portion of the dialog box, click in the Report field to display a drop down box.
- Select Spectrum.

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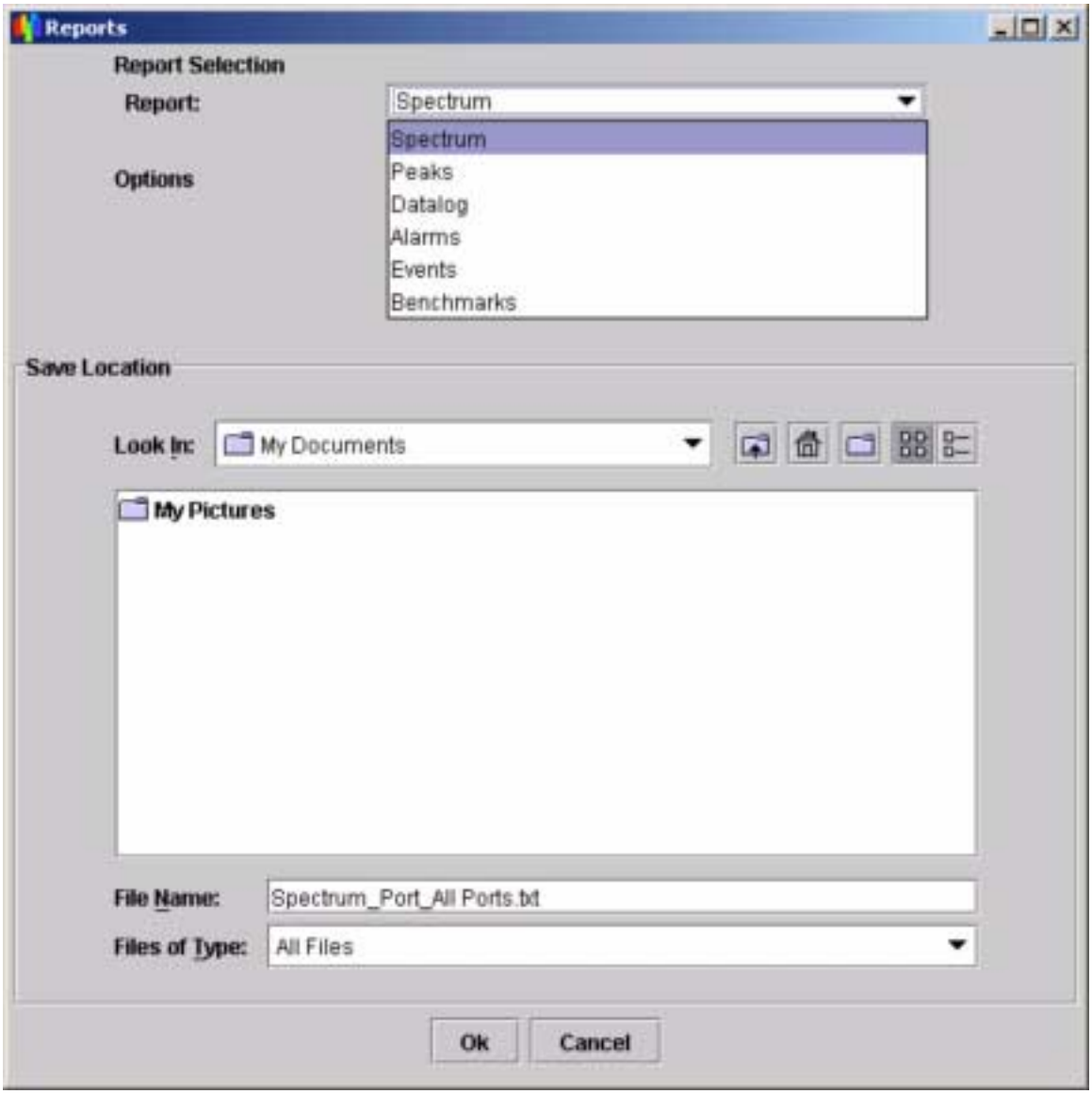


FIGURE -18. Reports - Spectrum

- In the Save Location subscreen, click in the **Look in** field and select the file destination.
- The OWM provides a default filename for the generated report. A new filename can be entered by selecting the filename in the **File Name** field and typing a new name and file extension.
- Click **OK**.

The following is an example of a Spectrum Report created using the default source file Spectrum_Port_All Ports.txt

```
#Report_Name: "Spectrum Report"
#Version: 1
#System: Salem
#IP_Address: 172.16.1.214
```


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```
#Time: 2002-09-12 15:16 +0000
#Time of capture: 2002-09-12 14:59:44 +0000
#Parameters: port=PORT 1
#ColumnHeader: Wavelength, Count, dBm

1529.56, 0, -45.6
1529.69, 0, -45.6
1529.82, 0, -45.6
...omitted remaining lines from example...
1564.18, 0, -45.6
1564.32, 0, -45.6
1564.45, 0, -45.6

#----------------------------------------

#Time: 2002-09-12 15:16 +0000
#Time of capture: 2002-09-12 15:16:04 +0000
#Parameters: port=PORT 2
#ColumnHeader: Wavelength, Count, dBm

1529.56, 0, -45.4
1529.69, 0, -45.4
1529.82, 2, -42.4
...omitted remaining lines from example...
1564.18, 0, -45.4
1564.32, 0, -45.4
1564.45, 0, -45.4

#----------------------------------------


#End of Report: "Spectrum Report"
```

Peaks Report

To generate a Peaks Report, perform the following:

- Click **File**.
- Click **Save Reports...** to display the Save Reports dialog box.
- In the Report Selection portion of the dialog box, click in the Report field to display a drop down box.

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- Select **Peaks**.

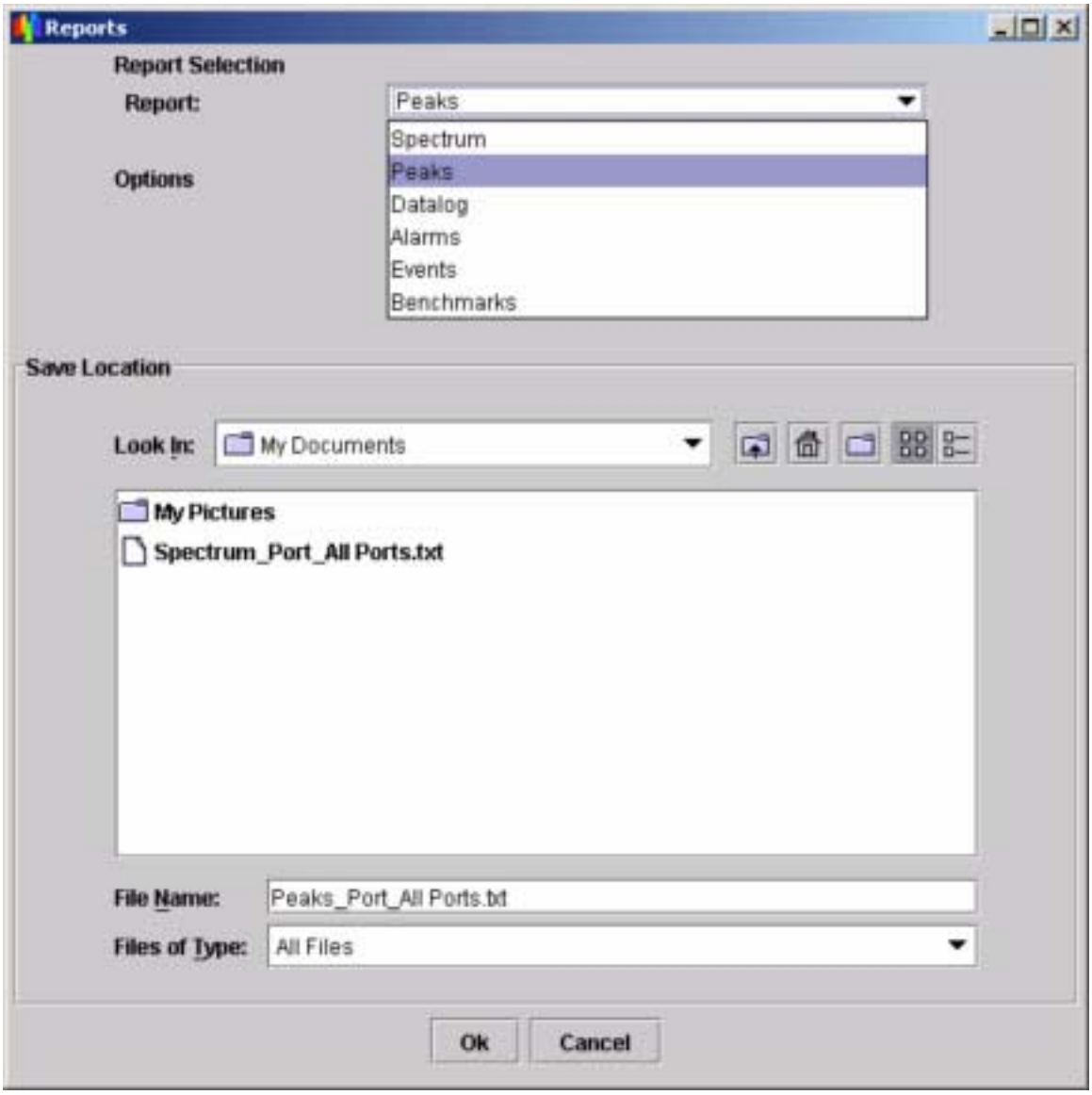


FIGURE -19. Reports - Peaks

- In the Save Location portion of the dialog box, click in the **Look in** field and select the file destination.
- The OWM provides a default filename for the generated report. A new filename can be entered by selecting the filename in the **File Name** field and typing a new name and file extension.
- Click **OK**.

The following is an example of a Peaks Report created using the default source file Peaks_Port_All Ports.txt

```
#Report_Name: "Peaks Report"
#Version: 1
#System: Salem
```


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```
#IP_Address: 172.16.1.214
#Time: 2002-09-12 15:27 +0000
#Parameters: port=PORT 1
#ColumnHeader: Wavelength, Power, OSNR


#-----------------------------------------

#Time: 2002-09-12 15:27 +0000
#Parameters: port=PORT 2
#ColumnHeader: Wavelength, Power, OSNR

1540.96, -26.0, 26.9
1542.07, -24.2, 22.6
1543.17, -21.0, 26.4
1544.29, -15.8, 30.0
1545.40, -7.9, 30.0
1546.51, 4.2, 30.0
1547.63, -3.9, 30.0
1548.74, -15.6, 29.7
1549.86, -21.0, 26.4
1550.98, -26.1, 22.0

#-----------------------------------------


#End of Report: "Peaks Report"
```

Datalog Report

To generate a Datalog Report, perform the following:

- Click **File**.
- Click **Save Reports...** to display the Save Reports dialog box.
- In the Report Selection portion of the dialog box, click in the Report field to display a drop down box.

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- Select Datalog.

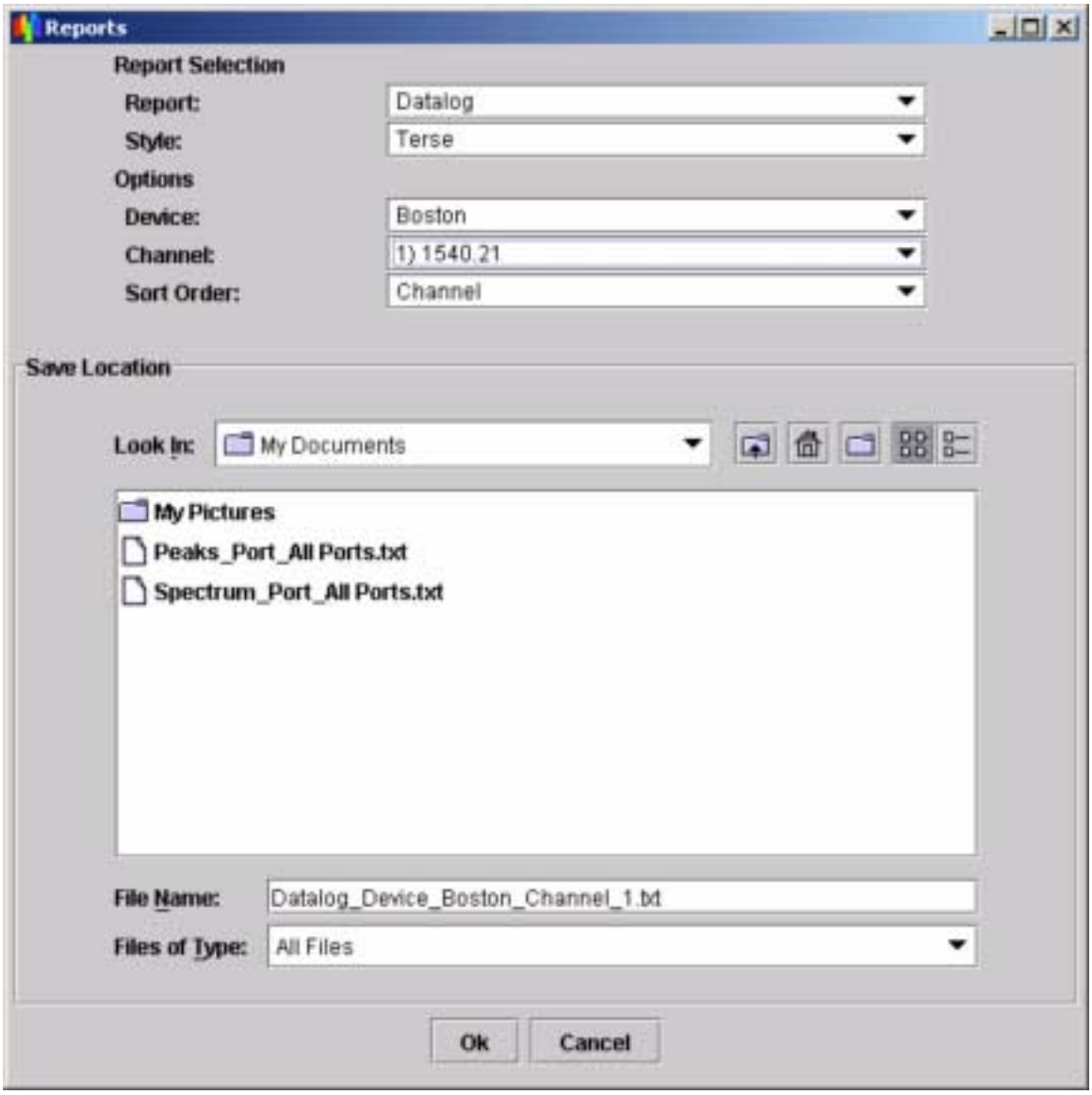


FIGURE -20. Reports - Datalog

- Click in the Style field of the Report Selection portion of the dialog box to display a drop down box of style options.
- Click Full or Terse. Full will generate a complete datalog report containing a log time stamp, a sample time stamp, a sample type, record ID, device name, device UID, port name, port UID, channel number, channel UID, power, wavelength, OSNR and peak count. Terse will generate a report containing everything that Full does except for the device name, port name, and channel number fields.
- In the Options portion of the dialog box, click in the Device field to display a drop down box.
- Select **All Devices** or a specific device.

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- If a specific device was selected, click on the channel field and select All Channels or an individual channel.
- Click on the Sort Order field and choose Channel or Time. These options define the method by which the report will be sorted.
- In the Save Location portion of the dialog box, click in the **Look in** field and select the file destination.
- The OWM provides a default filename for the generated report. A new filename can be entered by selecting the filename in the **File Name** field and typing a new name and file extension.
- Click **OK**.

The following is an example of a Datalog Report created using the default source file Datalog_Device_Boston_Channel_12.txt. The Datalog report was generated for channel 12 on device "Boston" in terse format.

```
#Report_Name: "Data Log - By Device (Terse)"
#Version: 1
#System: "Salem"
#IP_Address: 172.16.1.214
#Time: 2002-09-12 15:31:18 +0000
#Parameters: device "Boston" , channel 12
#ColumnHeader: Log_Time , Sample_Time , Sample_Type , Record_Id , Device_UID ,
Port_UID , Channel_UID , Power , Wavelength , OSNR

2002-09-12 14:32:00 +0000,2002-09-12 13:42:58 +0000,M,799,<3>,<1>,<12>,-45.6,-
1544.29,-10.0,0
2002-09-12 14:33:00 +0000,2002-09-12 13:42:58 +0000,M,800,<3>,<1>,<12>,-45.6,-
1544.29,-10.0,0
2002-09-12 14:34:00 +0000,2002-09-12 13:42:58 +0000,M,801,<3>,<1>,<12>,-45.6,-
1544.29,-10.0,0
...omitted remaining lines from example...
2002-09-12 15:00:00 +0000,2002-09-12 13:42:58 +0000,Q,56,<3>,<1>,<12>,-45.6,-
1544.29,-10.0,0
2002-09-12 15:15:00 +0000,2002-09-12 13:42:58 +0000,Q,57,<3>,<1>,<12>,-45.6,-
1544.29,-10.0,0
2002-09-12 15:30:00 +0000,2002-09-12 13:42:58 +0000,Q,58,<3>,<1>,<12>,-45.6,-
1544.29,-10.0,0

#End: of report "Data Log - By Device (Terse)"
```

Alarms Report

To generate an Alarms Report, perform the following:

- Click **File**.
- Click **Save Reports...** to display the Save Reports dialog box.
- In the Report Selection portion of the dialog box, click in the Report field to display a drop down box.

- Select Alarms.

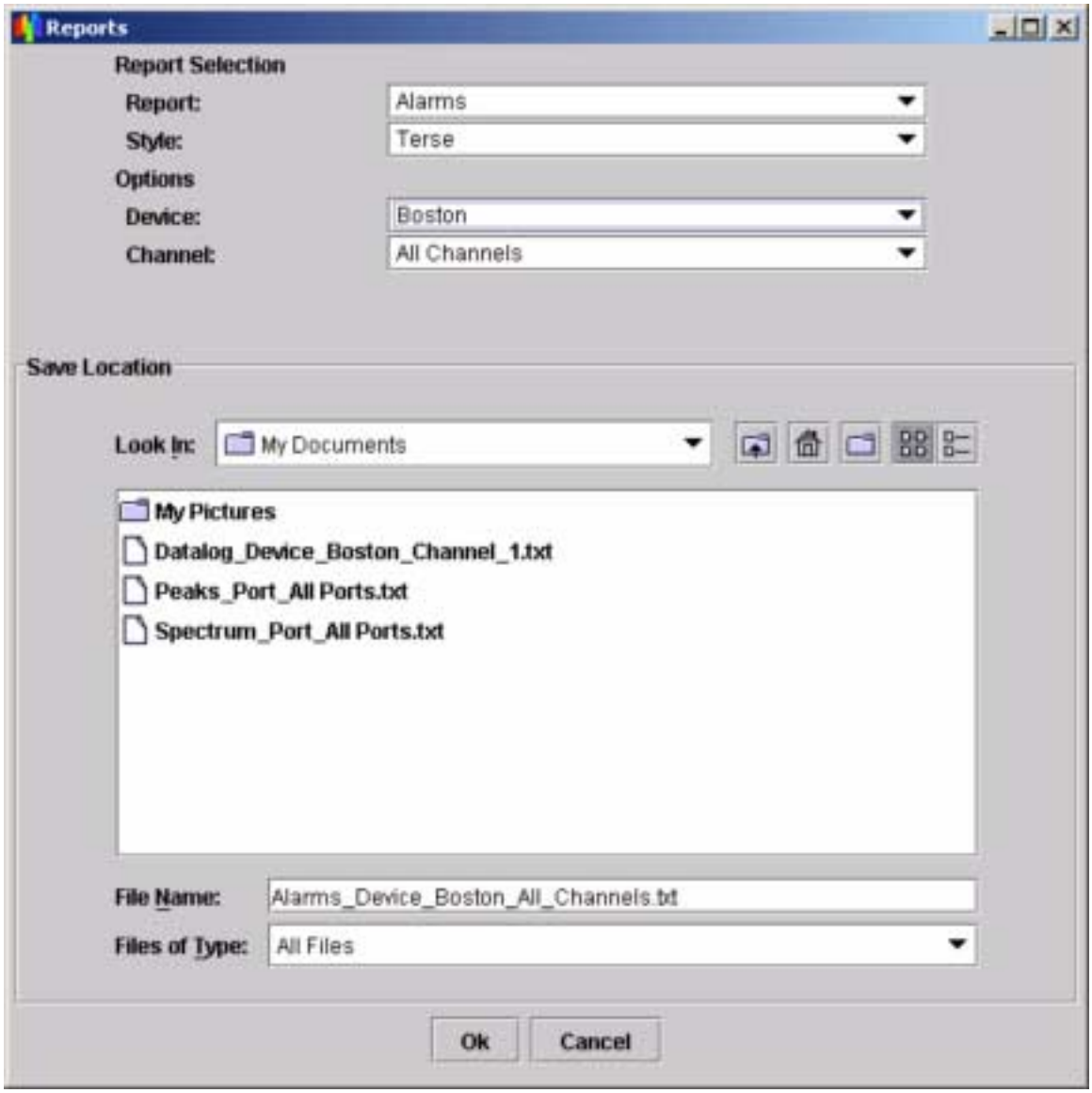


FIGURE -21. Reports - Alarms

- Click in the Style field of the Report Selection portion of the dialog box to display a drop down box of style options.
- Click Full or Terse. Full will generate a complete Alarms Report containing an alarm time, record ID, severity, type, alarm ID, device name, device UID, port name, port UID, channel number, channel UID, equipment, equipment UID and alarm description. Terse will generate a report containing everything that Full does except for the device name, port name, and channel number fields.
- In the Options portion of the dialog box, click in the Device field to display a drop down box.
- Select **All Devices** or a specific device.

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- If a specific device was selected, click on the channel field and select All Channels or an individual channel.
- In the Save Location portion of the dialog box, click in the **Look in** field and select the file destination.
- The OWM provides a default filename for the generated report. A new filename can be entered by selecting the filename in the **File Name** field and typing a new name and file extension.
- Click **OK**.

The following is an example of an Alarms Report created using the default source file Alarms_Device_Boston_Channel _8.txt. The Alarms report was generated for channel 8 on device "Boston" in terse format.

```
#Report_Name: "Alarm Report (Terse)"
#Version: 1
#System: Salem
#IP_Address: 172.16.1.214
#Time: 2002-09-12 15:42 +0000
#Parameters: device=Boston, channel=8
#ColumnHeader: Alarm Time, Record ID, Severity, Type, Alarm ID, Device UID, Port
UID, Channel UID, Equipment, Equipment UID, Description

2002-09-12 15:41:39 +0000, 58285, mj_set, com, 83000005, <3>, <1>, <8>, -, -,
"Channel has crossed its (major) minimum OSNR threshold."
2002-09-12 15:40:34 +0000, 57864, mn_set, com, 73000005, <3>, <1>, <8>, -, -,
"Channel has crossed its (minor) minimum OSNR threshold."
2002-09-12 15:40:34 +0000, 57842, mn_set, com, 73000003, <3>, <1>, <8>, -, -,
"Channel has crossed its (minor) minimum power level threshold."
2002-09-12 15:40:34 +0000, 57841, mj_set, com, 83000003, <3>, <1>, <8>, -, -,
"Channel has crossed its (major) minimum power level threshold."
2002-09-12 15:40:34 +0000, 57840, cr_set, com, 93000003, <3>, <1>, <8>, -, -,
"Channel has crossed its (critical) minimum power level threshold."

#End of Report: "Alarm Report (Terse)"
```

Events Report

To generate an Events Report, perform the following:

- Click **File**.
- Click **Save Reports...** to display the Save Reports dialog box.
- In the Report Selection portion of the dialog box, click in the Report field to display a drop down box.

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- Select Events.

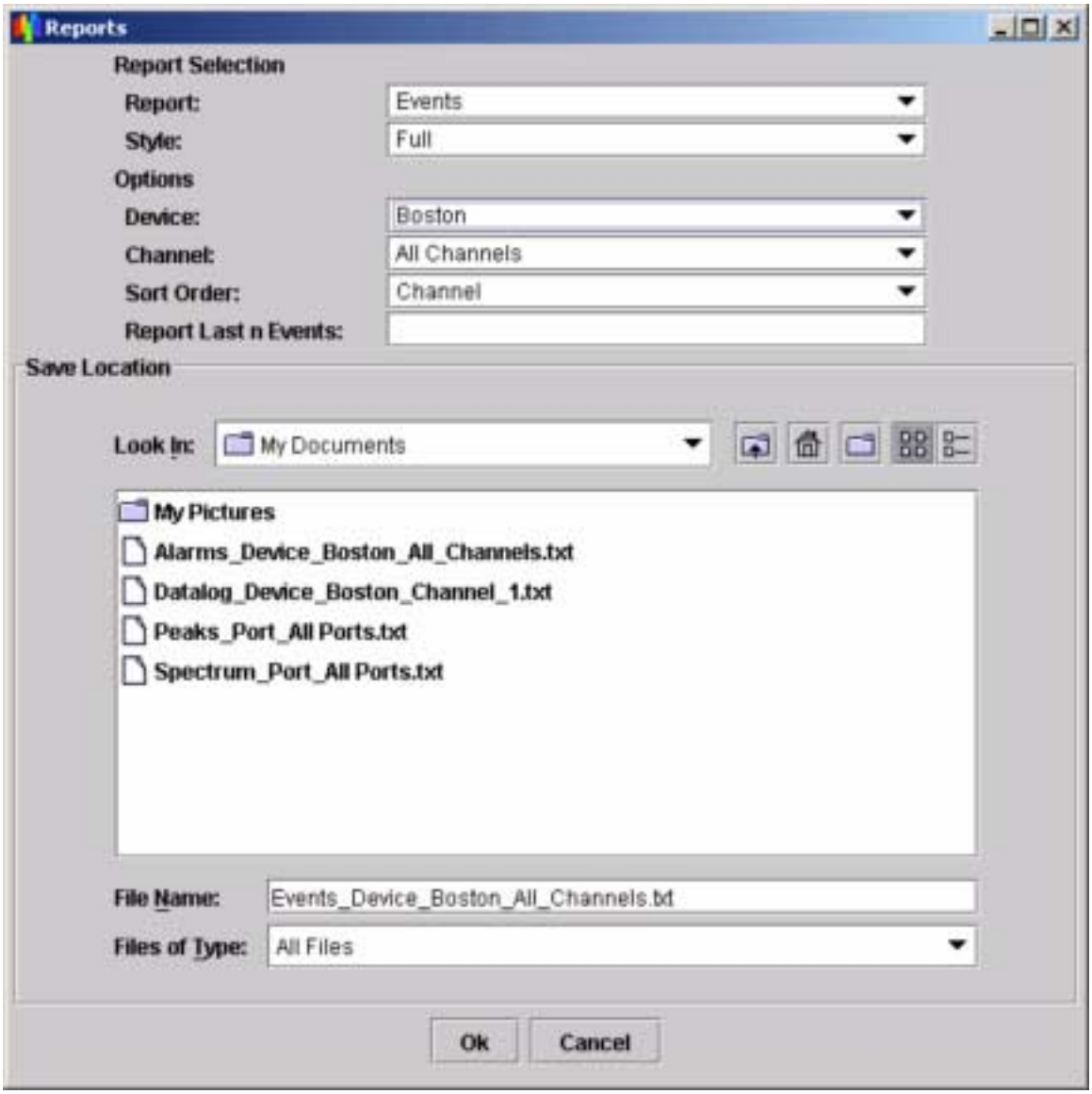


FIGURE -22. Reports - Events

- Click in the Style field of the Report Selection portion of the dialog box to display a drop down box of style options.
- Click Full or Terse. Full will generate a complete Events Report containing an event time, record ID, severity, type, event ID, device name, device UID, port name, port UID, channel number, channel UID, equipment, equipment UID and event description. Terse will generate a report containing everything that Full does except for the device name, port name, and channel number fields.
- In the Options portion of the dialog box, click in the Device field to display a drop down box.
- Select **All Devices** or a specific device.

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- If a specific device was selected, click on the channel field and select All Channels or an individual channel.
- Click on the Sort Order field and choose Channel or Time. These options define the method by which the report will be sorted.
- Click on the **Report Last n Events** field and enter the maximum number of events to be reported.
- In the Save Location portion of the dialog box, click in the **Look in** field and select the file destination.
- The OWM provides a default filename for the generated report. A new filename can be entered by selecting the filename in the **File Name** field and typing a new name and file extension.
- Click **OK**.

The following is an example of an Events Report created using the default source file Events_Device_Boston_All_Channels.txt. The Events report was generated for all channels on device "Boston" in terse format.

```
#Report_Name: "Event Report- By Channel (Terse)"
#Version: 1
#System: Salem
#IP_Address: 172.16.1.214
#Time: 2002-09-12 15:47 +0000
#Parameters: device=Boston
#ColumnHeader: Event Time, Record ID, Severity, Type, Event ID, Device UID, Port
UID, Channel UID, Equipment, Equipment UID, Description

2002-09-12 15:44:13 +0000, 61754, mn_set, com, 73000005, <3>, <1>, <2>, -, -,
"Channel has crossed its (minor) minimum OSNR threshold."
2002-09-12 15:44:12 +0000, 61753, mn_clr, com, 72000005, <3>, <1>, <2>, -, -,
"Channel is now within its (minor) minimum OSNR threshold "
2002-09-12 15:46:00 +0000, 63762, mj_set, com, 83000005, <3>, <1>, <8>, -, -,
"Channel has crossed its (major) minimum OSNR threshold."
2002-09-12 15:44:38 +0000, 62257, mj_set, com, 83000005, <3>, <1>, <8>, -, -,
"Channel has crossed its (major) minimum OSNR threshold."
2002-09-12 15:46:55 +0000, 64326, mj_set, com, 83000005, <3>, <1>, <8>, -, -,
"Channel has crossed its (major) minimum OSNR threshold."
2002-09-12 15:44:37 +0000, 62256, mj_clr, com, 82000005, <3>, <1>, <8>, -, -,
"Channel is now within its (major) minimum OSNR threshold "
2002-09-12 15:44:07 +0000, 61547, mj_clr, com, 82000005, <3>, <1>, <8>, -, -,
"Channel is now within its (major) minimum OSNR threshold "
2002-09-12 15:45:59 +0000, 63757, mj_clr, com, 82000005, <3>, <1>, <8>, -, -,
"Channel is now within its (major) minimum OSNR threshold "
2002-09-12 15:44:39 +0000, 62259, mn_clr, com, 72000005, <3>, <1>, <21>, -, -,
"Channel is now within its (minor) minimum OSNR threshold "
2002-09-12 15:44:08 +0000, 61548, mn_clr, com, 72000005, <3>, <1>, <21>, -, -,
"Channel is now within its (minor) minimum OSNR threshold "
2002-09-12 15:44:53 +0000, 62516, cr_clr, com, 92000034, <3>, <1>, <27>, -, -, "Zero
peaks are no longer detected in channel."
2002-09-12 15:44:53 +0000, 62517, cr_set, com, 93000034, <3>, <1>, <27>, -, -, "Zero
peaks have been detected in channel."

#End of Report: "Event Report- By Channel (Terse)"
```

Benchmarks Report

To generate a Benchmark Report, perform the following:

- Click **File**.
- Click **Save Reports...** to display the Save Reports dialog box.
- In the Report Selection portion of the dialog box, click in the Report field to display a drop down box.
- Select **Benchmarks**.

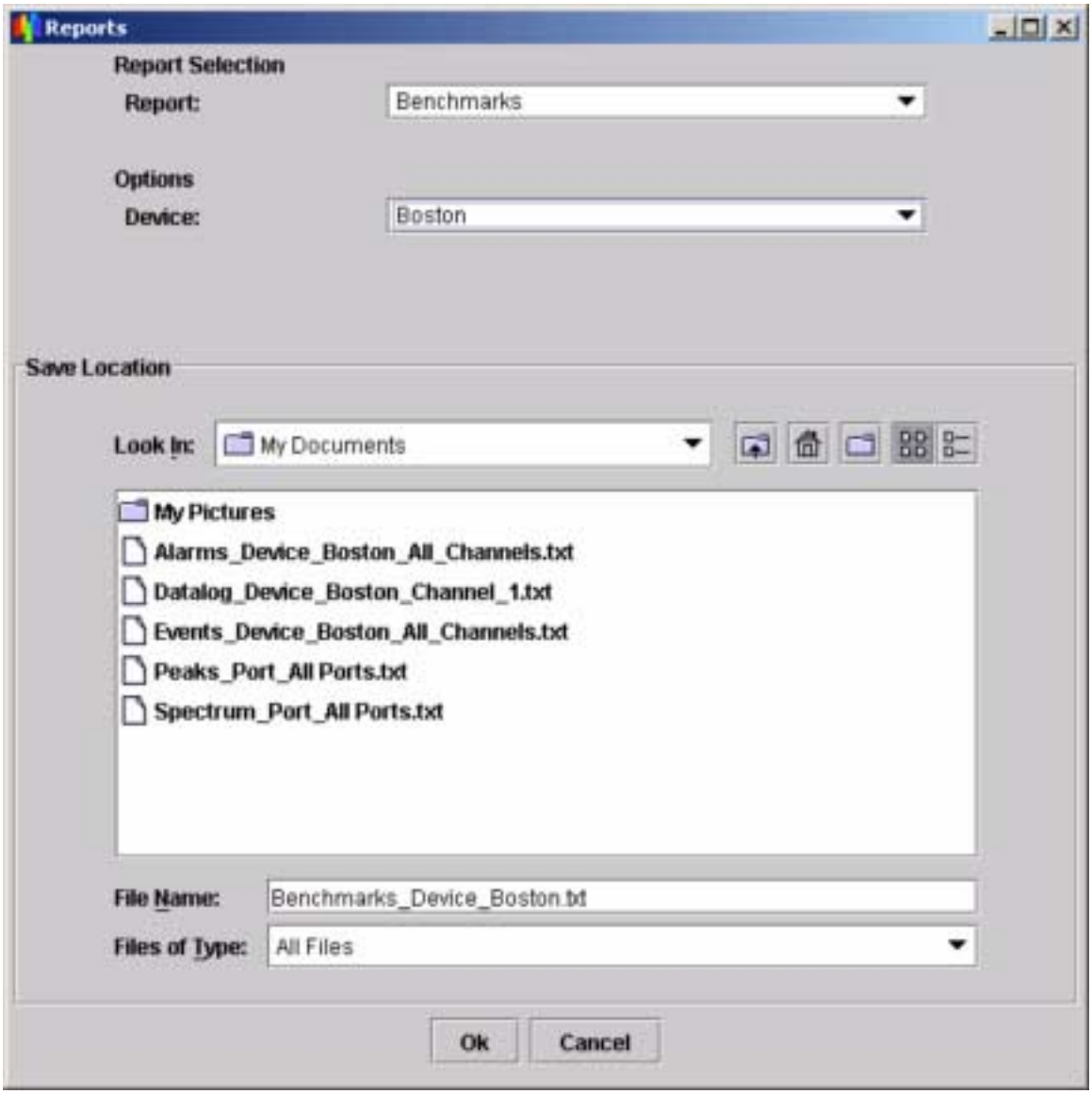


FIGURE -23. Reports - Benchmarks

- Click in the Device field and select **All Devices** or a specific device.
- The report generate a Benchmarks Report containing an the benchmark time, device name, device UID, port name, port UID, device tap power, channel number, channel UID, channel power, channel wavelength, channel OSNR, spectrum heading, pixel wavelength, pixel raw value, and pixel power.

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- In the Save Location portion of the dialog box, click in the **Look in** field and select the file destination.
- The OWM provides a default filename for the generated report. A new filename can be entered by selecting the filename in the **File Name** field and typing a new name and file extension.
- Click **OK**.

The following is an example of a Benchmark Report created using the default source file Benchmarks_Device_Boston.txt. The benchmark report was generated for all channels on device "Boston".

```
#Report_Name: "benchmarks"
#Version: 1
#System: "Salem"
#IP_Address: 172.16.1.221
#Time: 2002-09-06 08:19:38 +0000
benchmarks
device "Boston" 11 "PORT 1" 0.5 2002-09-06 02:25:32 +0000
1 , 1 , -22.5 , 1543.24 , 19.4
2 , 2 , -21.7 , 1544.38 , 21.0
3 , 3 , -20.8 , 1545.52 , 21.6
4 , 4 , -19.9 , 1546.66 , 21.8
5 , 5 , -18.7 , 1547.80 , 22.6
6 , 6 , -17.6 , 1548.95 , 23.9
7 , 7 , -16.0 , 1550.10 , 27.3
8 , 8 , -13.9 , 1551.24 , 30.0
9 , 9 , -10.1 , 1552.40 , 30.0
10 , 10 , -2.6 , 1553.55 , 30.0
11 , 11 , 1.1 , 1554.71 , 30.0
12 , 12 , 6.4 , 1555.86 , 30.0
13 , 13 , 8.1 , 1557.03 , 30.0
14 , 14 , 0.6 , 1558.19 , 30.0
15 , 15 , -11.2 , 1559.35 , 30.0
16 , 16 , -15.6 , 1560.52 , 30.0
spectrum "Boston" 11 "PORT 1" 0.5
1528.29 , 10 , -41.8
1528.42 , 20 , -38.7
1528.56 , 49 , -34.8
1528.70 , 51 , -34.7
1528.84 , 23 , -38.1
1528.97 , 14 , -40.3
1529.11 , 10 , -41.8
1529.25 , 11 , -41.3
1529.39 , 10 , -41.8
1529.53 , 20 , -38.7
1529.67 , 53 , -34.5
...omitted remaining lines from example...
1563.67 , 28 , -37.3
1563.80 , 41 , -35.6
1563.94 , 397 , -25.8

#End: of report "benchmarks"
```

Properties

To open the OWM Properties dialog box (Figure -24) do the following:

1. Click **File**.

2. Click **Properties**.

   The Properties dialog box is displayed.

3. Click **OK**.

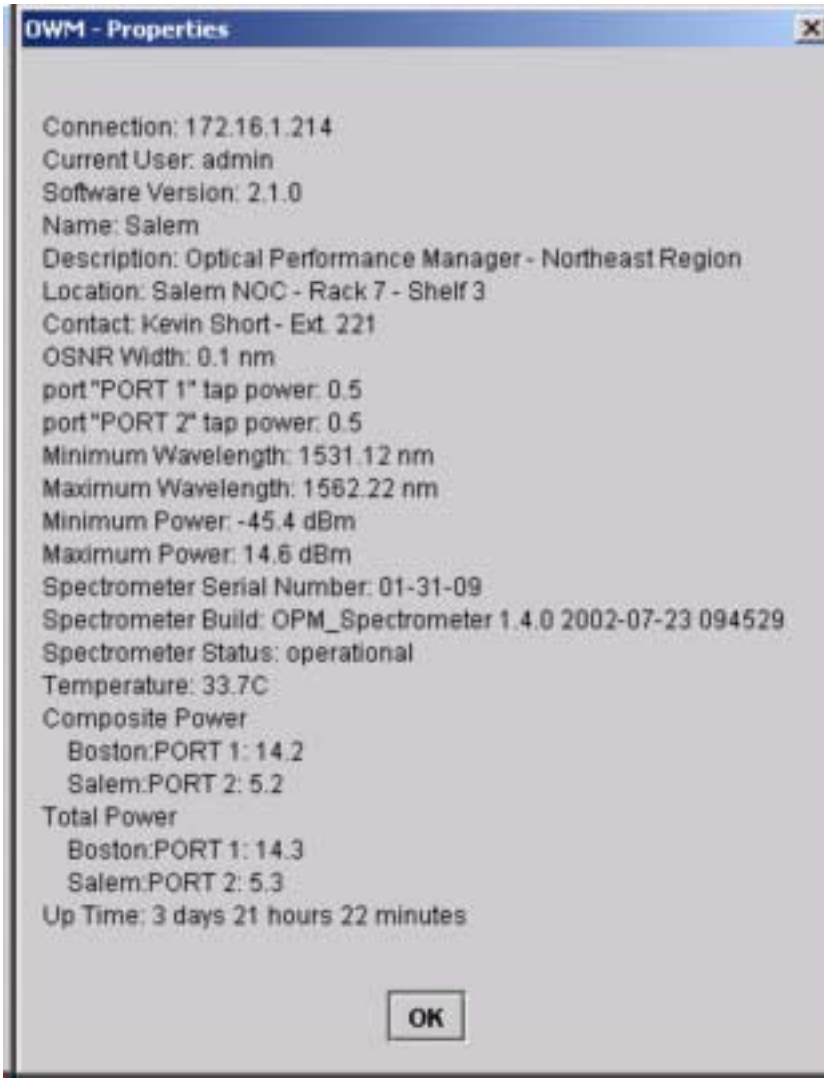


FIGURE -24. Sample OWM Properties Dialog Box

Users

The Users command displays an informational (read-only) dialog box containing a list of all users actively connected to the OWM. Each user is defined by an account name (username), type of connection (GUI, SNMP etc.) and physical connection (PC IP address and port number used by the PC to connect to the network). If the user is in configuration mode, it will be displayed in the connection column.

Perform the following instruction sequence to view active users:

- Click **File**.
- Click **Users** to display the Connected Users dialog box.

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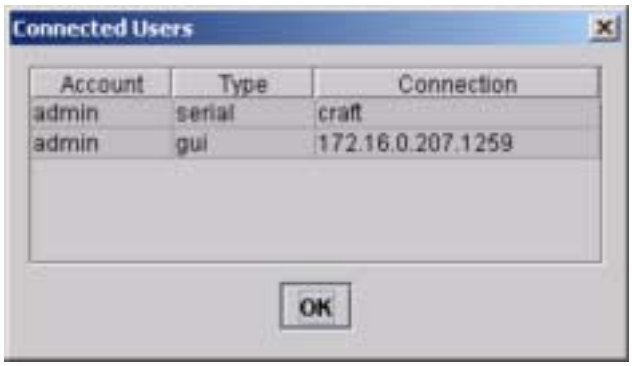


FIGURE -25. Connected Users

- Click **OK**.

Reset Password...

The Reset Password command is used to change a user's password. To change a password, do the following:

- Click **File**.
- Click **Reset Password...** to display the Account Password Change Request dialog box.



FIGURE -26. Account Password Change Request

- Enter your current password.
- Enter your new password.
- Confirm your new password by re-typing the password entered in the New Password field.
- Click **OK**.

Passwords are case sensitive.

Editing OWM Connections

The OWM IP addresses provide a quick way to connect to an OWM. These addresses are stored on the local PC. To edit the stored OWM IP addresses, do the following:

1. Click **File.**
2. Click **Edit OWM Connections** to display the Edit OWM Network Address dialog box.

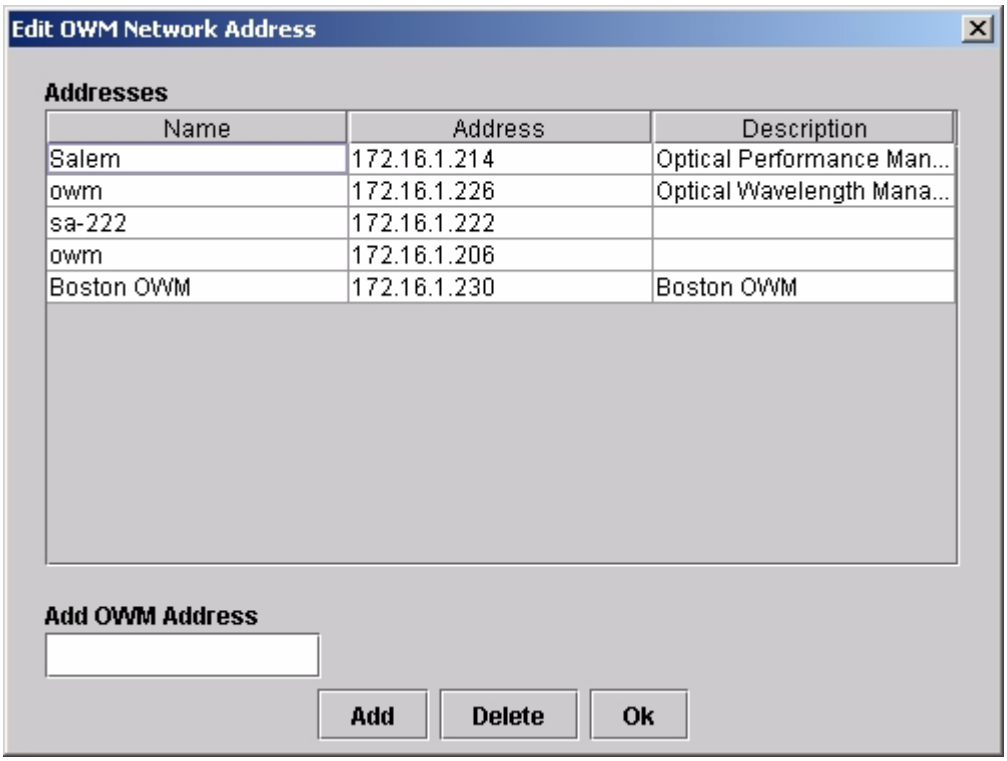


FIGURE -27. Edit OWM Network Address

3. To add a new network address, click in the **Add OWM Address** field. Type the new network address and click the **Add** button. When a connection is made to that network address, the Name and Description fields will be updated.
4. To delete an address, select the address from the table and click the Delete button.
5. Click **OK** to exit the dialog box.



*NOTE: All changes to the configuration file are saved when the **Add** or **Delete** buttons are pushed.*

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Connecting to the OWM

To connect to the OWM, do the following:

1. Click **File**.
2. Click **Connect to OWM**.
3. Enter your OWM IP address or select one from the **Address** table.

NOTE: See your System Administrator for the IP address of the OWM.

4. Enter your user name in the **User Name** field.
5. Enter your password in the **Password** field.
6. Click **OK**.

   The OWM Spectrum view (Figure -32 on page -41) is displayed.

Disconnecting from the OWM

To disconnect from the OWM, do the following:

1. Click **File**.
2. Click **Disconnect from OWM**.
3. Acknowledge the Disconnect confirmation screen by clicking **Yes**.

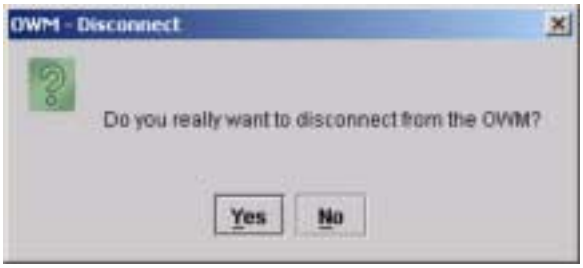


FIGURE -28. OWM - Disconnect

Exiting the OWM

To exit from the OWM, you can type **<ctrl> x** at any time except when in configuration mode or you can exit from the file menu by performing the following steps:

1. Click **File**.
2. Click **Exit**.
3. Acknowledge the OWM - Exit confirmation screen by clicking **Yes**.

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FIGURE -29. OWM - Exit

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VIEW

Zooming

The following views support Zooming:

- Spectrum View
- Peak View
- Channel View
- Table and Spectrum View
- Table and Peak View
- Table and Channel View

To zoom in, do the following:

1. Position the cursor in the graph area.
2. Click, hold and drag the left mouse button to highlight the area to zoom.
3. Release the mouse button.

When zoomed in, the UnZoom One Level and Reset Zoom icons (Figure -30) are enabled. When these views are not zoomed in, they are disabled.



FIGURE -30. Unzoom One Level/Reset Zoom Icons

Changing view resets the zoom to the normal level.

Color Displays

Different types of data are displayed in different colors (Table -12).

Table -12. Color Code

Color	View
Yellow	Spectrums and Peaks
Red	Spectrums and Peaks - Saturation
Green	Channels
Red	Channels - Critical Alarms
Yellow	Channels - Major Alarms
Blue	Channels - Minor Alarms

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Spectrum View



Spectrum view is the default view that is displayed after logging in to the OWM. Monitoring optical signals in spectrum view is possible when optical input is provided to the OWM.

The spectrum view is a point-to-point graphical representation of the raw optical signals generated by the last activated port. Each point is plotted from power measurements made at regular intervals across the OWM measurement range.

To view signals in Spectrum View:

- Click on View in the main menu bar to display the drop down box.

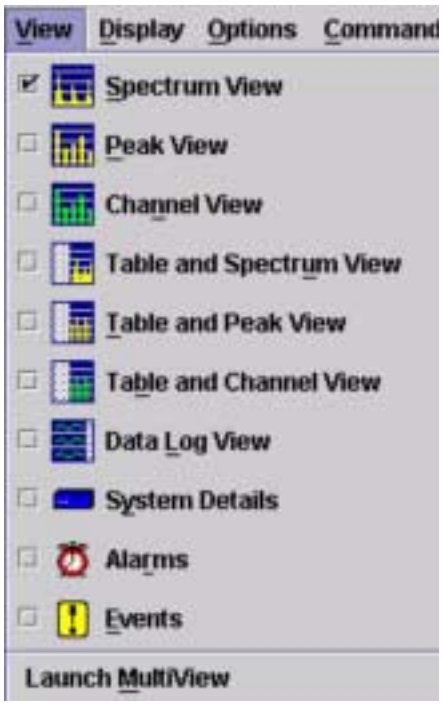


FIGURE -31. View Menu

- Click on Spectrum View.



Viewing signals in Spectrum View can also be accomplished by clicking the spectrum view icon ( *) on the toolbar.*

On the Spectrum View screen, check to see if the OWM port connected to the light source (PORT 1 to PORT n) is active in the screen title. If not, perform the following sequence of instructions to activate the port:

- Click on **Commands** in the menu bar to display a drop down box.
- Click on **Port Activate** to display a drop down box.

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- Click on the port that is connected to the OWM.

Signal activity in the Spectrum View is normally displayed in yellow. If the Spectrum View screen displays signal activity in **RED** then saturation has occurred. Saturation implies that the power coming into the OWM has exceeded the OWM's power measurement range. Adjust the optical signal power coming into the OWM so that the power in any individual channel does not exceed -10 dBm (+/- 3 dB tolerance). If a broadband optical source is used at the input, the spectral power density must be held below -1 dBm/nm (+/- 3 dB tolerance).

The Spectrum view graph (Figure -32) displays the following:

- Current device status (active/inactive)
- Port being displayed and the port status (active/inactive)

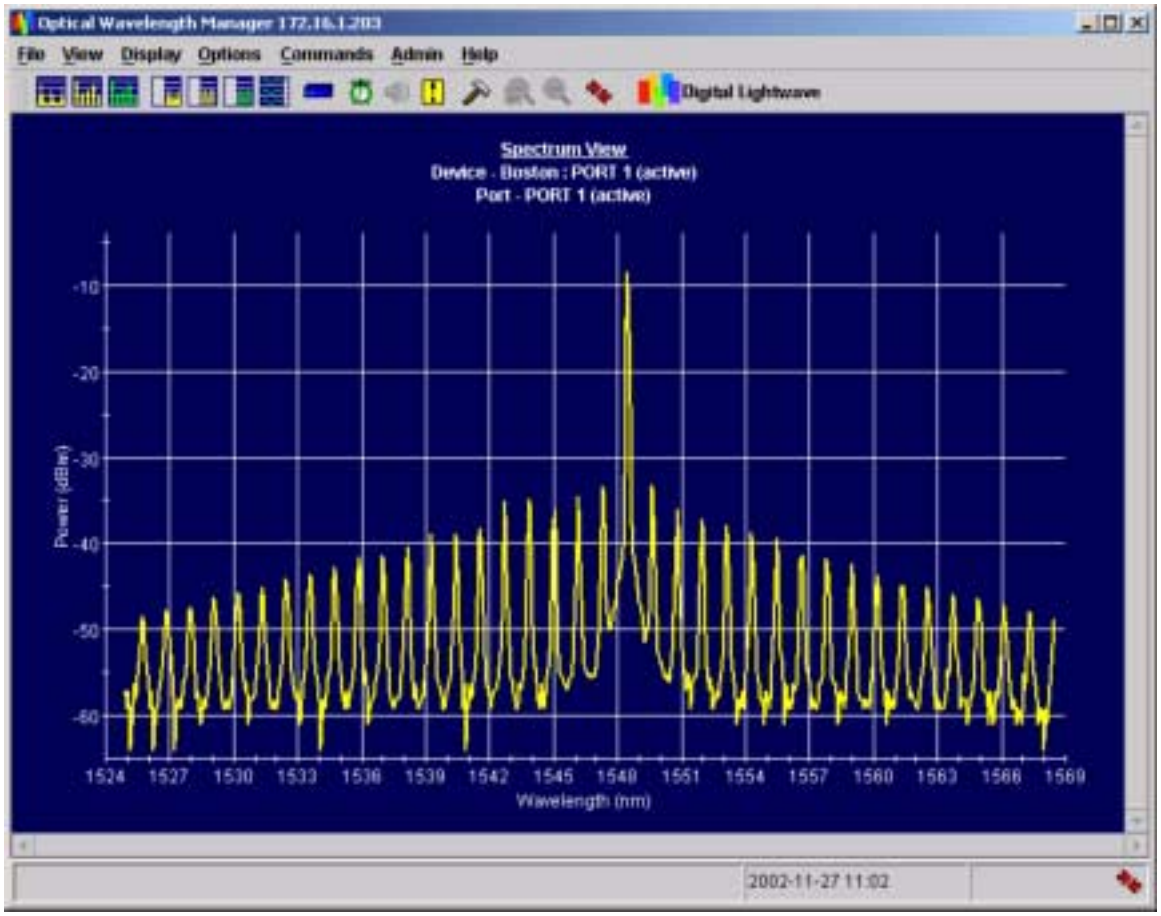


FIGURE -32. Spectrum View

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Peak View



The Peak View graph (Figure -33) displays the following:

- Current Device status (active/inactive)
- Port being displayed and the port status (active/inactive)

Normally, Peak data is displayed in yellow. When the port is saturated, however, the peak data is displayed in **RED**. Click and hold the left mouse button over a peak to display the peak number, power, wavelength and OSNR values for that peak in the Status bar. Clicking and releasing the left mouse button over a peak will display the values in the Status bar for up to 3 seconds.

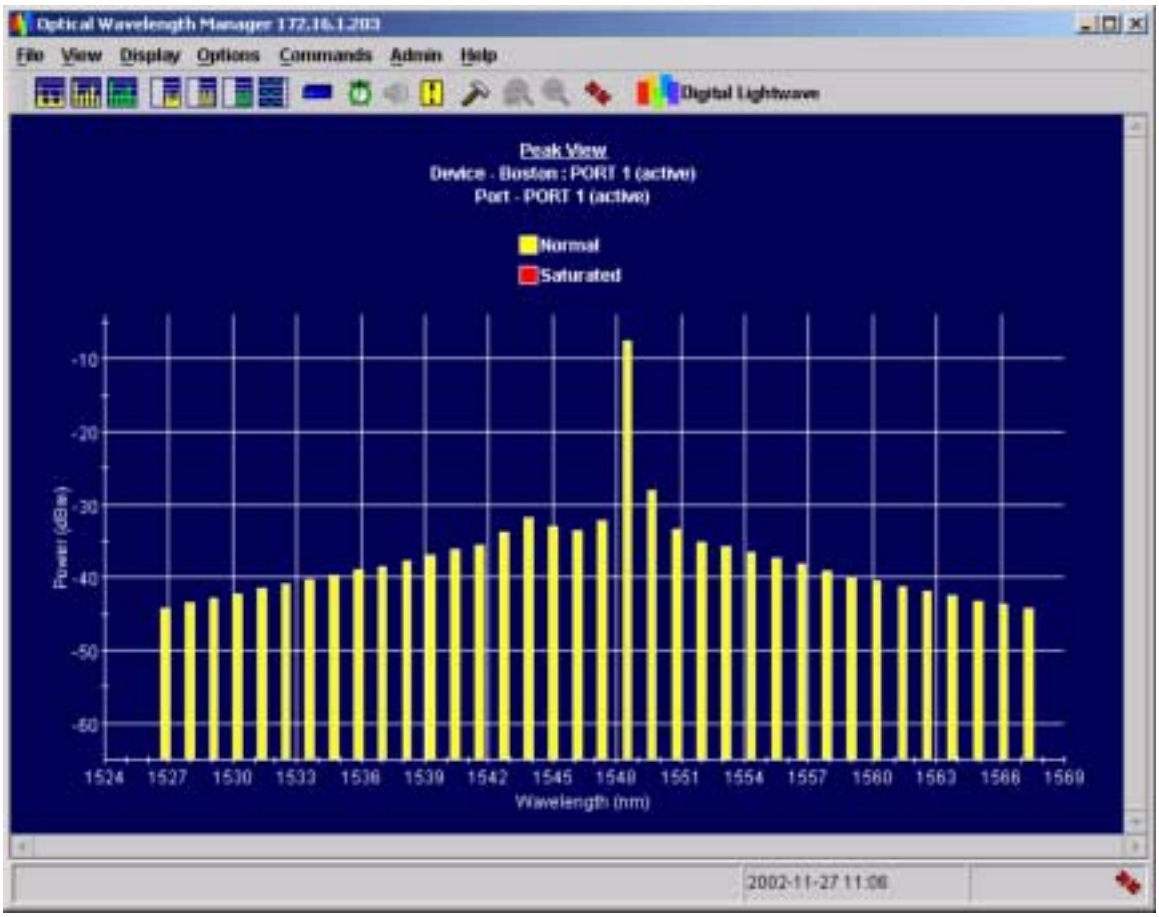


FIGURE -33. Peak View with legend

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Channel View



The Channel View graph (Figure -34) displays the following:

- The current device name and status (active/inactive)
- Port being displayed and the port status (active/inactive)
- Current data for the device (If the device is not active, the last known data is displayed)

Channel data is normally displayed in green. If the channel is in an alarm state, then that channel is displayed in the color of the most severe alarm. Critical alarms are displayed in red, major alarms are displayed in yellow and minor alarms are displayed in blue.

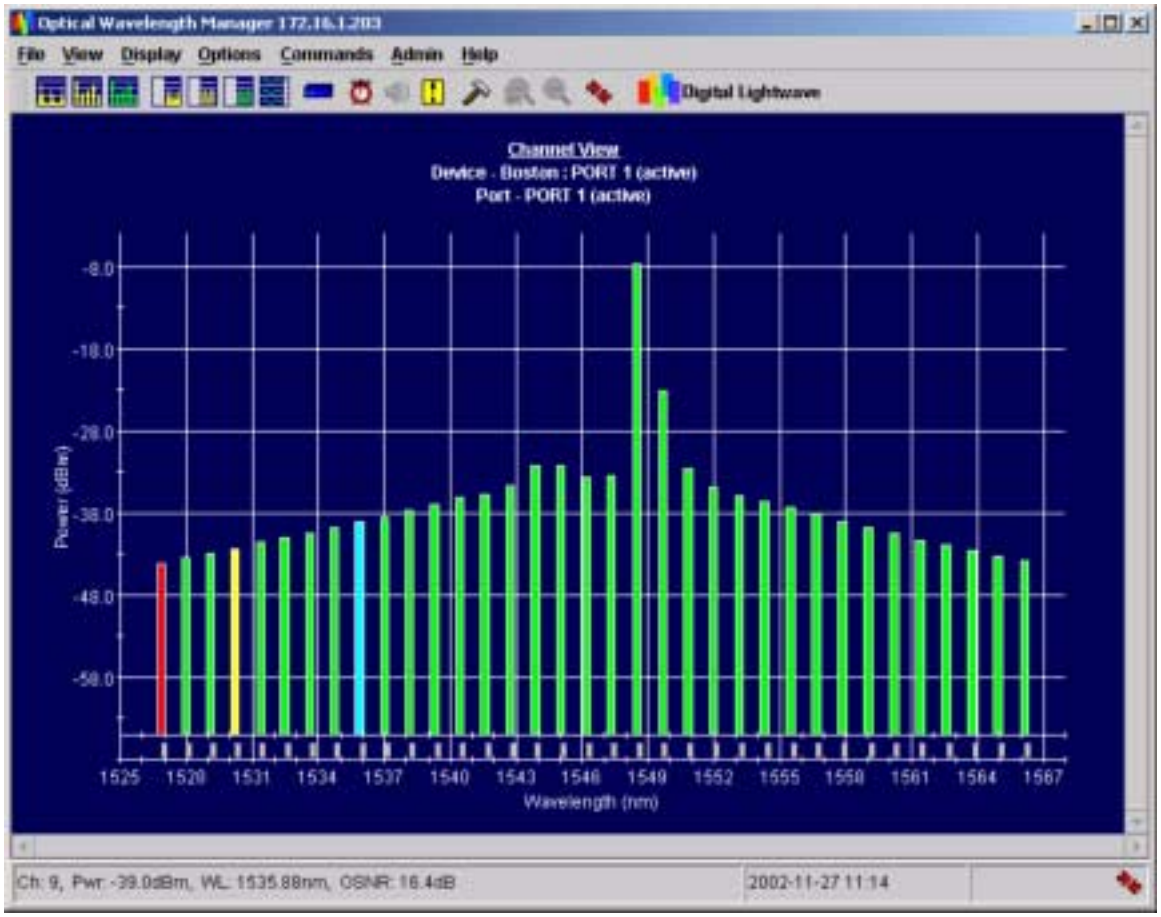


FIGURE -34. Channel View

Click and hold the left mouse over a channel to display the channel number, power, wavelength and OSNR values for that channel in the Status bar (Figure -34). Clicking and releasing the left mouse button over a channel will display the values in the Status bar for up to 3 seconds.

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At the bottom of the Channel View graph (Figure -34) is a gray line that shows the defined center wavelength for the channel. Using this line and the display of the channel is an indication of how much the channel has drifted. Figure -35 reflects a zoomed in display of the defined center wavelength.

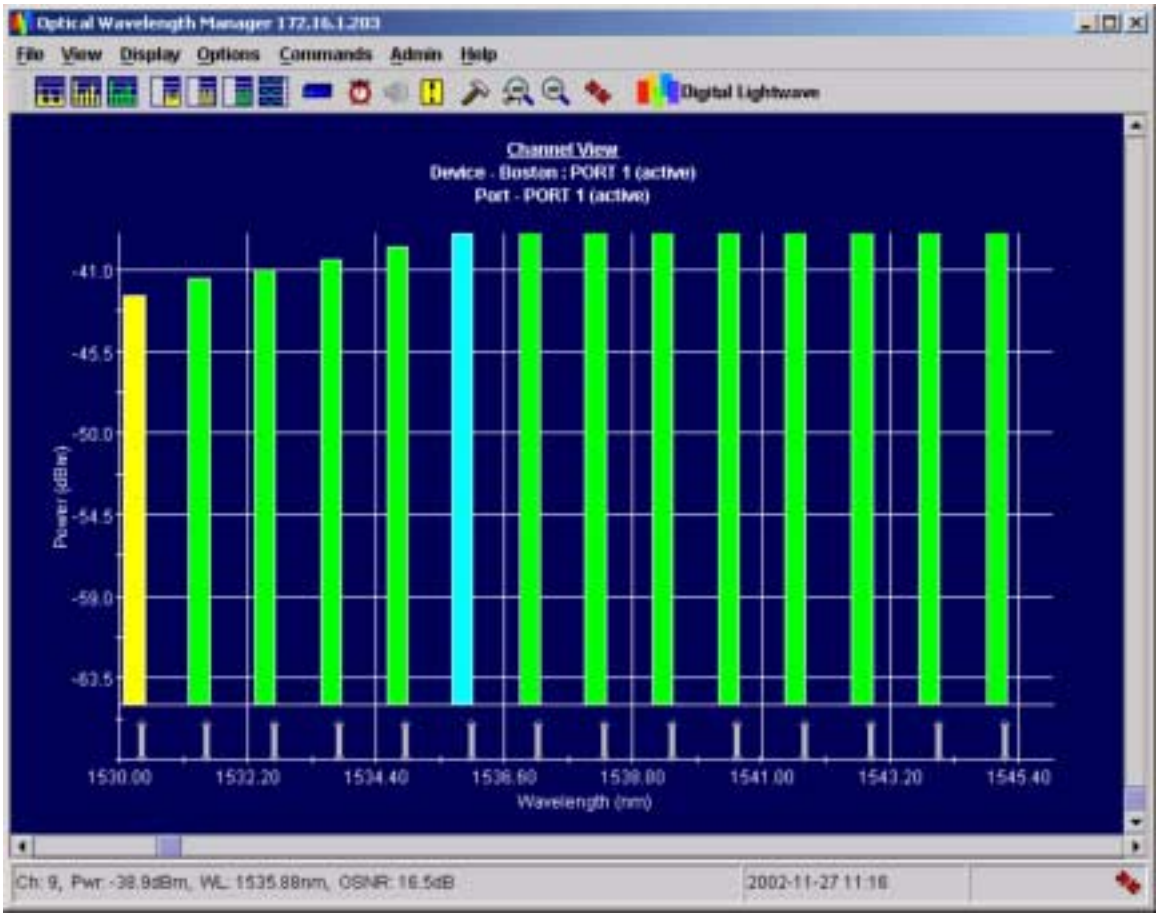


FIGURE -35. Defined Center Wavelength

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Right click over a channel to display the Detail, Alarms and Data Log menu (Figure -36).

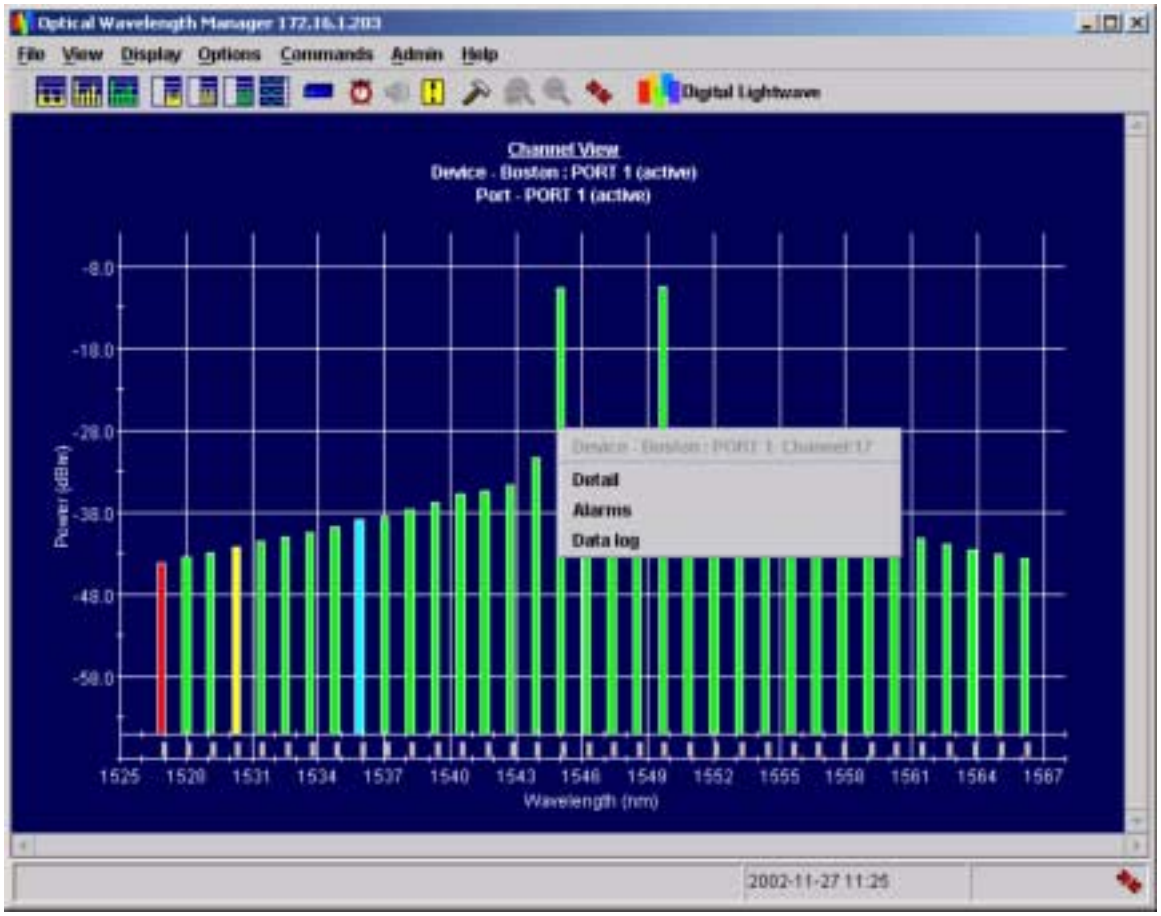


FIGURE -36. Detail, Alarms and Data Log Menu

From this menu, you can select the following:

- Channel Detail
- Channel Alarm
- Channel Data Log

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Channel Detail View

The Channel Detail view (Figure -37) displays the entire channel definition and the current values for that channel. This is a read-only screen from the Channel or Table and Channel Views. To make modifications to the Channel Detail view screen, refer to "Device Tab" on page -80.

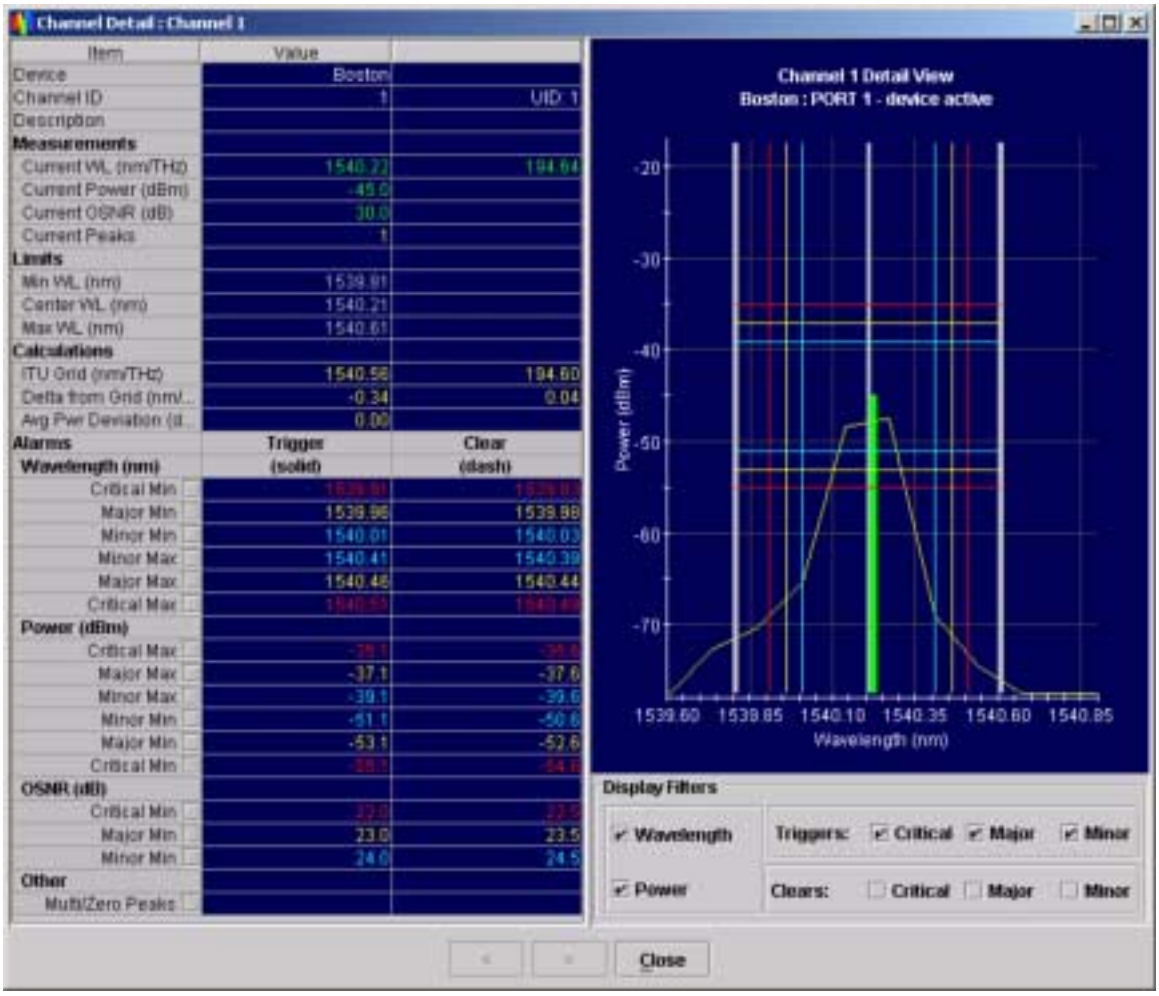


FIGURE -37. Channel Detail View

Measurements

The Measurements section of the Channel Detail view lists the values for current:

- Wavelength (nm) and frequency (THz)
- Power (dBm)
- OSNR (dB)
- Number of Peaks

Limits

The Limits section of the Channel Detail view lists the following:

- Defined Minimum wavelength (nm)

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- Defined Center wavelength (nm)
- Defined Maximum wavelength (nm)

Calculations

The Calculations section of the Channel Detail lists the following:

- **ITU Grid (nm/THz)** - the closest ITU grid wavelength for the defined channel. Value is displayed in both nm and THz.
- **Delta from ITU Grid (nm/THz)** - the Delta from ITU Grid (GHz) is the closest value within the defined ITU grid that matches the center wavelength of the channel. Value is displayed in both nm and THz.
- **Average Power Deviation (dBm)** - the Average Power Deviation is the difference between the power level of a specific channel and the logarithmic average power level of all of the defined channels for a logical device. The average power deviation is always displayed in the Channel Detail window whether or not the Channel Average Power Level (page -77) is actively being displayed. If the power value of the specific channel is less than the average power level of all of the defined channels, the average power may be negative. If it is greater than the average power level of the other channels, it may be positive.

Alarms

The Alarms section of the Channel Detail lists the Critical, Major, Minor and Multi/Zero alarm definitions for the following:

- Wavelength (nm)
- Power (dBm)
- OSNR (dB)
- Other

Buttons

The buttons shown below (Figure -38, Figure -39 and Figure -40) are located at the bottom of the Channel Detail dialog.



FIGURE -38. Next Button

Click this button to display the next channel.



FIGURE -39. Previous Button

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Click this button to display the previous channel.



FIGURE -40. Close Button

Click **Close** to close the dialog box.

Channel Alarms Dialog

The Channel Alarms dialog (Channel Alarms Dialog Box, Figure -41) displays all of the current outstanding alarms on the channel. The Event Log portion of the dialog displays both outstanding alarms and cleared alarms.

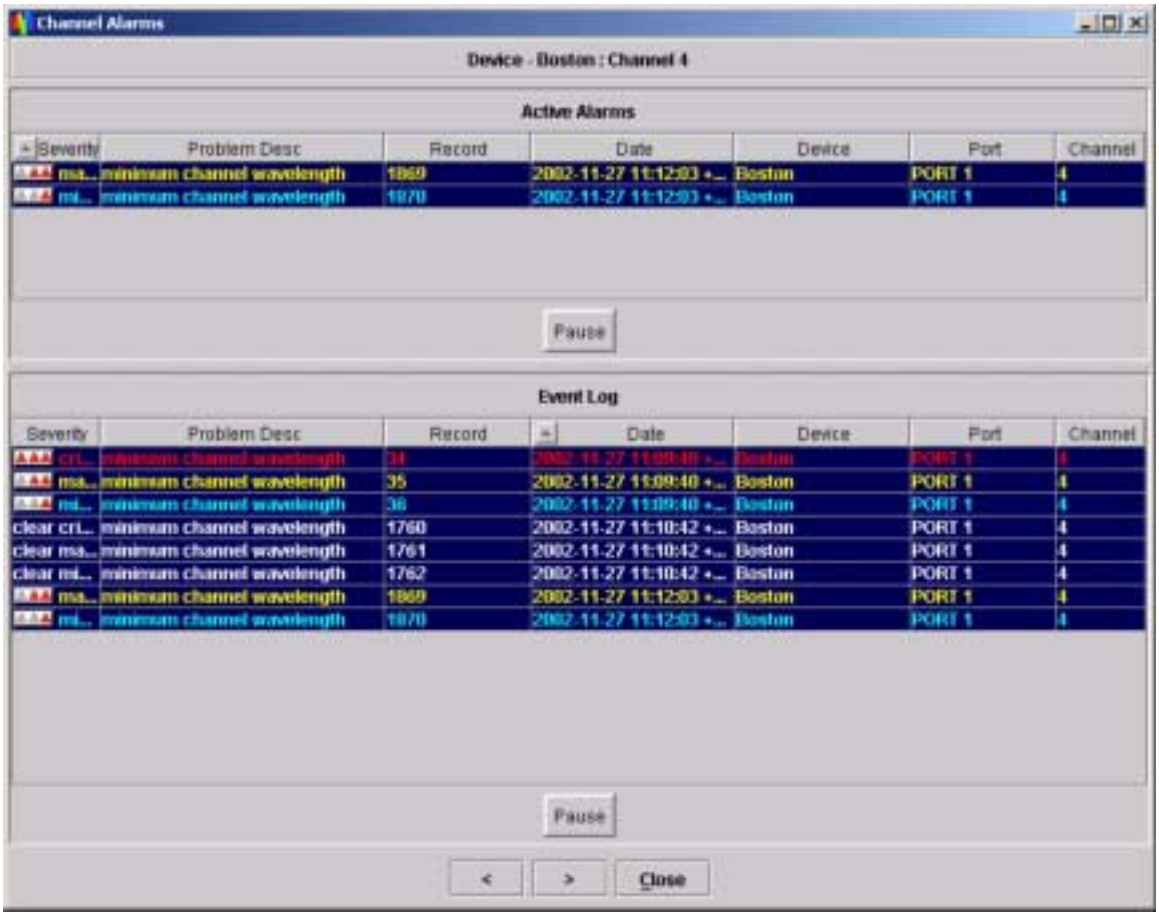


FIGURE -41. Channel Alarms Dialog Box

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Buttons

The Pause button (Figure -42) is located in the Active Alarms and the Event Log portions of the Channel Alarms dialog box.



FIGURE -42. Pause Button

Click these buttons to stop updating the alarms and the events.

These buttons are useful when many alarms are being generated for that channel.

The Next button (Figure -38) and the Previous button (Figure -39) are displayed at the bottom of the Channel Alarms dialog box and are used to navigate between channels within a device.

If the channel is at the end of the list, these buttons display the first/last channel.

Tables

The Active Alarms and Event Log portions of the Channel Alarms dialog box (Figure -41), display the following information:

- Severity
- Problem Desc
- Record
- Date
- Device
- Port
- Channel

Click on these column headings to sort the tables based on this column. If a table has been sorted, an Up and Down arrow is displayed in the column heading which indicates the direction of the sort.

Channel Data Log Dialog

For complete information on the Channel Data Log dialog, refer to "Data Log View" on page -52.

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Table and Spectrum View



The Table and Spectrum View (Figure -43) displays a table of tabulated values for each detected peak as well as a graphical representation of port activity. The table of tabulated values displays power, wavelength and OSNR values for each peak found. If OSNR cannot be calculated, the field is left blank.

A graphical representation of port activity is displayed in the Spectrum View portion of the screen. If you left click in the graph, the closest peak to the clicked spot is highlighted in the table. If the selected area is outside of the peak range, no items are highlighted in the table. For more information about this view, refer to "Spectrum View" on page -40.

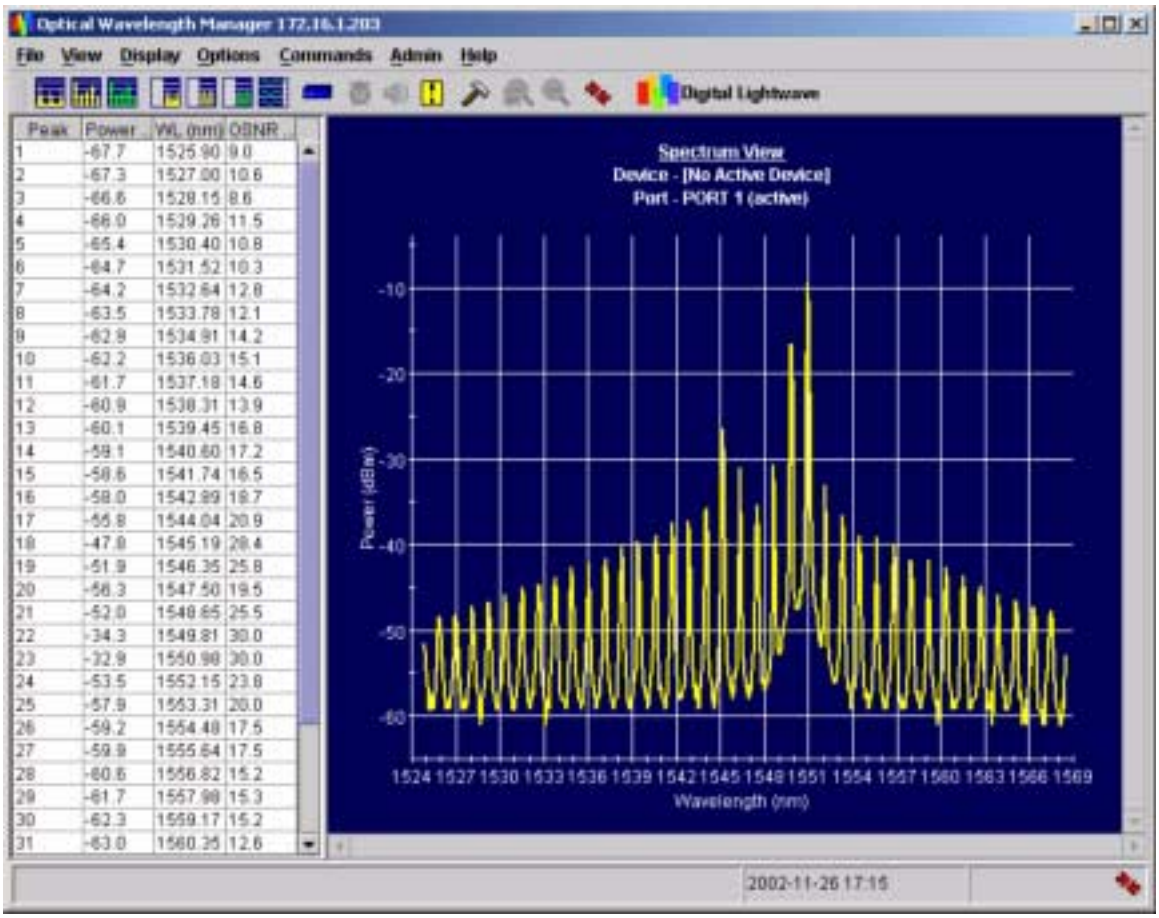


FIGURE -43. Table and Spectrum View

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Table and Peak View



The Table and Peak View (Figure -44) displays a table of tabulated values for each detected peak as well as a bar graphical representation of port activity. The table of tabulated values displays power, wavelength and OSNR values for each peak found. If OSNR cannot be calculated, the field is left blank.

A graphical representation of port activity is displayed in the Peak View portion of the screen. If you left click in the graph, the closest peak to the clicked spot is highlighted in the table. For more information about this view, refer to "Peak View" on page -42.

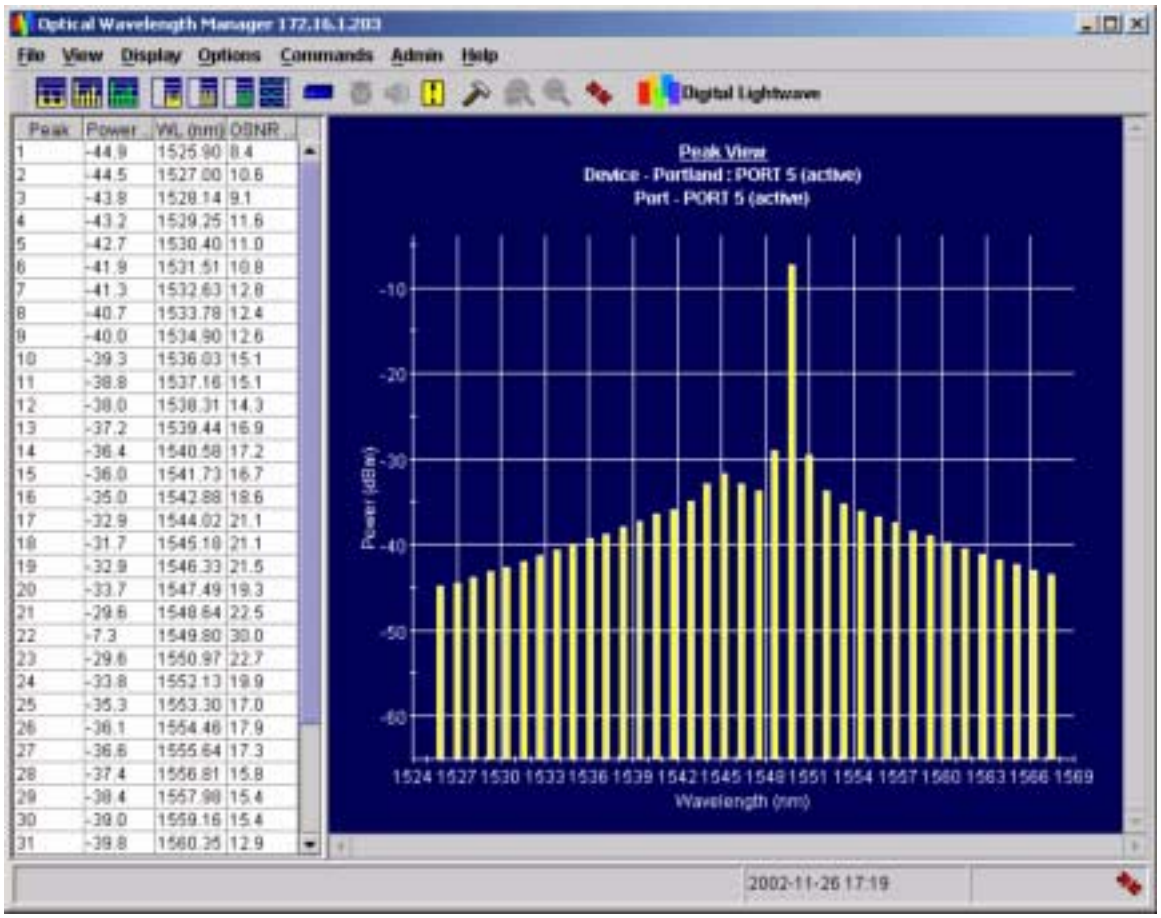


FIGURE -44. Table and Peak View

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Table and Channel View



The Table and Channel View (Figure -45) displays a table of tabulated values for each detected peak as well as a bar graphical representation of device activity. The table of tabulated values displays power, wavelength and OSNR values for each channel. If OSNR cannot be calculated, the field is left blank.

A graphical representation of device activity is displayed in the Channel View portion of the screen. If you left click in the graph on a channel, the channel bar selected is highlighted in the table. Right clicking on a channel in the graph or table invokes a context menu that provides Detail, Alarms and Data Log information for the specific channel. For more information about this view, refer to "Channel View" on page -43 and Figure -36 on page -45.

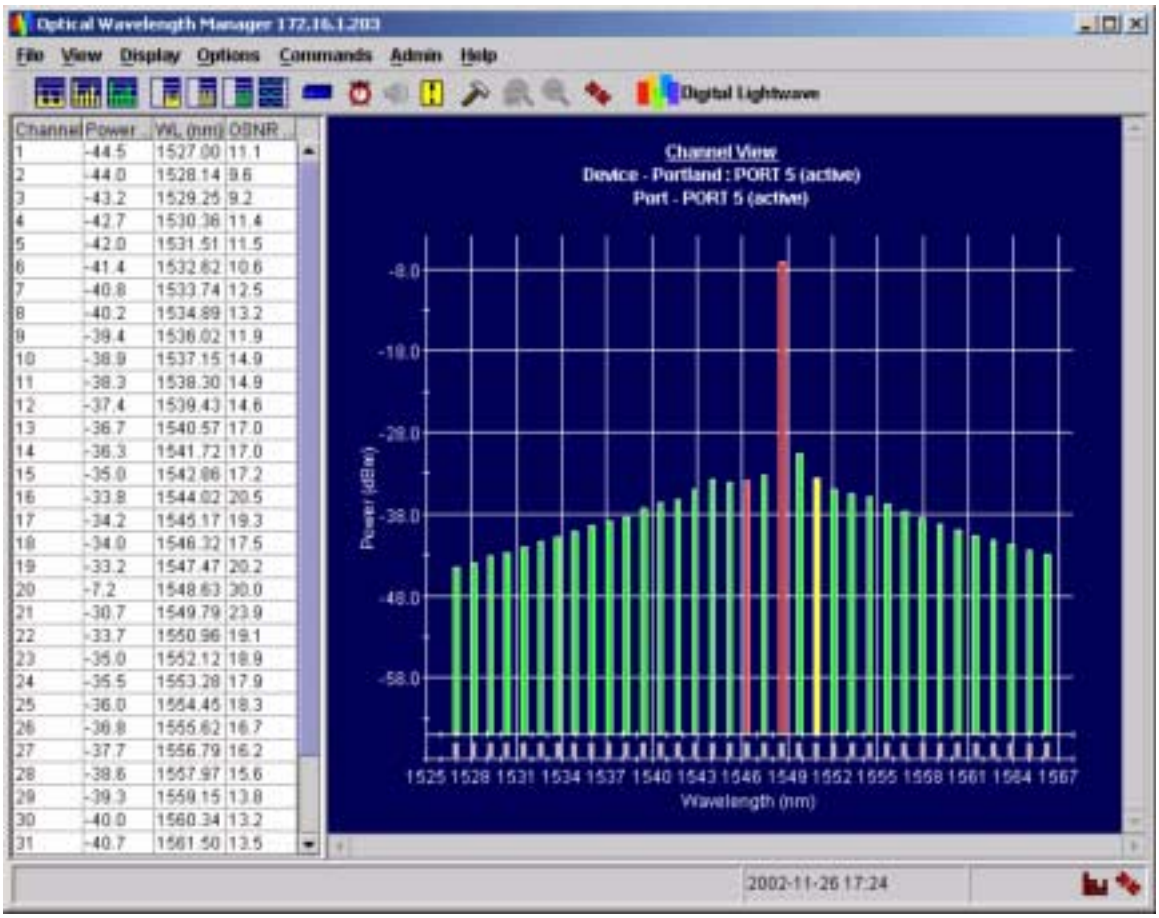


FIGURE -45. Table and Channel View

Data Log View

The Data Log view screen (Figure -46) provides a chronological device history of power, wavelength and OSNR values. Separate graphs are represented that plot power, wavelength and OSNR measurements for a specific device channel over time. The data log view also displays histogram

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and statistics graphs. Each histogram displays a frequency distribution for power, wavelength or OSNR. Each statistics chart displays the mean and standard deviation (STD) that characterizes the sample from which it was derived.

Left click and hold the mouse button on any of the visible points on the graph to display the specific data value (power, wavelength or OSNR) and corresponding date and time tag in the Channel View status bar. The date and time tag reflect when the sample was taken. Note that the active screen, the Channel Time Series screen, may need to be moved or dragged out of the way to view the status bar on the Channel View screen.

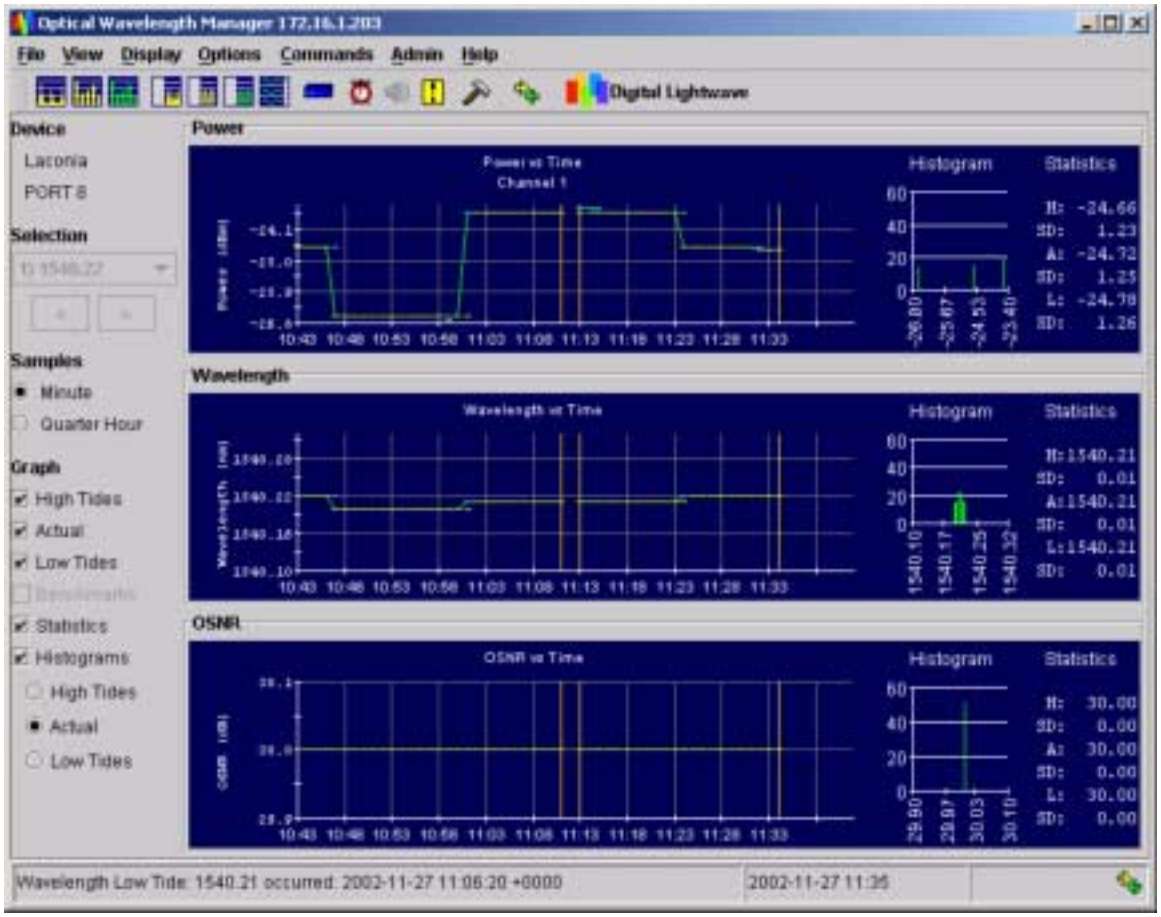


FIGURE -46. Channel Data Log Dialog

Selection

Clicking the drop down box under the Selections heading allows the user to select the channel for which the power, wavelength and OSNR values will be displayed. For convenience, left and right scroll buttons make stepping through the channels easy.

Samples

Device channel values can be displayed using one minute samples or quarter hour (15 minute) samples. Click on the desired radio button to display channel values at the desired sampling frequency.

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Graph

Graph checkboxes control the ability to view pre-recorded channel values, histograms and statistics graphs.

- » Hide Tides - enables/disables the display of high tidemarks.
- » Actual - enables/disables the display of channel value measurements as they were detected by the spectrometer.
- » Low Tides - enables/disables the display of low tidemarks.
- » Benchmarks - enables/disables the display of benchmarks. When enabled, the benchmark creation date and time will be displayed.
- » Histogram - enables/disables the display of the histogram graph. A Histogram is a bar graph of a frequency distribution in which the heights of the bars are proportional to the class frequencies. When histogram is enabled, radio buttons control whether a histogram of high/low tidemarks or actual channel values is plotted.
- » Statistics - enables/disables the display of the statistics graph. Statistics are numerical values, such as mean and standard deviation (STD), that characterizes the sample or population from which it was derived.

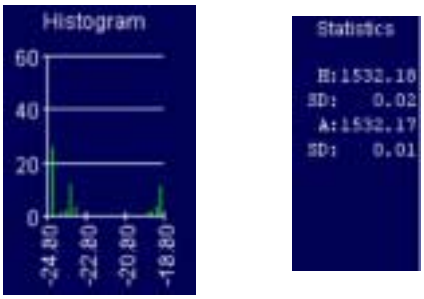


FIGURE -47. Histogram and Statistics Graphs

System Details



The System Details menu provides system status information, general OWM administration, SNMP configuration, IP and routing configuration, date and time configuration and software configuration. Each of these information categories is represented by the Status, General, SNMP, IP/Route, Date/Time and Software tabs respectively.

Status Tab

When selecting System Details, the OWM automatically defaults to displaying the information contained in the Status tab. The Status tab (Figure -48) is a read-only view that displays LED, relay, and current alarm information.

The LED status table displays the on/off status of the FAIL, ACTIVE and ALARM LEDs located on the front panel of the OWM.

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The Relay Status table displays the on/off status of the relays for Critical, Major, Minor and Information alarms.

The Current Alarms table displays the number of occurrences of alarms, equipment faults and events since the last acknowledgement.

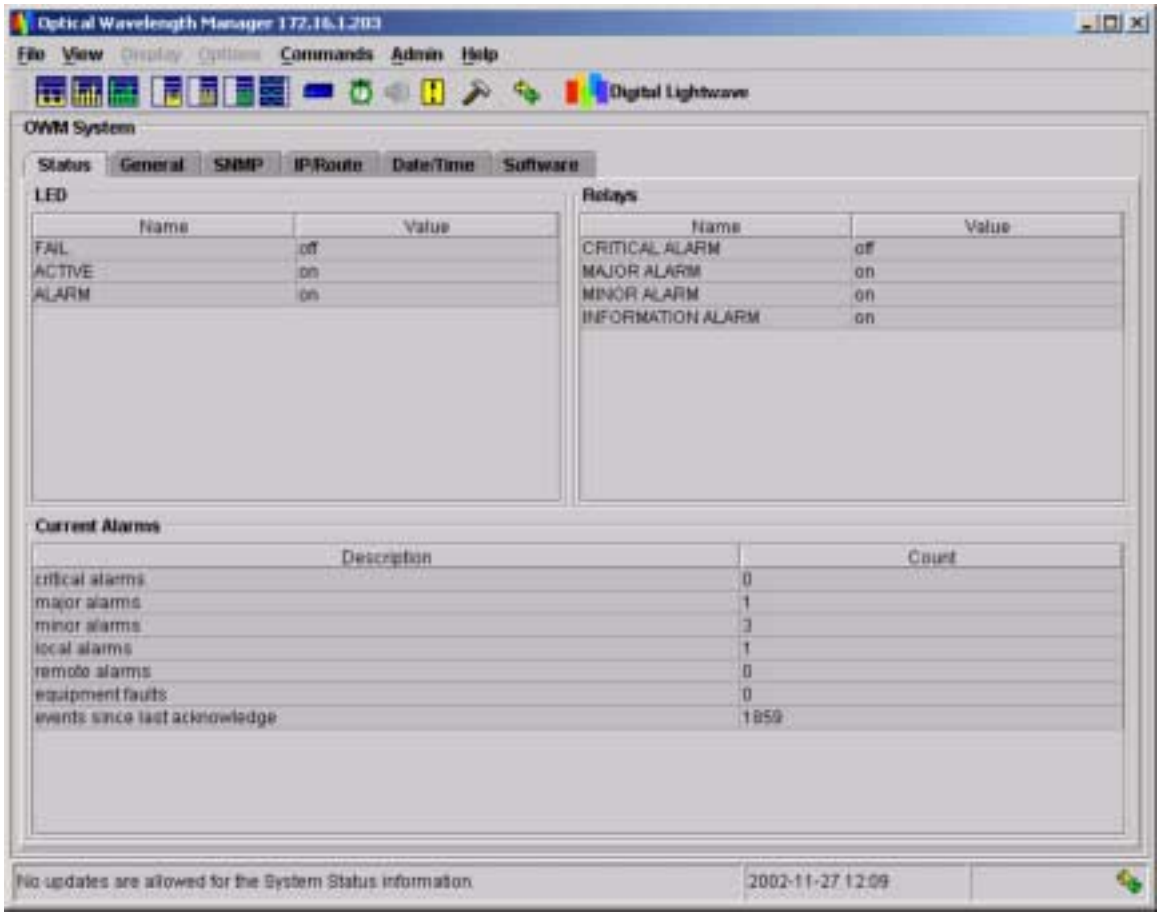


FIGURE -48. Status Tab

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General Tab

Selecting the General Tab (Figure -49) from the System Details menu, displays a list of user definable settings and a list of user Accounts.

The list of settings allow the Name, Description, Location, Contact and Global Alarm Broadcast information for the OWM to be modified, provided the user has the appropriate security level to modify the configuration. For more information on security level privileges, refer to "System Requirements" on page -2. Each of these settings can be modified by selecting the field, entering a new value and clicking on **UPDATE**. Notice that the **UPDATE** button is not enabled until a new value is entered into the field. The **CANCEL** button cancels the action and reverts to the original field value.

The User Account table is only viewable and modifiable by the Administrator and lists the usernames and their security level that can log on to the OWM. Up to 10 user accounts including 1 Administrator account can be defined. The Administrator can add new users by clicking on **NEW** and entering the new user's username. A security level can be assigned by clicking in the security level field and clicking again to reveal a drop down box. Selecting one of the security levels from the drop down box and clicking the **UPDATE** button causes the Enter Password menu to be displayed. Typing a password and password confirmation and clicking the **OK** button completes the addition of a new user account.

Deleting a user account is accomplished by highlighting the desired account and clicking the **DELETE** button. A Delete Account Verification menu appears. Clicking **YES** deletes the account permanently while **NO** cancels the transaction.

Changing the password of a user is achieved by selecting the user account and clicking **PASSWORD**. The new password and password confirmation can be entered from the account password change request menu.

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The Disk Log Control settings enable/disable the Disk Log. The Disk Log captures the 1 minute Data Log values and places those values on to a PCMCIA disk. To enable the Disk Log, click on the **Enable** radio button. Once enabled, you must select which PCMCIA slot to use. Select either ATA1 (Slot 1) or ATA2 (Slot 2). Click **Update** to accept the changes.

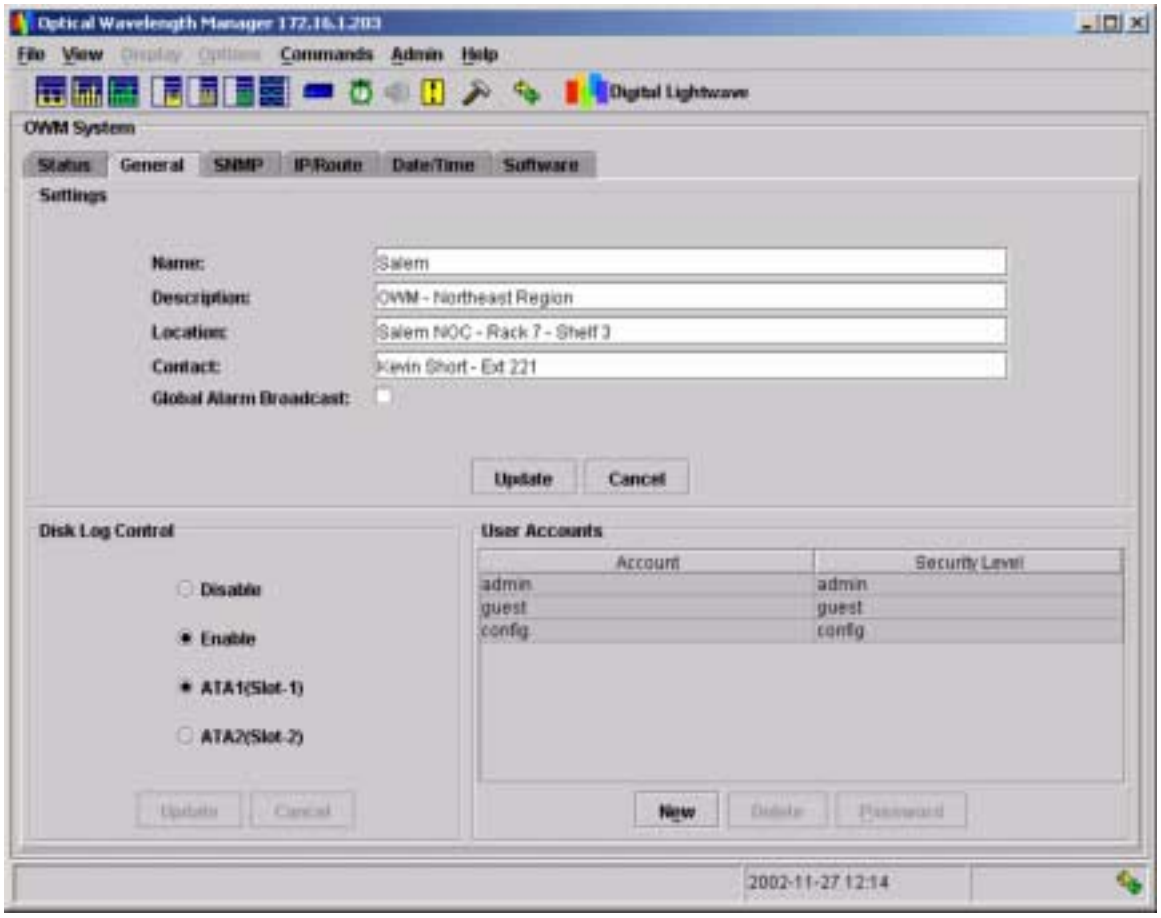


FIGURE -49. General Tab

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SNMP Tab

The SNMP (Simple Network Management Protocol) tab (Figure -50) is the place where OWM information pertaining to SNMP and SNMP traps can be configured. There are three areas of SNMP configuration that are defined from the GUI:

- SNMP settings
- community string entries
- trap destinations

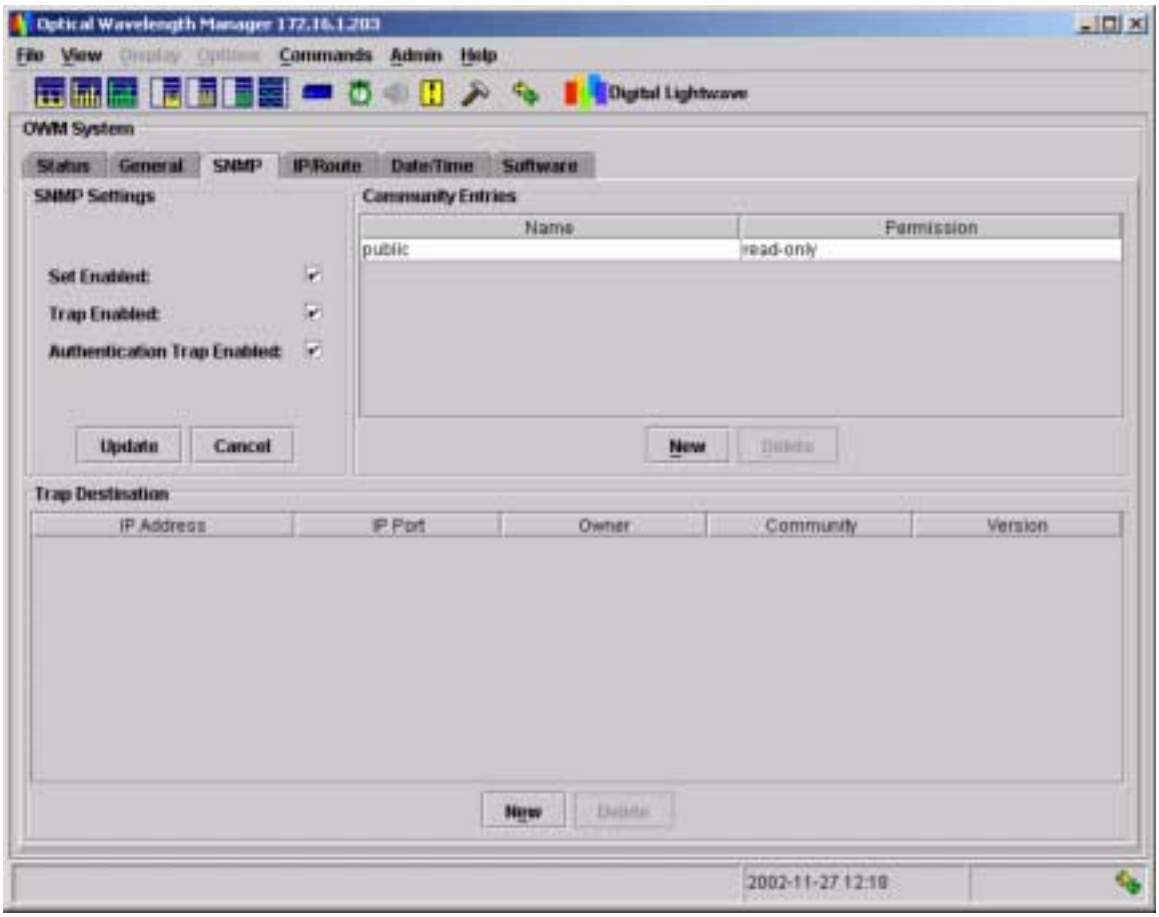


FIGURE -50. SNMP Tab

SNMP Settings

The SNMP settings portion of the SNMP tab screen is used for enabling/disabling SNMP and SNMP trap capabilities within the OWM. Specifically, the SNMP settings include Set Enabled, Trap Enabled and Authentication Trap Enabled. Each setting is enabled/disabled by toggling the corresponding check box. When a check mark appears in the check box, the setting is enabled.

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- **Set Enabled** - enable/disable the ability to modify the OWM through SNMP. When enabled, this setting allows write access to read-write MIB (Management Information Base) objects implemented in the SNMP agent within the OWM.
- **Trap Enabled** - enable/disable the ability of the OWM to send SNMP traps. When the trap enabled setting is on, system events are converted to traps and sent out as notifications to the trap destinations that are defined within the Trap Destination portion of the SNMP tab screen. Consequently, each trap destination is notified when a system event occurs.
- **Authentication Trap Enabled** - enable/disable the ability of the OWM to send SNMP authentication traps. When enabled, this setting will send notifications of unauthorized SNMP access attempts from the OWM's SNMP agent using an unknown community string. This switch is useful to detect illicit entry into OWM's SNMP MIB.

Community String Entries

Access to the SNMP agent within the OWM is controlled by read-only and read-write SNMP community strings. Community strings control whether an SNMP user can read or write MIB object information within the OWM's SNMP agent.

- **Name** - The name defines the SNMP community string. The community string (name) can be thought of as a password that allows a user to access the SNMP agent and MIB information.
- **Permission** - The permission defines the type of access, read-only or read-write, to the SNMP agent's MIB information.
  - Read-only community string entries enables an SNMP user to view MIB information implemented in the OWM. The OWM ships with a default community string entry with a read-only community string of "public".
  - Read-write community string entries enables an SNMP user to read information from a device and to modify settings on the OWM. Note that read-write access is only allowed when the set enabled switch is enabled.



All users can view read-only community string entries.
Only users with admin privileges can view read-write community string entries.

Adding a Community String Entry

1. Click **New** to add SNMP community strings with read-only or read-write permissions.
2. Type a community string.
3. Click in the Permission field to select read-only or read-write permission. (read-only is the default permission).
4. Click **Update** to complete your community string entry or **Cancel** to quit.

Deleting a Community String Entry

1. Select the community string entry name to be deleted. Multiple selections are possible using the control key.

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2. Click **Delete**.

   The Delete Community dialog box (Figure -51) is displayed:



FIGURE -51. SNMP Delete Community Dialog Box

3. Click **Yes** to delete the Community entry or **No** to cancel the action.

Trap Destination

The Trap Destination portion of the SNMP tab screen is the area where trap destinations can be defined. The OWM uses the trap destination definitions when SNMP traps or SNMP authentication traps are enabled (see "SNMP Settings"). Trap destinations are used to specify where trap or event notification should be sent. The destination is defined by IP Address, IP Port, Owner, Community String and Version.

- IP Address - the IP address of the management station receiving SNMP traps.
- IP Port - the UDP/IP port number on which the management station is listening for SNMP traps.
- Owner - a string that identifies who created the trap destination definition. Optionally, this field can also be used as a description field to describe the type of trap defined.
- Community - SNMP community string to use when issuing traps to this destination address.
- Version - the style of SNMP traps to issue to this destination address. The version can be 1 or 2, where 1 refers to SNMPv1 and 2 refers to SNMPv2c style traps.

Adding a Trap Destination

1. Click **New**.
2. Type a valid IP address in the IP Address field.
3. Type a valid IP port in the IP Port field.
4. Type the owner name with a maximum of up to 64 characters in the Owner field.
5. Type "private", "public" or a Community string of up to 127 characters in the Community field.
6. Click in the Version field to select the appropriate SNMP version.
7. Click **Update** to add the trap destination or **Cancel** to quit.

Deleting a Trap Destination

1. Select the trap destination to be deleted. Multiple selections are possible using the control key.

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2. Click **Delete**.

   The SNMP Trap Configuration dialog (Figure -52) is displayed:



FIGURE -52. SNMP Trap Configuration

IP/Route Tab

The IP/RouteTab screen (Figure -53) contains IP and route information. Everything on this screen is read-only and is exclusively for informational purposes.

The IP address is the unique address of the OWM. The IP mask is a software mask associated with the IP address on the OWM.

The route table contains information about the Destination, Net Mask and Gateway.

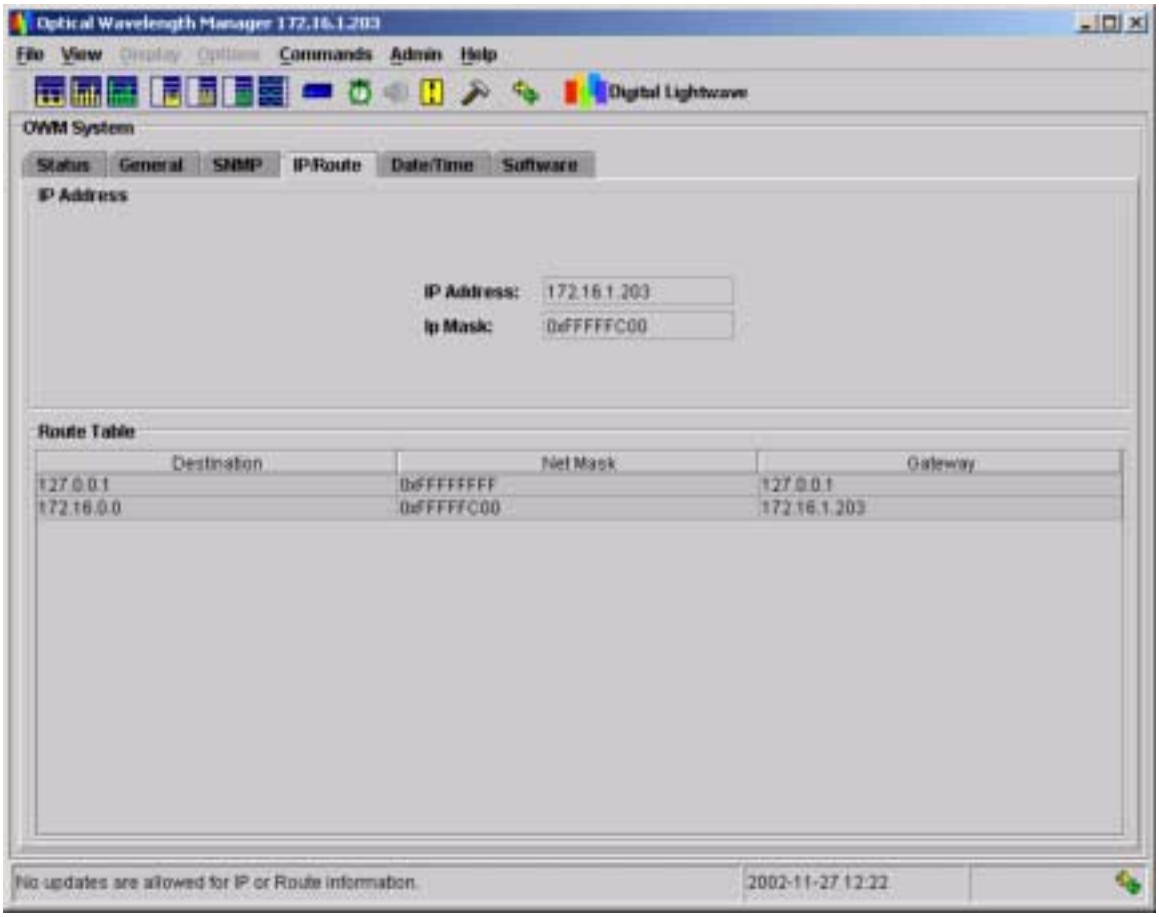


FIGURE -53. IP/Route Screen

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Date/Time Tab

The Date/Time Tab contains the settings which control the date/time and timezone. Selecting the **Reset to UTC** button results in setting the clock to Coordinated Universal Time.

Changing the date and/or time will affect the system "up time". Up time is displayed in the File Properties box and reflects the time elapsed since the OWM software was booted. Time will either be added or subtracted from the up time depending on how the date/time is changed relative to what the time was prior to the change.

It is recommended that the date and time not be set during the one hour overlap from daylight savings time to standard time in autumn and during the hour lost when switching from standard to daylight savings time in the spring.

To change the date and time settings:

1. Click the up and down arrows to change the date's day value. Users may also select an type in a value directly. Invalid entries will not be allowed.
2. Click the up and down arrows to change the time's minute values. Users may also select an type in a value directly. Invalid entries will not be allowed.
3. Click **Reset to UTC** to reset the system to Universal Time Coordinates.
4. Click **Update** to update your changes to the system.

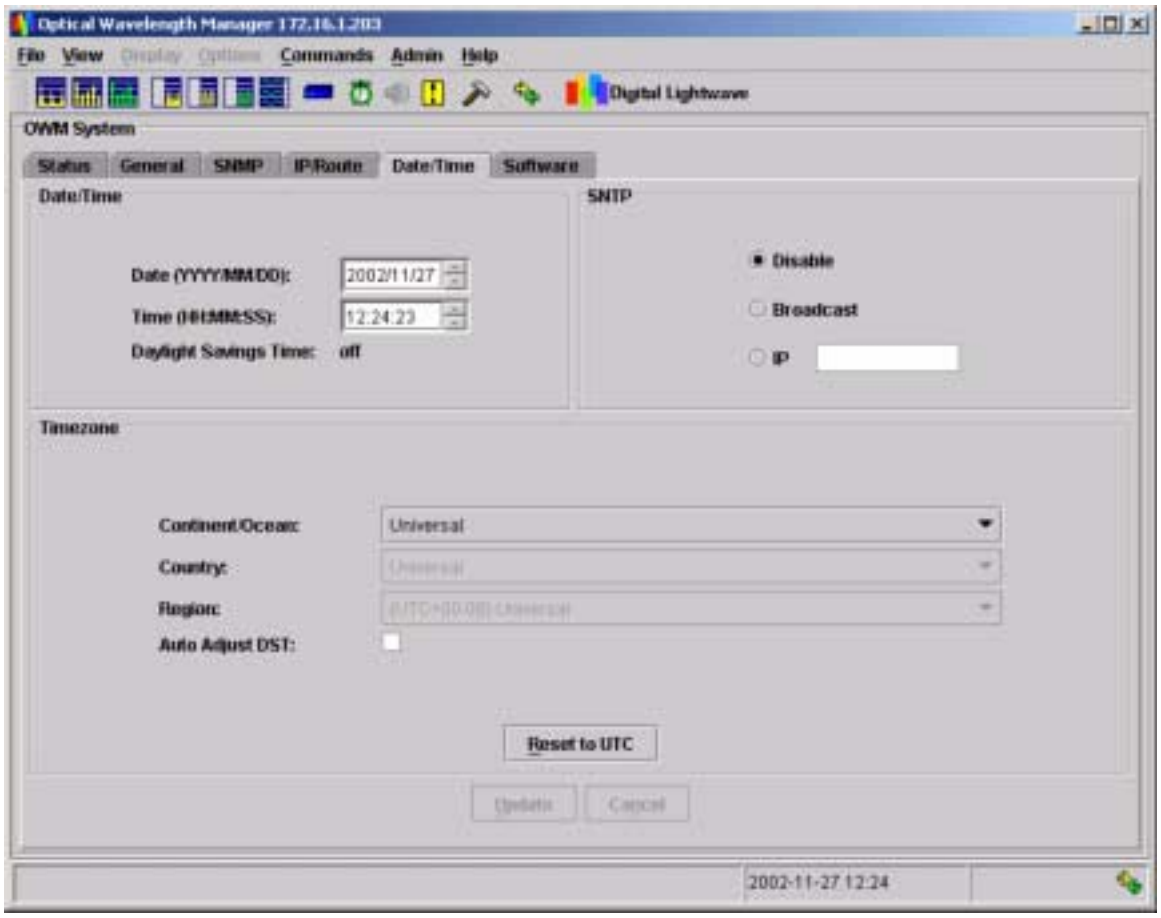


FIGURE -54. Date/Time Screen

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To change the Timezone settings:

1. Click in the Continent/Ocean field to display a drop down box and select the appropriate continent or ocean.
2. Click in the Country field to display a drop down box and select the appropriate country.
3. Click in the Region field to display a drop down box and select an appropriate region.
4. Click in the Auto Adjust DST checkbox to enable/disable the automatic adjustment for Daylight Savings Time.
5. Click **Reset to UTC** to reset the system to Universal Time Coordinates.
6. Click **Update** to update your changes to the system.

SNTP settings:

The Simple Network Time Protocol (SNTP) sub-screen allows the user to select the source for obtaining clock synchronization. There are several ways to obtain clock synchronization.

1. Broadcast - in broadcast mode, the OWM clock is maintained by receiving periodic time updates broadcast from a time server.
2. IP - by suppling the IP address of a time server, the OWM periodically polls the time server for the current time.

Click on the radio button that reflects the desired clock source. Note that Broadcast and IP mode will override a manually entered date/time in the date/time sub-screen. Click the **Disable** radio button to disable clock synchronization. With SNTP disabled, the date and time manually input from the date/time sub-screen supplies the OWM clock

Once all desired changes have been made to the SNTP, click on the **Update** button at the bottom of the screen to enforce the changes.

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Software Tab

The Software Tab is the screen that allows the selection of which version of OWM controller software to run. The default section of the settings table contains a check box for each version of controller software available. Slot 0 always contains the factory installed software version. Slots 1 and 2 are available slots where software can be loaded into via the CLI.

If the software version is updated by clicking the **UPDATE** button, the OWM must be rebooted from the controller (not via the GUI).

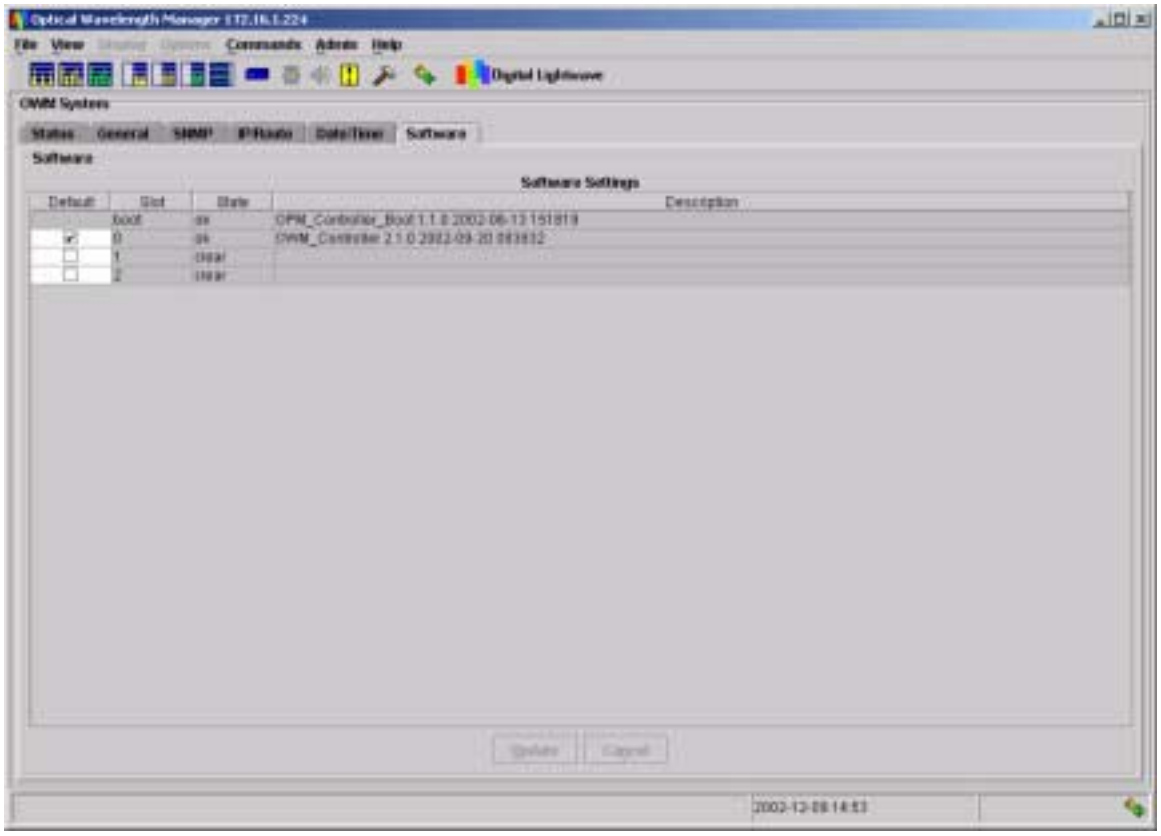


FIGURE -55. Software Screen

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Alarms



The Alarm View (Figure -56) displays all of the current alarms (Table -13).

- Severity
- Problem Desc
- Record
- Date
- Device
- Port
- Channel

If you double click on the severity description, the record ID or the time stamp, a detailed description of the alarm is displayed.

If you double click on the device, port or channel number, the Channel Detail view is displayed for that device and the channel.

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The Pause button (Figure -42) stops the update of the display. If there are no Alarms currently active, the alarm icon is disabled. If the alarms are acknowledged, the alarm icon is green.

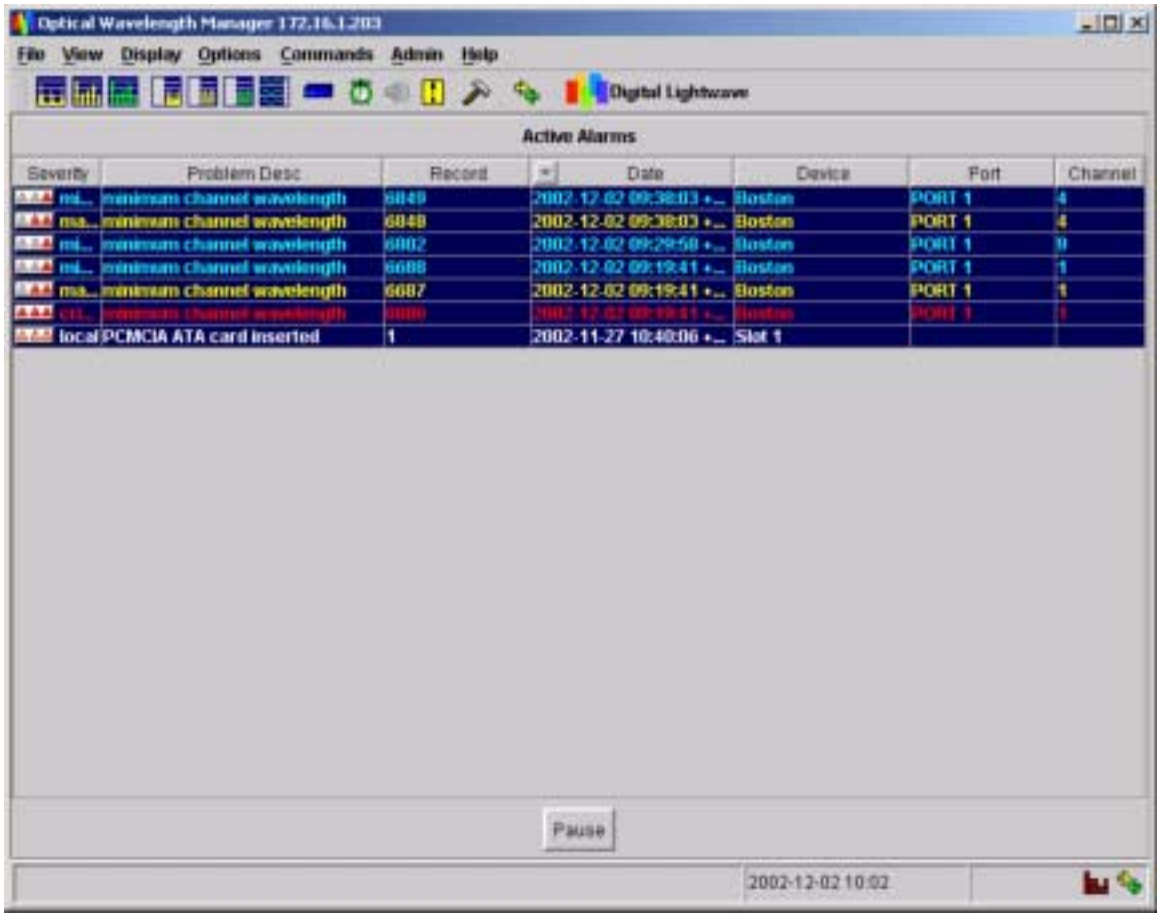


FIGURE -56. Alarm View

Table -13. Active Alarm Fields

Field	Description
Severity	Indicates the severity of the alarm, critical, major, minor or local.
Problem Desc	Describes the alarm problem.
Record	Displays the Record ID of the alarm.
Date	Displays the time stamp of the alarm.
Device	Displays the device where the alarm has occurred.
Port	Displays the status of the port.
Channel	Displays the channel number of the alarm.

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Events

The Event View (Figure -57) performs like the Alarms View except the Event View displays all events on the system. Additional events that are displayed include the following:

- Alarm Clears
- Alarm Acknowledgement
- Non-standing Alarms

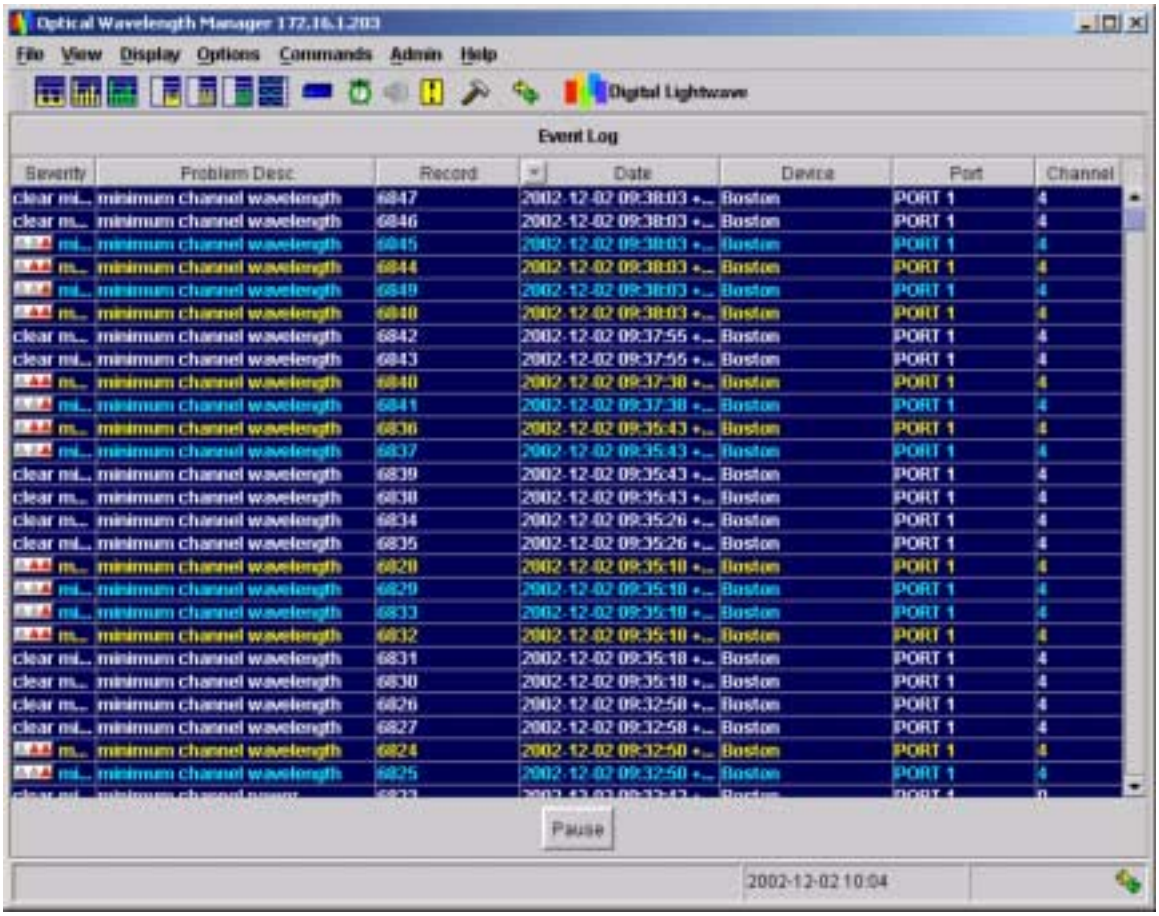


FIGURE -57. Event View

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Launch MultiView

Launch MultiView

The Multiple Window view graph (Figure -58) displays the following:

- Spectrum view graphs
- Peak view graphs
- Channel View graphs

When you select the Launch MultiView option from the View context menu, Spectrum, Peak and Channel Views are created for each port and defined device. A maximum of 12 windows can be displayed at any given time. Only one MultiView window can be launched at one time from the application. If you open configuration or alter it via other means, this window is removed and a new view must be created. When the window is initially opened, Tile layout is the default (Figure -58).

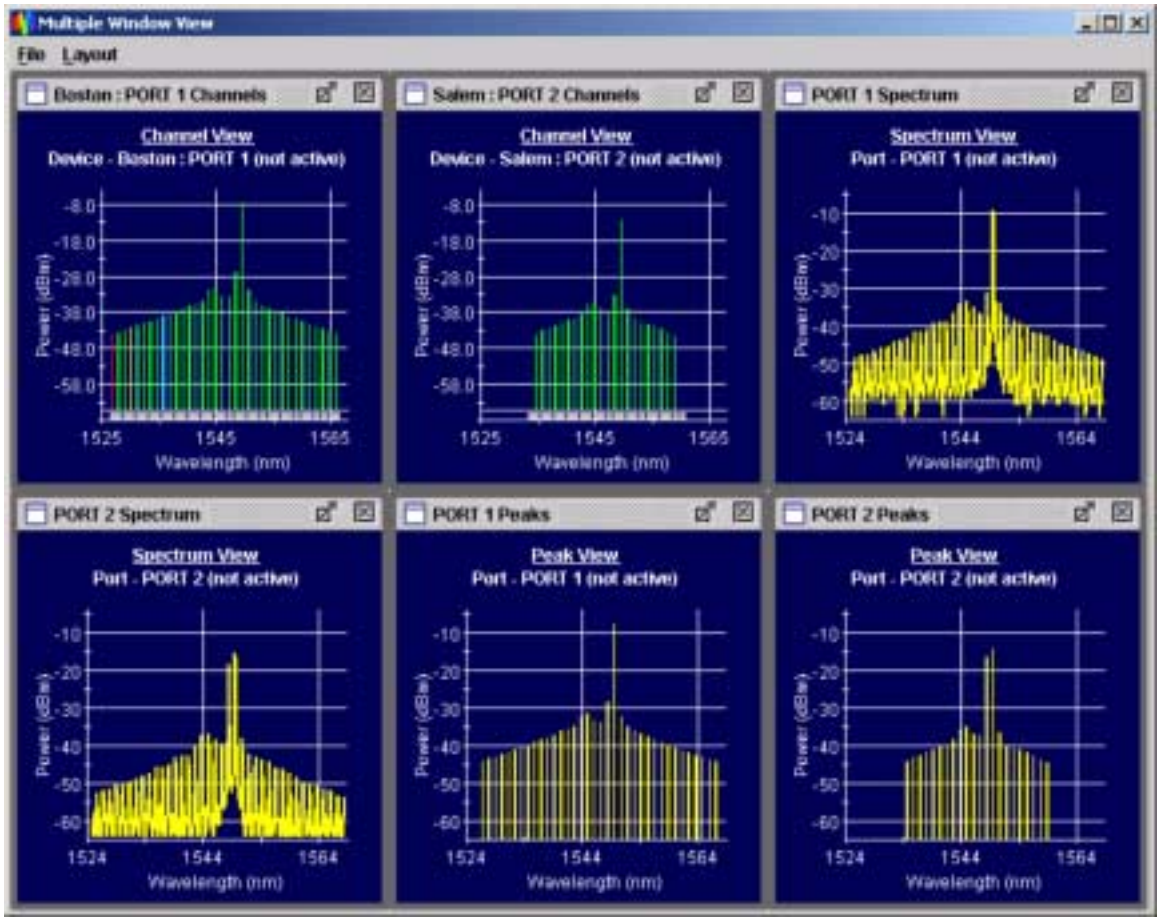


FIGURE -58. Launch MultiView

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To view the graphical display in cascade format (Figure -59), use the Layout context menu and select Cascade (Figure -60).

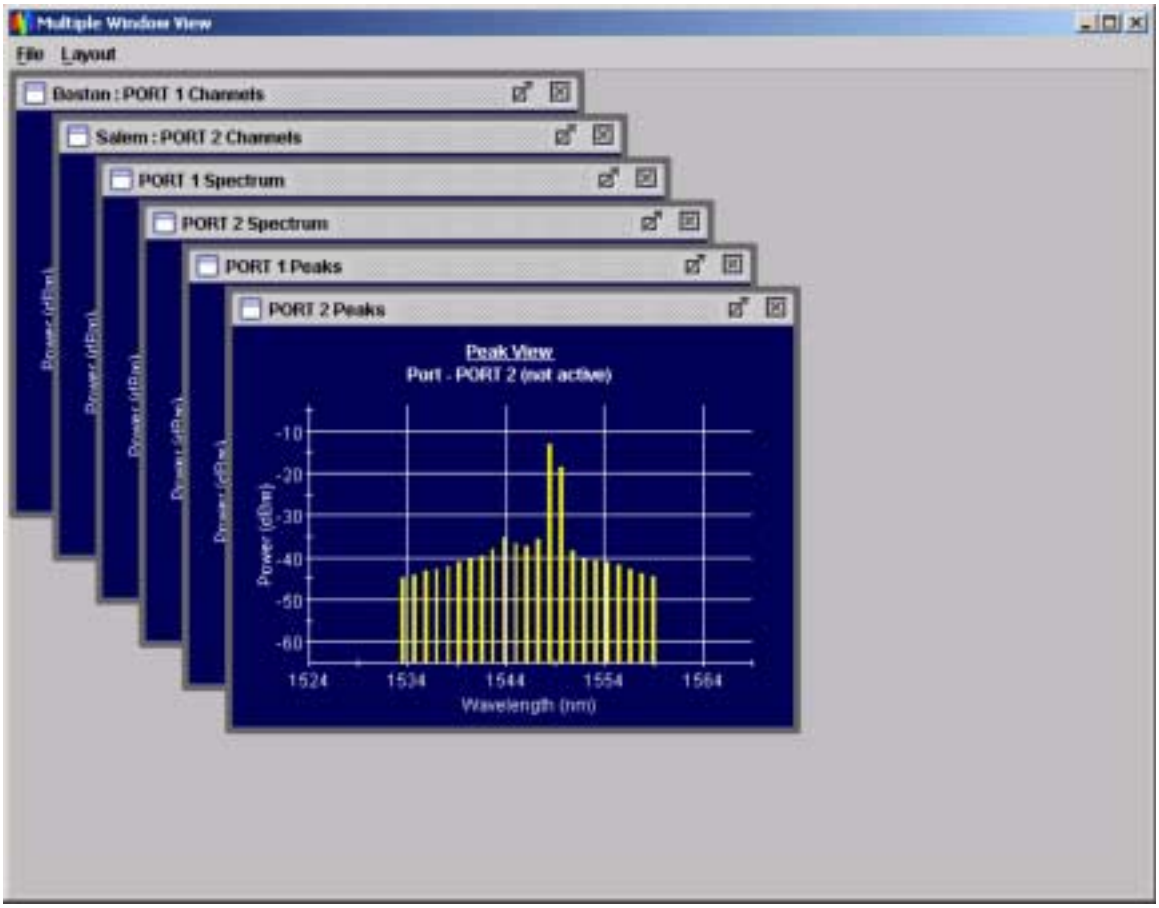


FIGURE -59. Cascade View

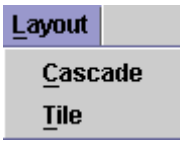


FIGURE -60. Layout Context Menu

You can control the display of each of these internal frames by moving, sizing, closing, minimizing or maximizing within the MultiView window. The windows are sized proportionately according to the number of windows open when you select an option from the Layout context menu.

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Once a view is closed, you can re-open it from the Multiple Window View File menu (Figure -61).

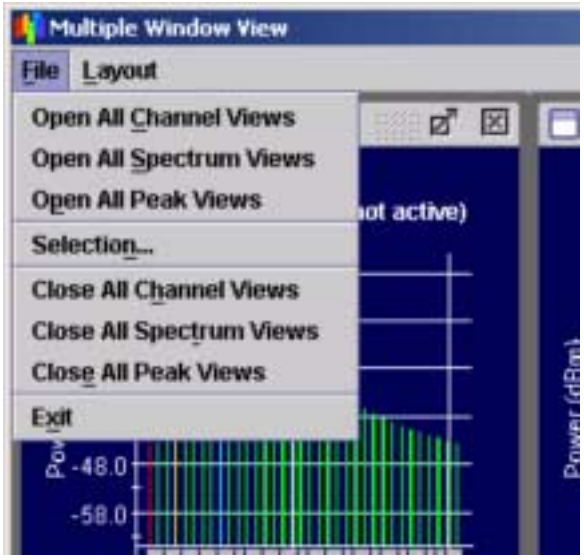


FIGURE -61. File Menu in Multiple Window View

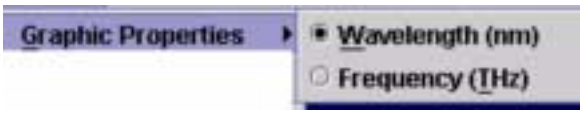
Opening a specific type of view will close all other types of views. Closing a specific type of view will close only that type of view. Use the selection option to open and/or close any combination of Channel, Spectrum, and Peak views.

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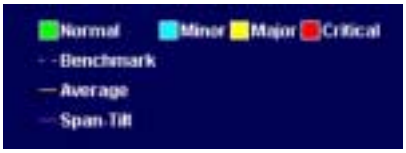
DISPLAY

The Display menu includes the following features related to controlling system display properties:

- Graphic Properties - allows all graphs and reports to be represented in wavelength (nm) or frequency (THz).



- Legend - enable/disable the display of a legend or key describing what information is presented on the graph.



- UnZoom One Level - zooming (zoom-in) is performed incrementally as needed. The unzoom one level (zoom-out) feature is used to incrementally restore zooming (zoom out) until normal viewing is achieved.
- Reset Zoom - restores the display to normal viewing.

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OPTIONS

The Options menu provides the ability to view graphs by monitoring activity from the port or device and enables the display of Channel Span Tilt and Channel Average Power Level.

Monitor Port View

The Monitor Port View command is enabled only when the Spectrum or Peak View graphs are being actively displayed.

The Monitor Port View command changes what is being displayed in the graph. It does not issue any commands to the connected OWM. There are two options for what is being displayed on the graph: the currently active port, or a selected port. If you choose the currently active port, then whichever port is active on the OWM will be displayed in the graph. If you choose a specific port to display, then only the data for that port will be displayed. If the port is not active on the OWM, then the last sampled values will be displayed. In both cases the graph title will reflect which port is being displayed.

Monitor Device View

The Monitor Device View command is enabled only when the Channel View or Data Log View is being actively displayed.

The Monitor Device View command changes what is being displayed in the graph. It does not issue any commands to the connected OWM. There are two options for what is being displayed on the graph: the currently active device, or a selected device. If you choose the currently active device, then whichever device is active on the OWM will be displayed in the graph. If the sequencer is on and the OWM is cycling through the devices, then the display will reflect this behavior. If you choose a specific device to display, then only the data for that device will be displayed. If the device is not active on the OWM, then the last sampled values will be displayed. In both cases the graph title will reflect which device is being displayed.

Spectrum Benchmarks

The spectrum benchmarks command is a switch that enables or disables the ability to view benchmarks while in spectrum or table and spectrum view. Benchmarking is the process of capturing current device channel values at a point in time and storing these values for future retrieval. The spectrum benchmarks command causes these stored values (raw spectrum, spectrum power and pixel wavelength) to be retrieved and graphically viewed.

Channel Benchmarks

The channel benchmarks command is a switch that enables or disables the ability to view benchmarks while in channel or table and channel view. Benchmarking is the process of capturing current device channel values at a point in time and storing these values for future retrieval. The channel benchmarks command causes these stored values (power, wavelength and OSNR) to be retrieved and graphically viewed.

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Channel Span-Tilt

Channel Span-Tilt feature only applies to Channel View graphs and is enabled only when the Channel View graph is being actively displayed. The feature can be selected or deselected by clicking on the associated check box. When the feature is selected, the color of all unselected channel bars are dimmed by 50%.

The Channel Span-Tilt is a linear regression calculation of the power values for two or more selected channels. The span-tilt is calculated by selecting or clicking on two or more channels displayed on the Channel View graph. As each channel is selected, the bar graph color is reset to 100% of the color. The calculated span-tilt value is displayed in the status bar. A negative span-tilt value represents a negative slope and a positive value displays a positive or upward slope of the line. The Channel View graph in Figure -62 shows the span-tilt line.

A group of channels can be selected by individually clicking on each desired channel or by holding down the control key on the keyboard while simultaneously left clicking the mouse and dragging it to the desired channel destination. Once the control key and mouse are released, the channels enclosed in the box are selected.

Holding down the control key on the keyboard and right clicking on the graph background (not on a channel) causes a menu to be displayed that allows the user to conveniently select all channels for a span-tilt calculation or to clear all the channels and span-tilt calculation (Figure -63). Note that deselecting the Channel Span-Tilt command using the check box, causes the slope line to disappear but does not clear the span-tilt calculations and associated channel selections from memory. After deselecting and reselecting the channel span-tilt command, the last known slope line and corresponding channels are redisplayed.

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Entering Configure Mode is another way that span-tilt calculations and associated channel selections are cleared from memory. Entering and subsequently exiting from Configure Mode acts similarly to the clear all command regardless of whether configuration is applied, saved or quit.

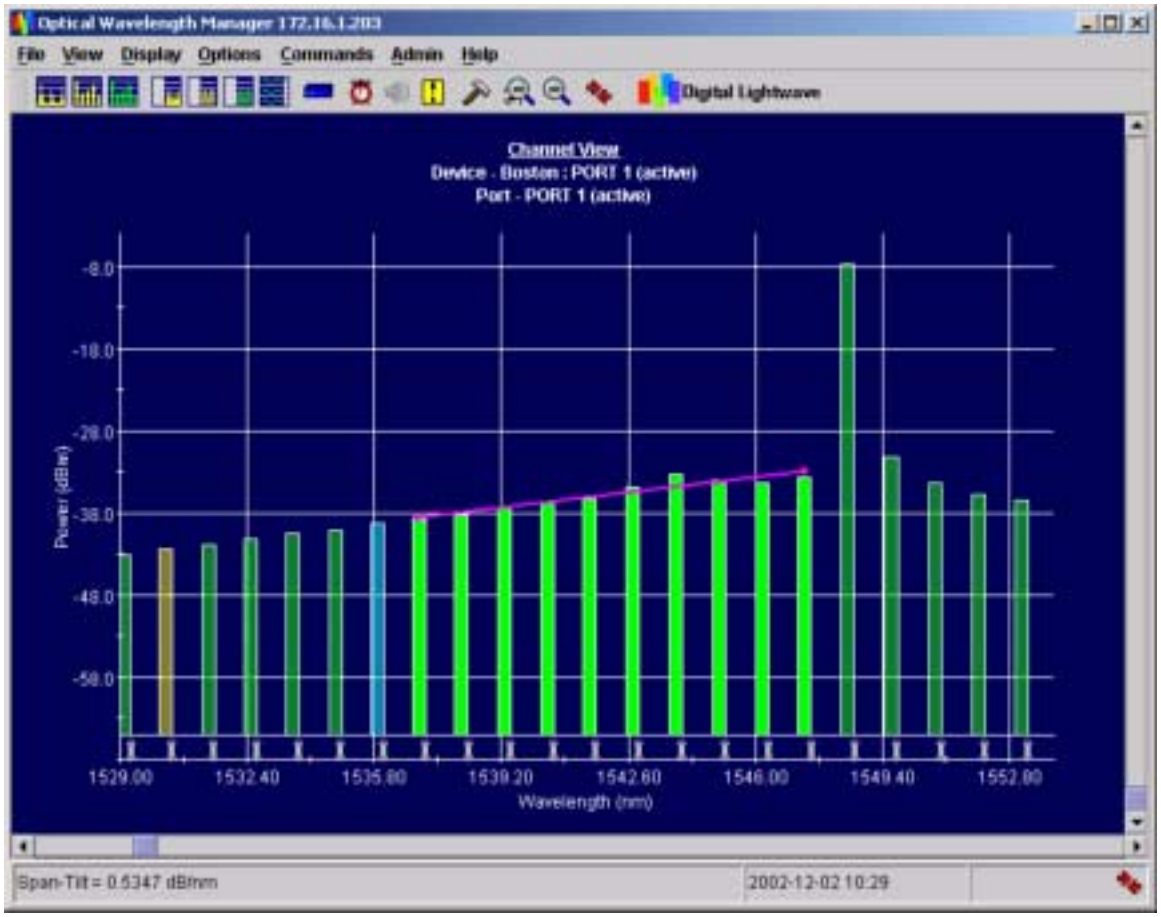


FIGURE -62. Channel Span-Tilt Graph

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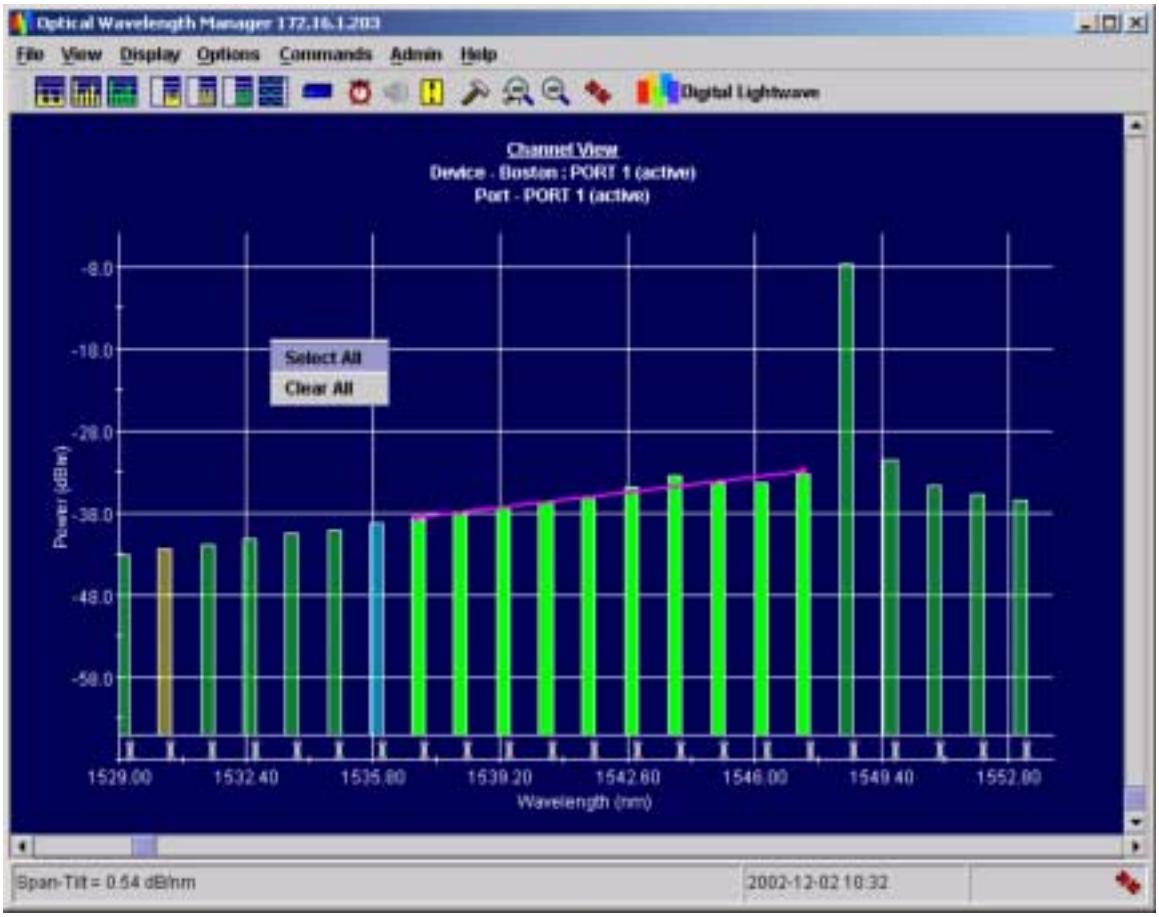


FIGURE -63. Control Key and Right Click Selection

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Displaying Channel Average Power Level

The average power level of a channel is the mean logarithmic average of all of the available channel power values for a specified device. The average line is displayed on the Channel View graph (Figure -64) by selecting the Channel Average Power Level option from the Display context menu. The average power level is displayed on all Channel View graphs while this option is selected.

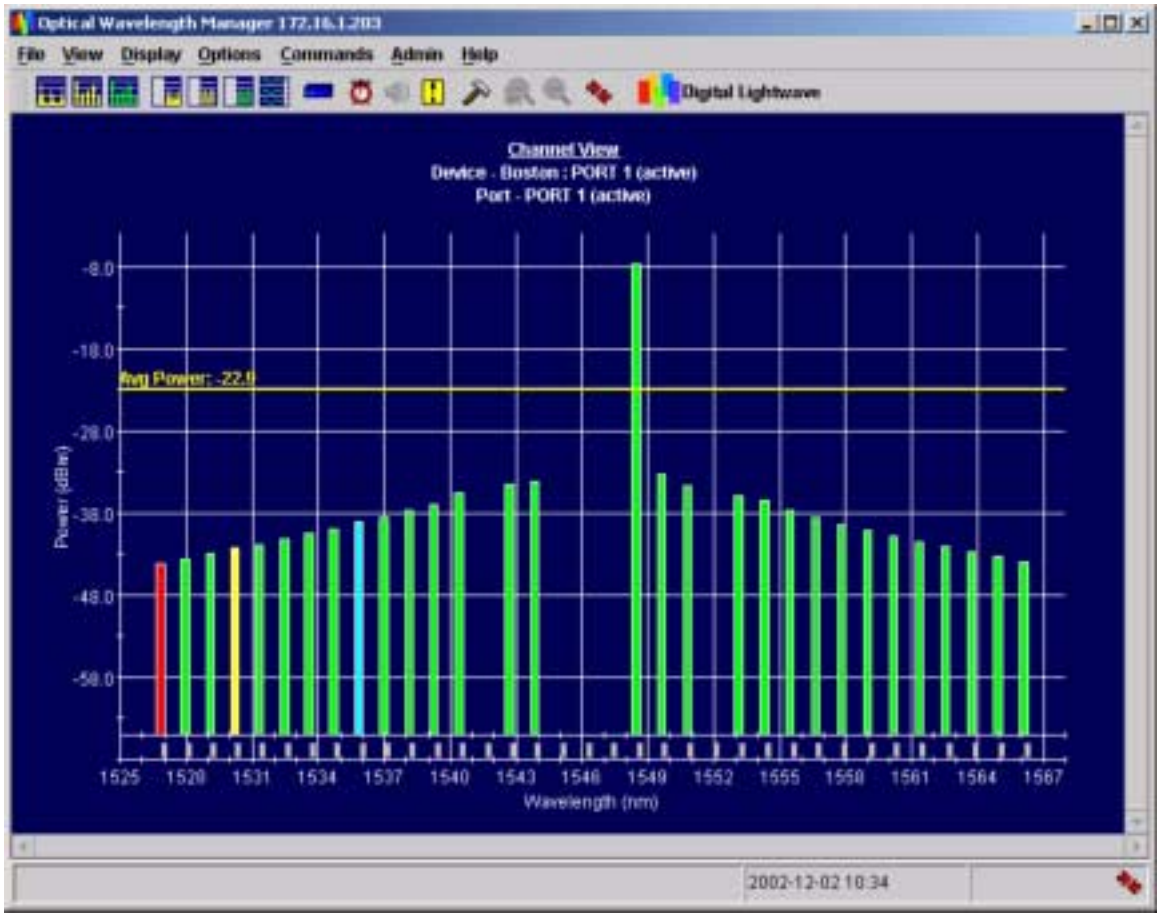


FIGURE -64. Average Power Level

COMMANDS

The Commands menu allows the user to control alarm, Sequencer, event, port and device activation functions.

Alarm Acknowledge

The Alarm Acknowledge menu command will send an alarm acknowledge command to the OWM.

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When an alarm has triggered, the alarm acknowledgement icon will appear in the state icons section of the status bar. The alarm is acknowledged by selecting Alarm Acknowledge from the Commands menu or by clicking on the alarm icon in the toolbar. Alarm acknowledgement generates an event in the event log and removes the alarm acknowledgement icon from the status icon panel. Refer to "Supported State Icons" on page -20 for a complete description of alarm icons.

The channel bar on the Channel View graph where the alarm was triggered continues to display the color of the associated alarm despite the alarm having been acknowledged. The alarm acknowledgment does not change the status of the alarm or the alarm LED but simply causes the Information alarm to be cleared. The alarm acknowledgement command will acknowledge all current alarms. An acknowledgement per alarm is not necessary.

Sequencer

The Sequencer menu command sends a sequencer on/off command to the OWM.

The Sequencer automatically activates devices. When the Sequencer is enabled, the OWM cycles between all the defined devices at a rate that is dependent on the number of monitor input ports on the OWM. For detailed information on the cycling rate see "Sequencer" on page 3-2. This feature allows periodic monitoring of optical fibers connected to each port.

By default the Sequencer is enabled at boot time. When the Sequencer is enabled, a check mark will appear in the check box associated with the Sequencer command and the Sequencer icons on the toolbar and in the state icon section of the status bar will become green and yellow. When the Sequencer is disabled, the Sequencer icons appear red. Toggling the icon in the toolbar enables/disables the Sequencer.

It is important to note that if the device is inactive on the view graph, the graph will appear static and display the last known values.

Refresh Alarms/Events

The Refresh Alarms/Events command is useful during event/alarm storms. Event/alarm storms occur when a catastrophic event occurs that causes the OWM to report a burst of events. It is conceivable that events are recognized by the OWM faster than the alarm/event logs can generate a report. Consequently, data can be lost.

The Refresh Alarms/Events command provides the ability to clear the existing alarms/events log and repopulate those logs with ALL the current alarms/events on the OWM. This command is most useful when an event/alarm storm is considered over. The event/alarm storm is considered over when the "event storm is occurring" icon is replaced by a yellow "view active alarms" icon located in the state icon section of the status bar or is removed completely. For a detailed description of these icons refer to "State Icons" on page -19.

Initialize Alarms/Events

The Initialize Alarms/Events command is useful during event/alarm storms. Event/alarm storms occur when a catastrophic event occurs that causes the OWM to report a burst of events. It is conceivable that events are recognized by the OWM faster than the alarm/event logs can generate a report. Consequently, data can be lost.

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The Initialize Alarms/Events command causes the existing alarm log to be cleared and repopulated with ALL the alarms on the OWM. Additionally, the event log is cleared and populated with only those events that occur after the Initialize Alarms/Events command has been issued. This command is most useful when an event/alarm storm is considered over. The event/alarm storm is considered over when the "event storm is occurring" icon is replaced by a yellow "view active alarms" icon located in the state icon section on the lower right-hand side of the status bar or removed completely.

This command is similar to the Refresh Alarms/Events command and may be more desirable because it may take less time to complete.

Port Activate

The Port Activate menu command issues a port active command on the OWM.

Selecting the Port Activate command allows monitoring of a specific port. From the menu, the user selects which port to monitor. After selecting the menu option, that port will become active on the OWM. Note that the Port Activate command turns off the Sequencer if it was enabled and deactivates all devices. After issuing the Port Active menu command, the display is changed to that port. In the menu, the currently active port displays an asterisk in the associated check box.

Device Activate

The Device Activate menu command issues a device active command on the OWM.

Selecting the Device Activate command allows monitoring of a specific device. From the menu, the user selects which device to monitor. After selecting the menu option, that device will become active on the OWM. Note that the Device Activate command turns off the Sequencer if it was enabled. After issuing the Device Active menu command, the display is changed to that device. In the menu, the currently active device displays an asterisk in the associated check box.

ADMIN

The Admin menu provides the ability to manage devices, channels and general optical settings.

Manage Configuration

The Manage Configuration command is used to define ports and devices and their associated settings. Clicking on Manage Configuration brings the user into Configure Mode. From this mode, device and optical configurations can be modified.

Only one user at a time can be in Configure Mode. Each time Configure Mode is entered by clicking on the Manage Configuration command, the configuration locked icon will appear in the state icon section on the lower right-hand side of the status bar. If another user has the configuration locked, as indicated by the configuration locked icon in the state icon section of the status bar and the Manage Configuration command is initiated, the user with *admin* or *config* privilege is presented with the opportunity to supersede the lock or quit out of Configure Mode (Figure -65). The Take Lock button is used to supersede the lock and take the configuration away from the other user. It is important to

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note that ALL of the changes that were made by the other user are discarded if those changes have not been applied or saved.

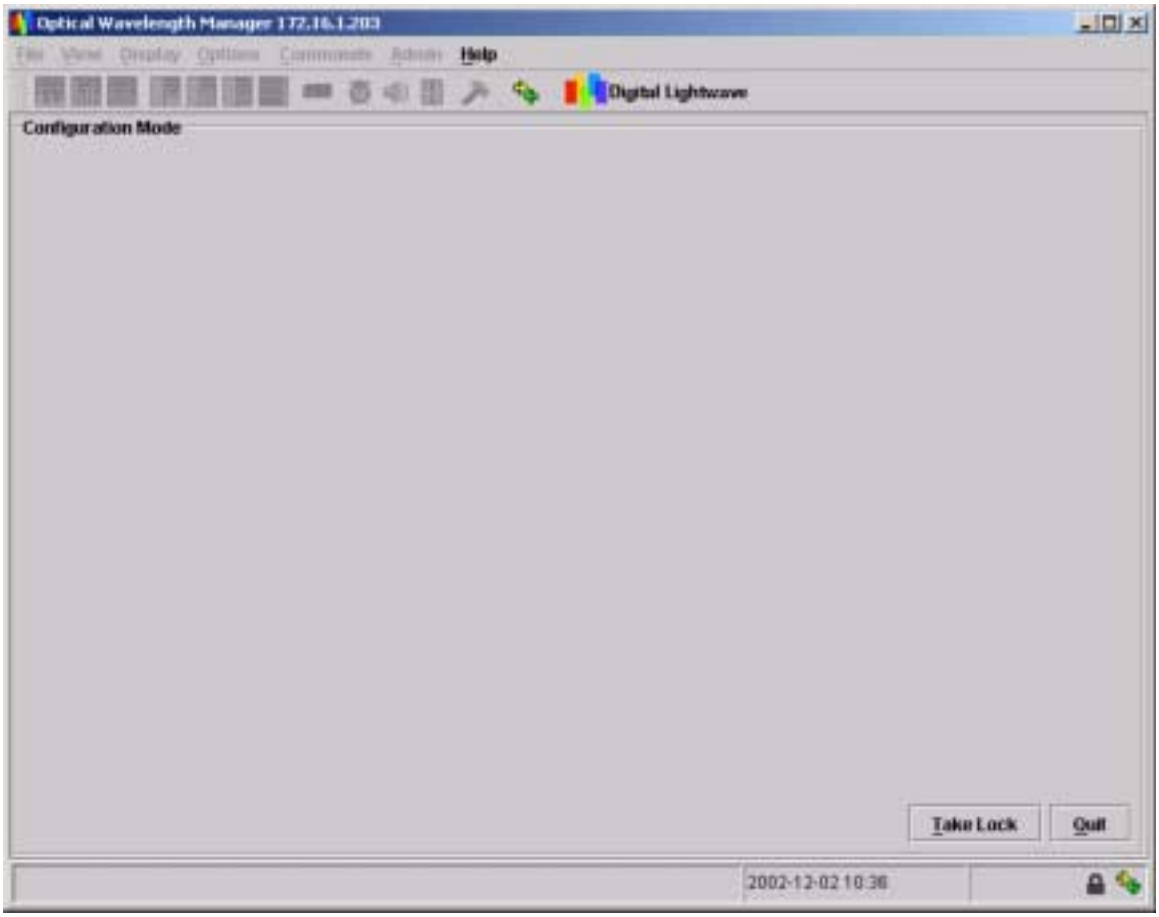


FIGURE -65. Take Lock Button

Device Tab

The Device tab displays a screen where devices can be added, deleted or configured (Figure -71). Devices configurations are added by clicking the **New...** button. The New Logical Device menu is displayed where name, description, OWM port and tap power values can be assigned.

- **Name** - a string defining the name of the device being configured.
- **Description** - a string defining a short description of the device being configured.
- **OWM Port** - a drop down box will contain the available ports to which the device will be associated with.
- **Tap Power** - a percentage of bandwidth used by the OWM when a device is active. Each device can have its own tap power associated with it. Valid tap power values must be greater than 0 and less than or equal to 100. Invalid entries are displayed in red.

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Adding a Device

1. Click **New...**. to open an input dialog to describe a new device. If the maximum number of devices have already been defined, an error message is displayed. The maximum number of devices is specific to the equipment.
2. Enter a name in the Name field. The name of the device is case sensitive.
3. Enter a description in the Description field (optional).
4. Select a port (PORT 1 to PORT *n*) from the OWM Port drop down box.
5. Enter the tap power.
6. Click **Update** to store the newly added information into the table.
7. Click **Apply** to put these changes into running memory and/or **Save** to permanently save the running configuration to a file. You may only "**Apply**" changes, however, these changes will be lost when the system is rebooted. The saved file generated by the **Save** command is used to establish configuration during reboot. When you reboot the system, your last changes are present.
8. Once a device has been added, the user can proceed to configure that device. Refer to "Configuring a Device".

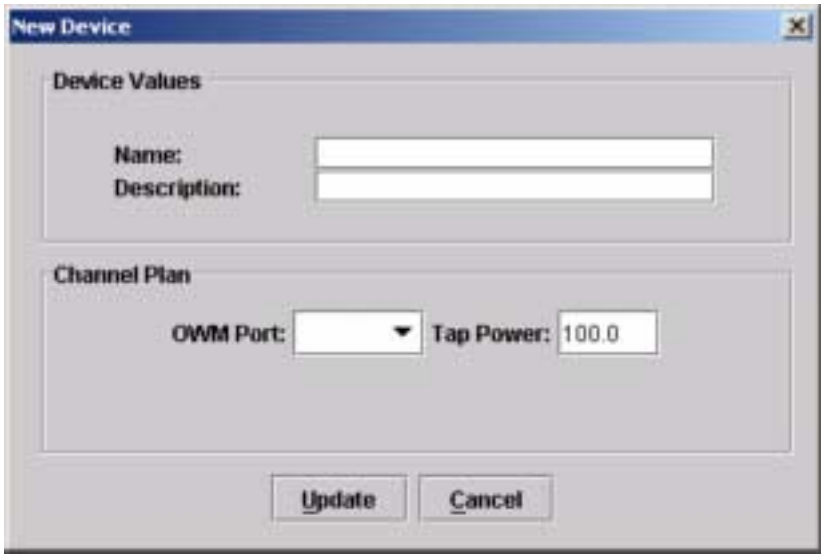


FIGURE -66. New Device

Deleting a Device

1. Select the device or devices to be deleted. Multiple devices can be selected for deleting by holding down the control key while clicking on the device names.

2. click **Delete**.



FIGURE -67. Delete Button

3. A confirmation window will appear that queries if the selected device(s) should be deleted. Clicking **Yes** deletes the device(s).

Configuring a Device

Configuring a device is composed of three processes: Defining the channels, Defining the alarms and changing the port assignment. Configuring devices can be done automatically or manually.

Configuring a Device Automatically

Defining Channels Automatically:

1. Select the device to be configured.
2. Use the **Auto Channels** button to have the OWM automatically generate channels for the device. The Channel Override Confirmation (Figure -69) dialog is displayed anytime a channel delete with replacement is attempted. The Channel Override Confirmation overwrites the existing channel plan. When **YES** is entered the Automatic Channel Definition dialog appears.



FIGURE -68. Auto Channels Button

3. The Automatic Channel Definition dialog allows channels to be defined in one of three ways; Peaks with Alarms, Peaks or CBand. For a complete description of these channel definitions refer to the sections titled "Peaks with Alarms", "Peaks" and "CBand". This dialog box also allows the maximum channel width to be defined. To set the maximum channel bandwidth, click one of the Max Channel Width radio buttons. The bandwidth is determined by the difference between the peaks. If the width is greater than one half channel width maximum, then one half maximum is used.
4. To automatically generate channel definitions, click Auto Define.

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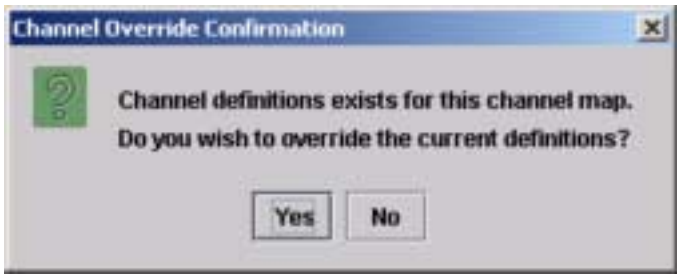


FIGURE -69. Channel Override Confirmation Dialog



FIGURE -70. Automatic Channel Definition

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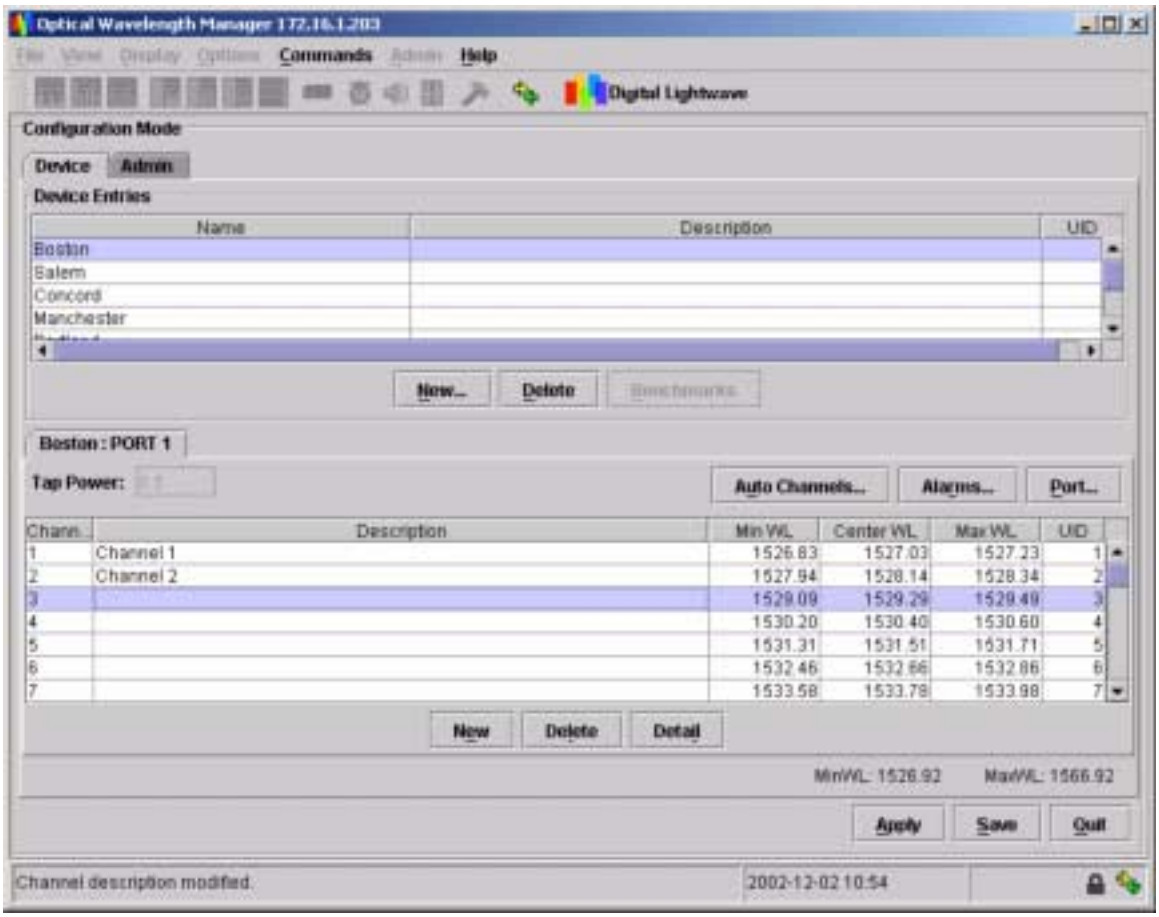


FIGURE -71. Device Screen

Defining Alarms Automatically

Alarms can be defined automatically when defining channels from Peaks and selecting the Peaks with Alarms option. See Figure on page -84. In this case, alarms are defined at the same time that channels with peaks are automatically defined. All alarms defined automatically are disabled. After the alarms have been defined, they can be modified manually.

Device Alarm Management

The Device Alarm Management dialog enables/disables alarms on a device. If all alarms of a given type need to be enabled or disable at once, use this dialog.

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1. Click on the **Alarms...** button to display the Device Alarm Management dialog (Figure -72).



FIGURE -72. Device Alarm Management Dialog

2. Click on the appropriate radio button to enable/disable alarms for the device. Enable All Alarms will enable all defined alarms for that device. Enable Multiple/Zero Peaks Alarms will enable only the multiple/zero peak alarms. The Disable buttons work the same way.
3. Click **OK**.

Changing the Port Assignment

1. Click on the **Port...** button to display the Change Port Assignment dialog.
2. Select the port to associate with this device from the OWM port drop down box.
3. Select the current tap power and enter the tap power assignment for this device.

NOTE: Alarms defined using a previously defined device tap power are not automatically adjusted when a new device tap power is defined. Consequently, alarms may be triggered when changing the device tap power. It may be desirable to re-define device alarms whenever the device tap power changes.

To manually re-define device alarms see page -86 or to automatically define new alarms using the "Peaks with Alarms" command see page -90.

4. Click **Update** to complete the port assignment.

Configuring a Channel Manually

1. Select the device.

2. Click on the **New** channel button and a new channel dialog is displayed.
3. Enter the description of the channel in the Description field. (optional)
4. Enter the minimum wavelength in the Min WL field.
5. Enter the center wavelength in the Center WL field.
6. Enter the maximum wavelength in the Max WL field.
7. Click **Update** to complete.



FIGURE -73. New Channel Definition

The Channel number and the Channel UID fields cannot be edited. After the channel is added, the channels are sorted by center wavelength. The channel numbers are updated. Once a new channel is created, the channel is assigned a UID which does not change again for that channel. However, if a channel is deleted and then added back in again, a new UID is generated because the channel is considered to be new.

If the channel definitions contain errors, the a dialog message will be displayed on the update request. Only valid data can be applied.

To Manually Define Alarms

A channel definition can have multiple alarms associated with it. Wavelength, power and optical signal to noise ratio (OSNR) can be monitored for alarm conditions. Alarm definitions place limits around the channel. Any value outside of the limits causes an alarm. For each alarm level (Critical, Major, Minor) you can define:

- Minimum wavelength trigger and clear
- Minimum power trigger and clear
- Minimum OSNR trigger and clear

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- Maximum wavelength trigger and clear
- Maximum power trigger and clear

Clear indicates the value at which the alarm is turned off and trigger is the value at which the alarm is turned on.

After a new channel has been defined, you can now define channel alarms by selecting the device from the confirmation mode screen, selecting the channel and clicking the **Detail** button. Click in the Trigger and Clear fields and enter appropriate wavelength, power or OSNR values. "Channel Alarm Validations" on page 3-7 gives an informative description of configuration rules that apply to defining wavelength, power and OSNR alarms.

To Enable Alarms

Alarms that are defined are not activated until they are enabled. This section describes the process for activating alarms. There are several ways to enable alarms; enable all alarms or selectively enable an alarm on a channel.

Enable All Alarms - this procedure activates all the alarms defined on all channels of a selected device. From the Device Tab in the Configuration mode screen, select the device and click on the **Alarms...** button. From the Device Alarm Management dialog, click on the radio button to **Enable All Alarms**.

Selectively Enable an Alarm - this procedure activates alarms on a specific channel. From the Device Tab in the Configuration mode screen, select the device, click on a channel and click on the **Details** button. From the Channel Detail screen, click on the checkboxes matching the alarm criteria you wish to activate. Note that buttons to display the next/previous channel provide a convenient method for cycling through the channels. Click the **Close** button when finished.

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FIGURE -74. Channel and Detail View in Configuration Mode

On the left hand side of the Channel Detail view, a table is displayed (refer to Table -14).

Table -14. Channel Definitions, Channel Values and Alarm Settings

Field	Read/Write Status
Channel definition	Read-only
Current channel measurements (wavelength, power, OSNR and #peaks)	Read-only
Wavelength Limits (min, center, max)	Read-only
Calculations (ITU Grid, delta from Grid, Avg pwr deviation)	Read-only
Alarm settings	Read-write

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On the right-hand side of the screen is a view of the channel with the spectrum displayed (Figure -74).

Display Filters

The Display Filters (Figure -75) in the Channel Detail dialog display the trigger and clear definitions. When you select Display Filters, the trigger and clear alarms can be displayed or hidden.

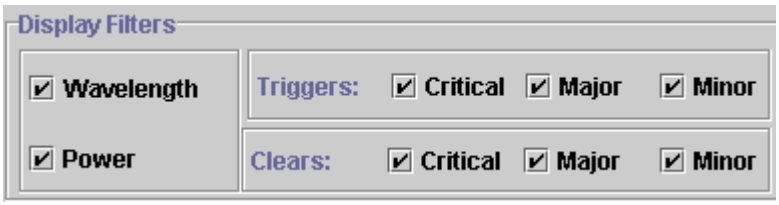


FIGURE -75. Display Filters

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Alarms Color Key

Table -15 below contains the alarm color key for the alarms trigger and clear definitions.

Table -15. Alarms Color Key

Type	Color	Line Type
Critical alarm trigger	Red	Solid
Critical alarm clear	Red	Dashed
Major alarm trigger	Yellow	Solid
Major alarm clear	Yellow	Dashed
Minor alarm trigger	Light blue	Solid
Minor alarm clear	Light blue	Dashed
Center WL definition	Grey	Heavy solid
Minimum WL definition	Grey	Heavy solid
Maximum WL definition	Grey	Heavy solid
Current Power/WL	Green/Red/Yellow/Light blue	Heavy solid
Spectrum	Yellow	Solid

Each of the alarms has an Enable and Disable check box, a trigger value and a clear value. All alarms must be valid before they can be applied.

Peaks with Alarms

The Peaks with Alarms option performs the Peak command and generates a best estimate on alarm definitions. When you click this option, the current state of the OWM is captured including the current port, the current device and the Sequencer state. It switches to the specified device port and gets the peaks for that port. For each peak, a channel is defined. The specified GHz parameter is used to determine the maximum bandwidth of the channel. Current values are 200 GHz (1.6 nm bandwidth) or 100 GHz (0.8 nm bandwidth).

The channel defined must be valid. From each peak, power and OSNR values are taken and alarms are defined and stored with the channel definition. The system is then restored to its original state.

Peaks

The Peaks option sets the OWM port and reads in the peak values where channels are defined.

CBand

The CBand option takes the first 50/100 channels in the CBand that meet the minimum requirements for an OWM channel. The number of channels created is dependant on the type of OWM.

Channel bandwidth requirements

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- All frequency wavelengths are specified to 2 decimal places.
- The maximum bandwidth is limited to the value specified.

To calculate the minimum wavelength offset

1. Take the difference between the current peak and the previous channel center wavelength and subtract 0.01 nm. The 0.01 nm is used to prevent overlapping channels.

   If the difference is greater than 1/2 maximum bandwidth, use the 1/2 maximum bandwidth as the offset.

2. Take the current peak and subtract the offset.

   If this value is less than the minimum OWM system wavelength, use the minimum OWM system value.

To calculate the maximum channel wavelength offset

1. Take the difference between the current peak and the next channel center wavelength.

   If this is greater than 1/2 maximum bandwidth, use the 1/2 maximum bandwidth as the offset.

2. Take the current peak and add the offset.

   If this value is greater than the maximum OWM wavelength, use the maximum OWM system value.

Benchmarks

The benchmarks button begins a dialog that allows the user to take a snapshot of device optical activity. Specifically, current device channel values (power, wavelength and OSNR) are collected as well as spectral values (raw spectrum, spectrum power and pixel wavelengths). These benchmark measurements are time-stamped and preserved until the user issues a command to clear the benchmark or initiate a new benchmark. Benchmarks must be applied and saved in configuration mode for the feature to succeed. Benchmarks serve as a useful tool for comparing current optical activity with activity that occurred when the snapshot was taken.

To create a benchmark, the user must be in configuration mode and device definitions must be "applied". The following procedure sets a benchmark on a device(s).

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- Click on the **Benchmarks** button ("Device Screen" on page -84) to reveal the Benchmarks dialog box (Figure -76).



FIGURE -76. Benchmarks Dialog

- Click the **Create benchmarks for the selected device** radio button to set a benchmark for a specific device. Click the drop down box and select the device. Click **Issue** to run the command. If benchmarks already exist for the device, the Overwrite Benchmarks dialog box appears (Figure -77). Click **Yes** to capture a new set of benchmarks and overwrite the existing benchmarks.



FIGURE -77. Overwrite Benchmarks Dialog

- Click the **Create benchmarks for all devices** radio button to capture benchmarks on all defined devices. Click **Issue** to run the command. If benchmarks already exist, the Overwrite Benchmarks dialog box appears (Figure -77). Click **Yes** to capture a new set of benchmarks and overwrite existing benchmarks.
- Click the **Clear all benchmarks** radio button to remove existing benchmarks on all devices. Click **Issue** to run the command. The Overwrite Benchmarks dialog screen appears reminding the user that existing benchmarks will be erased.
- Click **close** to return to the Configuration Mode screen.

Once benchmarks have been created, they can be viewed by selecting "Spectrum Benchmarks" on page -73 or "Channel Benchmarks" on page -73 in the Options menu or by clicking the **Benchmark** button in Data Log view.

Admin Tab

The Admin tab is where optical signal-to-noise ratio (OSNR) width and Tap Power values associated with ports are assigned or modified.

- **OSNR** - The optical signal-to-noise ratio (OSNR) width in nanometers (nm) can be assigned by clicking on the drop down box and selecting one of the predefined ratio widths.
- **Tap Power** - The Tap Power value for a specific port can be modified by clicking on the Tap Power field, selecting the current tap power value and entering a new value. Valid tap power values must be a percentage, greater than 0 and less than or equal to 100. Invalid entries are displayed in red.

HELP

The Help menu is designed to provide the information necessary to contact the technical support staff at Digital Lightwave, Inc.

Help

The Help menu (Figure -78) provides copyright information, technical support contact information and Digital Lightwave, Inc. hours of operation.



FIGURE -78. Online Help

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About OWM

The About OWM menu (Figure -79) provides copyright information, OWM software version and creation date information. The six digit number in the lower right-hand corner is an internal number used by technical support.



FIGURE -79. About OWM

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CHAPTER

Simple Network Management Protocol

This section describes the Simple Network Management Protocol (SNMP), which includes SNMP management information bases (MIBs), MIB Walks, interaction between MIBs and the CLI, creating and deleting channel definitions using SNMP and creating and deleting trap destinations using SNMP.

SNMP Overview

SNMP is an application-layer communication protocol that allows network devices to exchange management information. SNMP enables network administrators to manage network performance, find and solve network problems and plan network growth. OWM SNMP implementation uses standard Internet Engineering Task Force (IETF) MIBs to convey management information for generic read-only management. SNMP allows limited management of the OWM by generic SNMP management software. The OWM supports SNMP Version 1 (SNMPv1) and SNMP Version 2c (SNMPv2c). Both versions share many features, but SNMPv2c includes additional protocol operations.

An SNMP-managed network consists of three primary components: managed devices, agents and management systems. A managed device is a network device that contains an SNMP agent and resides on an SNMP-managed network. Managed devices collect and store management information and use SNMP to make this information available to management systems that use SNMP.

An agent is a software module that resides in a managed device. An agent has local knowledge of management information and translates that information into a form compatible with SNMP. The SNMP agent gathers data from the MIB, which is the repository for device parameter and network data made up of managed objects. The agent can also send traps or notification of certain events, to the manager.

MIB-II Compliance

Table -1, "MIB-II Compliance" on page -1 lists the standard supported MIBs from MIB-II (RFC1213) and variations from standards (IETF RFCs) are italicized in the Compliance column.

Table -1. MIB-II Compliance

Group	Object	Compliance
system	*sysDesc*	Supported
system	*sysObjectID*	Supported
system	*sysUpTime*	Supported
system	*sysContact*	*Limited to 80 characters maximum*

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Group	Object	Compliance
system	*sysName*	*Limited to 32 characters maximum*
system	*sysLocation*	*Limited to 80 characters maximum*
system	*sysServices*	Supported
interfaces	*ifNumber*	Supported
interfaces	*ifIndex*	Supported
interfaces	*ifDescr*	Supported
interfaces	*ifType*	Supported
interfaces	*ifMtu*	Supported
interfaces	*ifSpeed*	Supported
interfaces	*ifPhysAddress*	Supported
interfaces	*ifAdminStatus*	*Read-only*
interfaces	*ifOperStatus*	Supported
interfaces	*ifLastChange*	Supported
interfaces	*ifInOctets*	Supported
interfaces	*ifInUcastPkts*	Supported
interfaces	*ifInNUcastPkts*	Supported
interfaces	*ifInDiscards*	Supported
interfaces	*ifInErrors*	Supported
interfaces	*ifInUnknownProtos*	*Unknown*
interfaces	*ifOutOctets*	Supported
interfaces	*ifOutUcastPkts*	Supported
interfaces	*iifOutNUcastPkt*	Supported
interfaces	*ifOutDiscards*	Supported
interfaces	*ifOutErrors*	Supported
interfaces	*ifOutQLen*	Supported
interfaces	*ifSpecific*	Supported
at	*atIfIndex*	Read-only
at	*atPhysAddress*	Read-only

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Group	Object	Compliance
at	*atNetAddress*	Read-only
ip	*ipForwarding*	*Read-only*
ip	*ipDefaultTTL*	Supported
ip	*ipInReceives*	Supported
ip	*ipInHdrErrors*	Supported
ip	*ipInAddrErrors*	Supported
ip	*ipForwDatagrams*	Supported
ip	*ipInUnknownProtos*	Supported
ip	*ipInDiscards*	Supported
ip	*ipInDelivers*	Supported
ip	*ipOutRequests*	Supported
ip	*ipOutDiscards*	Supported
ip	*ipOutNoRoutes*	Supported
ip	*ipReasmTimeout*	Supported
ip	*ipReasmReqds*	Supported
ip	*ipReasmOKs*	Supported
ip	*ipReasmFails*	Supported
ip	*ipFragOKs*	Supported
ip	*ipFragFails*	Supported
ip	*ipFragCreates*	Supported
ip	*ipAdEntAddr*	Supported
ip	*ipAdEntIfIndex*	Supported
ip	*ipAdEntNetMask*	Supported
ip	*ipAdEntBcastAddr*	Supported
ip	*ipAdEntReasmMaxSize*	Supported
ip	*ipRouteDest*	*Read-only*
ip	*ipRouteIfIndex*	*Read-only*
ip	*ipRouteMetric1*	*Read-only*

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Group	Object	Compliance
ip	*ipRouteMetric2*	*Read-only*
ip	*ipRouteMetric3*	*Read-only*
ip	*ipRouteMetric4*	*Read-only*
ip	*ipRouteNextHop*	*Read-only*
ip	*ipRouteType*	*Read-only*
ip	*ipRouteProto*	Supported
ip	*ipRouteAge*	*Read-only*
ip	*ipRouteMask*	*Read-only*
ip	*ipRouteMetric5*	*Read-only*
ip	*ipRouteInfo*	Supported
ip	*ipNetToMediaIfIndex*	*Read-only*
ip	*ipNetToMediaPhysAddress*	*Read-only*
ip	*ipNetToMediaNetAddress*	*Read-only*
ip	*ipNetToMediaType*	*Read-only*
ip	*ipRoutingDiscards*	Supported
icmp	*icmpInMsgs*	Supported
icmp	*icmpInErrors*	Supported
icmp	*icmpInDestUnreachs*	Supported
icmp	*icmpInTimeExcds*	Supported
icmp	*icmpInParmProbs*	Supported
icmp	*icmpInSrcQuenchs*	Supported
icmp	*icmpInRedirects*	Supported
icmp	*icmpInEchos*	Supported
icmp	*icmpInEchoReps*	Supported
icmp	*icmpInTimestamp*	Supported
icmp	*icmpInTimestampReps*	Supported
icmp	*icmpInAddrMasks*	Supported
icmp	*icmpInAddrMaskReps*	Supported

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Group	Object	Compliance
icmp	*icmpOutMsgs*	Supported
icmp	*icmpOutErrors*	Supported
icmp	*icmpOutDestUnreachs*	Supported
icmp	*icmpOutTimeExcds*	Supported
icmp	*icmpOutParmProbs*	Supported
icmp	*icmpOutSrcQuenchs*	Supported
icmp	*icmpOutRedirects*	Supported
icmp	*icmpOutEchos*	Supported
icmp	*icmpOutEchoReps*	Supported
icmp	*icmpOutTimestamps*	Supported
icmp	*icmpOutTimestampReps*	Supported
icmp	*icmpOutAddrMasks*	Supported
icmp	*icmpOutAddrMaskReps*	Supported
tcp	*tcpRtoAlgorithm*	Supported
tcp	*tcpRtoMin*	Supported
tcp	*tcpRtoMax*	Supported
tcp	*tcpMaxConn*	Supported
tcp	*tcpActiveOpens*	Supported
tcp	*tcpPassiveOpens*	Supported
tcp	*tcpAttemptFails*	*Not supported*
tcp	*tcpEstabResets*	Supported
tcp	*tcpCurrEstab*	Supported
tcp	*tcpInSegs*	Supported
tcp	*tcpOutSegs*	Supported
tcp	*tcpRetransSegs*	Supported
tcp	*tcpConnState*	*Read-only*
tcp	*tcpConnLocalAddress*	Supported
tcp	*tcpConnLocalPort*	Supported

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Group	Object	Compliance
tcp	*tcpConnRemAddress*	Supported
tcp	*tcpConnRemPort*	Supported
tcp	*tcpInErrs*	Supported
tcp	*tcpOutRsts*	Supported
udp	*udpInDatagrams*	Supported
udp	*udpNoPorts*	Supported
udp	*udpInErrors*	Supported
udp	*udpOutDatagrams*	Supported
udp	*udpLocalAddress*	Supported
udp	*udpLocalPort*	Supported
egp	All objects	*Not supported*
transmission	All objects	*Not supported*
snmp	*snmpInPkts*	Supported
snmp	*snmpOutPkts*	Supported
snmp	*snmpInBadVersions*	Supported
snmp	*snmpInBadCommunityNames*	Supported
snmp	*snmpInBadCommunityUses*	Supported
snmp	*snmpInASNParseErrs*	*Not supported*
snmp	*snmpInTooBigs*	Supported
snmp	*snmpInNoSuchNames*	Supported
snmp	*snmpInBadValues*	Supported
snmp	*snmpInReadOnlys*	Supported
snmp	*snmpInGenErrs*	Supported
snmp	*snmpInTotalReqVars*	Supported
snmp	*snmpInTotalSetVars*	Supported
snmp	*snmpInGetRequests*	Supported
snmp	*snmpInGetNexts*	Supported
snmp	*snmpInSetRequests*	Supported

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Group	Object	Compliance
snmp	*snmpInGetResponses*	Supported
snmp	*snmpInTraps*	Supported
snmp	*snmpOutTooBigs*	*Not supported*
snmp	*snmpOutNoSuchNames*	*Not supported*
snmp	*snmpOutBadValues*	Supported
snmp	*snmpOutGenErrs*	Supported
snmp	*snmpOutGetRequests*	Supported
snmp	*snmpOutGetNexts*	Supported
snmp	*snmpOutSetRequests*	Supported
snmp	*snmpOutGetResponses*	Supported
snmp	*snmpOutTraps*	Supported
snmp	*snmpEnableAuthenTraps*	*Functions per SNMPv1 rules*

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APPENDIX A

System Specifications

The Digital Lightwave Optical Wavelength Manager (OWM) complies with the following industry and regulatory standards and unit specifications.

Network Element Product Level

Radio Frequency Devices Unintentional Radiators, Commercial Environment

FCC Part 15, Subpart B, Class A

RADIO AND TELEVISION INTERFERENCE

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

In order to maintain compliance with FCC regulations shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio & television reception.

Rack Panel Mounting Standards (Telco 1-inch pitch hole mounting also included).

ANSI/EIA-RS-310C, IEC 297-1

Unit Specifications

The functional specifications for the OWM unit are as follows:

Attribute	Values
General	
Dimensions	16"W x 3.5"H x 12"D (provided with mounting brackets for 19-inch and 23-inch equipment rack width)

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Attribute	Values
Channel Count	100 @ 50 GHz spacing for 40nm OWMs
	50 @100 GHz spacing for 40nm OWMs
	40 @100 GHz spacing for 32nm OWMs
	25 @ 200 GHz spacing for 40nm OWMs
	20 @200 GHz spacing for 32nm OWMs
Number of Input Ports	1 to 8
Dynamic range	60 dB
Channel spacing	50 GHz or greater for 40nm OWMs
	100 GHz or greater for 32nm OWMs
Noise floor	–70 dBm ±3dB
Wavelength	
Range (between peaks)	31.5 or 40 nm, C-band
Accuracy	±0.02 nm
Resolution	0.01 nm
Measurement Rate (all channels)	10 ms
Power	
Signal Measurement Range (peaks detection)	–10 dBm ±3 dB to –50 dBm ±3 dB
Resolution	0.1 dB
Accuracy	±0.5 dB
Measurement Rate (all channels)	10 ms
Optical signal-to-noise ratio (OSNR)	
Measurement Range (at 0.1 nm bandwidth)	50 GHz: 22 dB 100 GHz: 30 dB
Measurement Rate (all channels)	100 ms
Environment	
Operating Temperature Range	0 to 50° C
Power Requirement	10 W max
Power Options	–48 VDC

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Attribute	Values
Connectors	
Fiber Connector Style	SC/UPC or SC/APC
External Interfaces	
Serial Port (CRAFT)	RS-232 DB9 male CRAFT port, for Command Line Interface (CLI)
Network Ports	10Base-T Ethernet RJ45, two ports on a common hub

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CHAPTER 1

System Description

Overview

This chapter provides an overview of the Digital Lightwave Optical Wavelength Manager (OWM).

The OWM is a ready-to-integrate solution that provides spectral measurement of Dense Wavelength Division Multiplexing (DWDM) signals which includes wavelength, power and optical signal-to-noise ratio (OSNR) on a per-channel basis. Spectral parameters such as signal power, wavelength and OSNR are measured and reported through CRAFT (RS-232) or Ethernet interfaces. The unit is designed to locally or remotely monitor and manage up to 100 individual optical channels in a single DWDM signal stream and supports a channel spacing of 50 GHz or greater. The unit reports alarms based on user-preset thresholds.

The OWM supports a wavelength measurement range in the C-band, with a measurement dynamic range of 60 dB. This wide range enables the unit to simultaneously monitor optical channels with large power differences. The high optical power sensitivity of the Optical Performance Monitor (OPM) permits non-intrusive optical performance monitoring using as low as 0.1% optical taps.

The OWM operates over a temperature range between 0°C and 50°C with a low (less than 10 watts) power requirement. The unit is also designed for rapid incorporation into an optical network and features a simple interface with other DWDM units such as:

- Multiplexers
- Demultiplexers
- Erbium-Doped Fiber Amplifiers (EDFAs)
- Optical Add/Drop Multiplexer Units (OADMs)

The unit can be controlled remotely by using either of the unit's two Ethernet ports. An RS-232 console port is also provided for local control. The unit is equipped with dual –48 VDC power supply inputs. Refer to Figure 1-1 to view the front panel of the OWM.



FIGURE 1-1. Optical Wavelength Manager Overview

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OWM Styles

The OWM is available in two styles; a chassis mount version and a portable field pack version. Functionally, these two units are identical. The chassis mount OWM includes a rack-mountable assembly designed for mounting on either a 19 inch or a 23 inch EIA equipment mounting rack meeting EIA-RS-310C standards.

The portable field pack version of the OWM comes in a padded softcase with a field pack accessory kit containing:

- portable Digital Lightwave Optical Wavelength Manager (OWM)
- power supply
- terminal block power adaptor
- null modem cable
- category 5 Ethernet crossover cable to directly connect the OWM LAN port to a workstation or PC
- Java GUI Application CD
- OWM Quick Start Guide

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Physical Description

The internal and external components of the OWM are listed in the table below and described more fully in the following sections.

Location	Component
Internal	Controller
	Spectrometer
	DC Power Supply
External	Monitor Input Ports
	CRAFT Port
	LAN A and LAN B
	PCMCIA slots 1 and 2
	Alarm Port
	Device Status LEDs
	Dual Power Supply Inputs

Controller

The controller is the main CPU of the unit which manages and controls the internal peripherals and external optical devices. The controller also provides the interface ability for FTP, Telnet, SNMP, SNTP and Command Line Interface (CLI). For example, the Telnet protocol provides a remote terminal interface for accessing the Command Line Interface (CLI).

Spectrometer

The spectrometer is an internal optical measurement device which captures, digitizes and processes optical signals. The primary function of the spectrometer is to

- obtain the raw spectrum data for display and reporting purposes
- detect peaks in the optical spectrum
- measure the power, wavelength and optical signal to noise ratio (OSNR) of the detected peaks
- map the peaks to user defined optical channels

DC Power Supply

The DC power supply is a Digital Lightwave proprietary component that can be accessed from the rear of the OWM unit. Due to the proprietary nature, replacement power supplies can only be purchased directly from Digital Lightwave.

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Monitor Input Ports

The monitor input port is the conduit by which optical signals are supplied to the OWM. The OWM supports up to eight monitor input ports. The number of input ports is determined at the time of purchase. Each monitor input port is a keyed interface that can accept either an SC/UPC or SC/APC fiber connector.

CRAFT Port

The CRAFT Port is a serial RS-232/DB9M connector used to connect to a serial terminal or console program. The port is configured to run at 9600 baud, 8 bits per character, no parity, one stop bit and no flow control. The port provides a local terminal interface for accessing the Command Line Interface (CLI).

LAN A and LAN B

The standard RJ-45 connectors, LAN-A and LAN-B, are used to connect the unit to the Ethernet LAN. Either LAN port can be used because they are internally connected to each other via the OWM's own internal Ethernet hub. Ethernet communication settings must be configured prior to operating the OWM's graphical user interface (GUI), FTP, Telnet or SNMP functions.

PCMCIA slots 1 and 2

Each PCMCIA (Personal Computer Memory Card International Association) slot on the front panel is designed to accept a credit card-size I/O device. In this case, each slot may contain an ATA style card used to externally store reports generated by the OWM.

Alarm Port

A standard RJ-45 connector is used to connect an optional external alarm monitoring device to the alarm port. Typically, the connected device is intended to signal an alarm condition such as an audible device.

Device Status LEDs

The device status LEDs are meant to provide a visual signal to alert an operator of certain device status conditions. There are three device status LEDs:

- **FAIL** - indicates a system failure (i.e. optical switch, spectrometer or software checksum failure)
- **ACTIVE** - software load is in progress when blinking, otherwise, unit is operational
- **ALARM** - indicates that an alarm has been generated.

Dual Power Supply Inputs

The power supply inputs located on the front panel supply power to the OWM. Once the initial power connection is made, the OWM will boot after approximately 30 seconds. Having two power supply inputs allows uninterrupted power to the OWM when switching external batteries.

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Features

The OWM supports a variety of convenient features that make it a convenient tool for managing and monitoring optical networks. Key features supported by the OWM are:

User account levels - provides multiple user accounts with four levels of security access.

Rapid power, wavelength and OSNR acquisition - supports the ability to rapidly and accurately capture power, wavelength and OSNR.

Programmable alarms - provides the ability to program alarms on individual channels for power, wavelength and OSNR thresholds and multi/zero peaks.

Device definitions - provides the ability to map a pre-defined channel plan to an input port. The channel plan provides a tap power and channel definitions. Each channel definition provides minimum, center and maximum wavelengths plus all their critical, major and minor alarm thresholds.

Data logging - provides a convenient method for reviewing optical performance history useful for identifying network performance trends and identifying preemptive corrective action.

Benchmarking - provides the ability to record and display a snapshot of device optical activity.

General reporting - generating reports provide a convenient method for analyzing power, wavelength and OSNR measurements with respect to ports and devices.

Event/Alarm reporting - provides notification of system performance issues.

User friendly interfaces - supports a command line and graphical user interactive interface.

SNMP - as a managed device, the OWM collects and stores management information and make this information available to Network Management Systems (NMS) that use SNMP. The OWM sends traps or notification of certain events to the SNMP manager.

SNTP - provides the ability to receive time of day updates from a network time server.

Simple Network Management Protocol

The Simple Network Management Protocol (SNMP) is used to access the OWM Management Information Base (MIB).

The primary use of SNMP is to acquire current operational state and gather trend data. Read and write access "community names" can be configured to provide a degree of security to keep unauthorized parties from accessing the unit.

The unit can be configured to send SNMP traps to up to ten SNMP trap destinations when a fault/ alarm condition occurs.

SNMP Versions

The versions of the SNMP protocol supported by the Digital Lightwave™ OWM are SNMPv1 and SNMPv2c.

SNMPv1

This is the first version of the protocol and it is defined by the RFC 1157. Security is based on community strings.

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SNMPv2c

This version of the protocol is called community string-based SNMPv2. It uses community-based security from SNMPv1. It is defined by RFC 1901, RFC 1905 and RFC 1906.

SMI

The Structure of Management Information (SMI) describes the format for:

- Defining managed objects that are accessed via the SNMP protocol.
- The data types of objects.
- The format for defining events (called traps SMIv1 and notifications in SMIv2).
- Containing a few administrative assignments.

There are currently two versions of the SMI:

- SMIv1, which is defined by RFC 1155, RFC 1212 and RFC 1215.
- SMIv2, which is defined by RFC 2578, RFC 2579 and RFC 2580.

SNMP Agent

The Digital Lightwave OWM SNMP Agent supports SNMPv1 and SNMPv2c.

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The following MIBs are supported.

Table 1-1. MIBs Supported by the OWM

RFC	Status	Name
SMIv1 Data Definition Language		
1155	full standard	RFC1155-SMI
1212	full standard	RFC-1212
1215	informational	RFC1215-TRAP
SMIv2 Data Definition Language		
2578	full standard	SNMPv2-SMI
2579	full standard	SNMPv2-TC
2580	full standard	SNMPv2-CONF
SNMPv1 Protocol		
1157	full standard	RFC1157-SNMP
SNMPv2 Protocol		
1901	experimental	Community-based SNMPv2c
1905	draft standard	SNMPv2-PDU
1906	draft standard	SNMPv2-TM
SMIv1 MIB Modules		
1213	full standard	RFC1213-MIB
SMIv2 MIB Modules		
2737	proposed standard	ENTITY-MIB
2571	draft standard	SNMP-FRAMEWORK-MIB
Digital Lightwave Proprietary MIB Modules		
	proprietary	DIGL_GLOBAL_REG_MIB.mib
	proprietary	DIGL-OWM-GLOBAL-REGISTRY.mib
	proprietary	DIGL-OWM-MIB.mib

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SNMP Commands

The following SNMP commands are detailed in Chapter , "Command Line Interface"

Table 1-2. SNMP Commands

Command	Description
SNMP Add Community	Adds a community name.
SNMP Add Trap Destination	Adds an entry to the SNMP trap destinations table.
SNMP Delete Community	Deletes a community name.
SNMP Delete Trap Destination	Deletes a trap destination.
SNMP Set	Enables or disables SNMP 'set' processing.
SNMP Trap	Enables or disables sending of SNMP traps.
SNMP Authentication Trap	Enables or disables sending of SNMP Authentication traps.

FTP Server

The File Transfer Protocol (FTP) is used to:

- Download software images to the OWM
- Upload and download system configurations
- Download saved data logs

Internet Protocol (IP) Settings

IP settings must be configured before using Telnet, FTP, SNMP, SNTP or the GUI. The following IP settings can be configured:

- IP Address
- Subnet mask
- Static routing (optional)
- Default route (optional)

SNTP

Simple Network Time Protocol (SNTP) can be used to synchronize the OWM system clock with a Network Time Protocol (NTP) server on your network or the Internet. When SNTP is enabled, the OWM polls the server for time approximately every 10 minutes. SNTP can also be configured to receive broadcasts from the NTP server. The version of SNTP supported by the OWM is version 3 (RFC 1769).

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APPENDIX B
Performance Verification

This section includes the equipment required to verify the Digital Lightwave Optical Wavelength Manager (OWM) performance which includes:

- Agilent 81682 Tunable Laser or equivalent
- Agilent 81635A Optical Sensor or equivalent optical power meter
- Optical connector termination for the optical tap's primary signal output
- Two optical jumper cables with appropriate connectors

Refer to Figure 2-1 and follow the steps below:

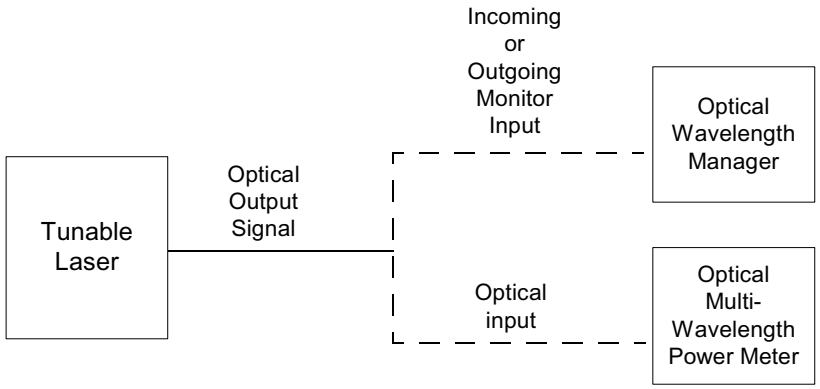


FIGURE 2-1. Test Setup Diagram

1. Connect a fiber optic patch cord from the output of the tunable laser to the input of the optical power meter.
2. Turn on the tunable laser output. Set the power to -30 dBm and set the wavelength to 1532.00 nm.
3. Configure the power meter for 1532 nm operation. Record the optical power measured by the meter (it should be nearly equal to -30 dBm).
4. Change the wavelength to 1545.00 nm; configure the power meter for this wavelength and record the power.
5. Repeat Step 4 for 1560.00 nm.
6. Set OWM tap settings to 100%.
7. Disconnect the patch cord from the power meter. Inspect and clean the connector and then connect the patch cord directly into the OWM.
8. Set the tunable laser to 1532.00 nm and record the power reading from the OWM. The OWM reading should agree with the first power meter reading within +/- 0.5 dB.
9. Repeat Step 7 for wavelengths of 1545.00 and 1560.00 nm.

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Trouble Analysis

If the power measurements made by the OWM disagree with the measurements made by the power unit, re-inspect all connectors for cleanliness and repeat the test.

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APPENDIX C

Error Messages

This appendix summarizes Command Line Interface (CLI) and Boot Loader error messages.

CLI Error Messages

Table C-1 summarizes all error messages generated by the Command Line Interface (CLI). Each table entry identifies an error number, error message, and error description. The table is organized by error type. The type of errors recognized by the CLI are:

- General Errors
- User Errors
- Network Errors
- Channel Map Errors
- Configuration Errors
- Parser Errors
- Time Errors
- SNMP Errors
- Data Log Errors
- Spectrometer Errors

The format of an error message is !ERROR: [0x8xxxxxxx] error message. An example of an error message is:

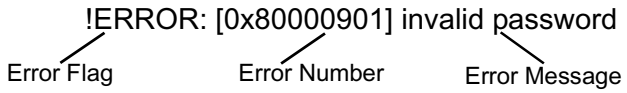


Table C-1. Command Line Interface Errors

Error Number	Error Message	Error Description/User Action
General Errors		
0x80000000	general error	A condition or command has failed.
0x80000001	invalid device	You have entered an invalid device. Enter a valid name with a maximum length of 32 characters that is unique to the OWM.
0x80000002	device already exists	You are adding a device name that already exists. Add a different valid name.

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Error Number	Error Message	Error Description/User Action
0x80000003	not in Configure Mode	You have entered a configuration command while in User Mode. You must be in Configure Mode.
0x80000004	saving configuration	There was an error saving the configuration.
0x80000005	device limit has been reached	The device limit has been reached. Only two devices can be defined. Delete a device.
0x80000006	no active device	The specified device is not active. Activate a device.
0x80000007	invalid device or device has not been activated	You are trying to get the values for a device that has not been activated or does not exist. Enter a new device name or wait until the device has been activated.
0x80000008	request timed out	The command did not process because of a time out. Enter the command again.
0x80000009	no channels are defined	The device has no channels. It has not been activated.
0x8000000A	invalid port	You have set an incorrect port. Enter a valid port name (PORT 1 to PORT n).
0x8000000B	file not found	An invalid filename was specified.
0x8000000C	file read	There was a general error reading from the file.
0x8000000D	file write	There was a general error writing to the file.
0x8000000E	invalid description	You have incorrectly specified the description for the OWM. A valid description has a maximum length of 80 characters.
0x8000000F	invalid OSNR width	You attempted to set an incorrect Optical Signal to Noise Ratio (OSNR) width number. Enter a valid value (0.1, 0.2, 0.3 or 0.4).
0x80000010	invalid location	You have not set the location description for the MIB-II SNMP agent. Set a valid location description up to 80 characters.
0x80000011	invalid contact	You have not set the contact description for the MIB-II SNMP agent. Set a valid contact description up to 80 characters.
0x80000012	invalid user id	You have set an incorrect user id. Verify that the user id path is valid.
0x80000013	invalid password	You have entered an incorrect password. Enter the correct password.
0x80000014	message timeout	The system was too busy; try repeating the command. If unsuccessful, try a reboot and run the command again.

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Error Number	Error Message	Error Description/User Action
0x80000015	slot not cleared	You have attempted to download into a slot which has not been cleared. Download again into a cleared slot.
0x80000016	invalid format	The download has encountered a problem with the format of the file being loaded. Verify the format of the file.
0x80000017	device write	Error writing to flash.
0x80000018	invalid slot	You have specified an invalid slot number. Specify the correct slot number.
0x80000019	cannot modify the default slot	You cannot change Slot 0. Modify the correct slot number.
0x8000001A	invalid alarm	You are trying to delete an alarm that does not exist.
0x8000001B	device full	You attempted to create a file or write to a full device such as the Random Access Memory (RAM) disk or the PCMCIA card. Go back and create space.
0x8000001C	no peaks are available	You are trying to define channels from peaks, but there are no peaks available.
0x8000001D	no profile is available	There was a problem reading the profile information. Try a reboot. If unsuccessful, contact technical support or the appropriate personnel.
0x8000001E	new passwords do not match	The verification password does not match the new password. When changing your password, both first and second password entries must be exact. Passwords are case sensitive.
0x80000020	source and destination files the same	The destination is the same as the source for the file copy. Copy the file to a different destination.
0x80000022	duplicate uid	Duplicate device or channel. SNMP-user related program error.
0x80000023	name specified is not a file	You specified a directory name instead of a file name. This can happen when you specify the directory name without including the file name for the destination.
0x80000024	file is read only	You are trying to delete a file that does not have write permission. This file was read only, which protects against data loss from accidental overwrite by a user.
0x80000026	file already exists	You are trying to overwrite a file that exists with the same name. Use a different file name.

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Error Number	Error Message	Error Description/User Action
0x80000030	slot is already cleared	You cleared a slot that was previously cleared. Type **show software** to view all slots and active states.
0x80000031	unsupported option	You are attempting to select 50GHz spacing when doing a channel-from-peaks on a 100GHz spectrometer.
User Errors		
0x80000900	invalid access rights	You do not have the appropriate access right to perform the current operation.
0x80000901	invalid password	You have typed the wrong password. The password entry is case sensitive.
0x80000902	user factory	The customer has attempted to change a factory image of a setting.
0x80000903	invalid username	No account exists for the specified username.
0x80000904	duplicate username	An account already exists for the specified username.
0x80000905	invalid user level	A specified user level does not exist.
0x80000906	user account limit reached	An account can not be added, because the maximum number of accounts was reached. The total number of user accounts including the Administrator account is ten.
0x80000908	one *admin* user account allowed	A second *admin* user account can not be added, because the account level policy specifies that only one user account, which is usually the *admin* user account, can have administrative privileges.
Network Errors		
0x80000101	invalid name	You have entered an invalid name. Either the name does not exist or you have entered more than 32 characters,
0x80000111	MAC address not configured	The MAC address was not configured. Set the correct MAC address.
0x80000121	invalid IP address	You have set an invalid IP address. Set the correct IP address.
0x80000122	invalid IP netmask	You have set an invalid IP/netmask. Set the correct IP netmask.
0x80000123	failed to set IP configuration	You have set an invalid IP/netmask. Enter a valid Class A, B or C IP address.

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Error Number	Error Message	Error Description/User Action
0x80000124	failed to get IP configuration	You did not configure the IP address.
0x80000125	IP not configured	You did not configure a valid IP address.
0x80000131	invalid IP route destination	You have entered an incorrect destination network. Enter a valid destination parameter.
0x80000132	invalid IP route netmask	You have entered an incorrect subnet mask. Enter a valid netmask parameter.
0x80000133	invalid IP route gateway	You have entered an incorrect gateway address. Enter a valid gateway parameter.
0x80000134	failed to add IP route	You have not added an IP route on the OWM device. Add the IP route.
0x80000135	failed to delete IP route	You have not deleted an IP route defined on the OWM device. Delete the IP route.
0x80000136	failed to get IP route(s)	There was an internal error while reading the IP routing table.
0x80000137	failed to flush IP route(s)	The flush command did not flush the IP routing table on the OWM device.
0x80000A10	No SNTP servers configured	No SNTP servers have been configured.
0x80000A11	Max server limit exceeded	The maximum number of SNTP servers have been configured.
Channel Map Errors		
0x80000201	invalid tap power	You have incorrectly set the tap power. The valid tap power range is from 0.1 to 100.0 and is a percentage.
0x80000202	invalid minimum wavelength	You have incorrectly set the Minimum wavelength. The Minimum wavelength must be less than the Center wavelength. Refer to Chapter , "Configuration" for additional information about wavelength alarms.
0x80000203	invalid center wavelength	You have incorrectly set the Center wavelength. The Center wavelength must be greater than the Minimum wavelength and less than the Maximum wavelength. Refer to Chapter , "Configuration" for additional information about wavelength alarms.

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Error Number	Error Message	Error Description/User Action
0x80000204	invalid maximum wavelength	You have incorrectly set the Maximum wavelength. The maximum wavelength must be less than the next Minimum wavelength. Refer to Chapter , "Configuration" for additional information about wavelength alarms.
0x80000205	invalid channel number	You are trying to query against an invalid channel. Enter a new channel.
0x80000207	overlapping channel definition	You are within the bandwidth of another channel.
0x80000208	duplicate channel definition	The center wavelengths are being checked.
0x8000020A	channel limit has been reached	You have attempted to enter too many channels. The maximum number of channels is 50.
0x8000020B	not all alarms could be generated	Required alarms could not be generated. Generate the alarms via the Channel Device.
0x80000220	invalid alarm - critical minimum power	You are entering the incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x80000221	invalid alarm - critical maximum power	You are entering the incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x80000222	invalid alarm - critical minimum wavelength	You are entering the incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x80000223	invalid alarm - critical maximum wavelength	You are entering the incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x80000224	invalid alarm - critical minimum wavelength	You are entering the incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x80000225	invalid alarm - major minimum power	You are entering the incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x80000226	invalid alarm - major maximum power	You are entering the incorrect value. Enter a valid value. Refer to Chapter , "Configuration".

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Error Number	Error Message	Error Description/User Action
0x80000227	invalid alarm - major maximum wavelength	You are entering the incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x80000228	invalid alarm - major maximum wavelength	You are entering an incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x80000229	invalid alarm - major minimum OSNR	You are entering an incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x8000022A	invalid alarm - minor minimum power	You are entering an incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x8000022B	invalid alarm - minor maximum power	You are entering an incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x8000022C	invalid alarm - minor minimum wavelength	You are entering an incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x8000022D	invalid alarm - minor maximum wavelength	You are entering an incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
0x8000022E	invalid alarm - minor minimum OSNR	You are entering an incorrect value. Enter a valid value. Refer to Chapter , "Configuration".
Configuration Errors		
0x80000300	already in Configure Mode	The configure command cannot be repeated. You are already in Configure Mode.
0x80000301	configuration is locked by another user	Another user has Configure Mode. Only one user is allowed in this mode at a time. Resolve with the other user.
0x80000302	not in Configure Mode	The CLI was not in Configure Mode. Type the configure command.

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Error Number	Error Message	Error Description/User Action
0x80000304	configuration changes have not been applied	You saved the changes before you applied them. First, use the Apply command to apply the changes, then use the Save command to save the changes.  If you exit from Configure Mode without saving your changes, you lose all your changes unless you reenter Configure Mode and Save the changes.
0x80000305	configuration changes have not been saved	You applied the changes, but did not save them. First, use the Apply command to apply the changes, then use the Save command to save the changes. You can also get this error message if you did not apply as well as save your changes.  If you exit from Configure Mode without saving your changes, you lose all your changes unless you reenter Configure Mode and Save the changes.
Parser Errors		
0x80000303	write permission has been taken by another user	Another user has taken write permission. You are back at the user prompt.
0x80000400	syntax error	You have entered something invalid. Enter the information again.
0x80000401	parsing error	You have misspelled the command or parameters are missing. Enter the command again and verify the parameters.
Time Errors		
0x80000500	invalid year	You incorrectly set the year. Enter a valid four digit number representing the year.
0x80000501	invalid month	You have set an incorrect number. Enter valid two digit numbers representing the month (01-12).
0x80000502	invalid day	You have set an incorrect number. Enter valid two digit numbers representing the day (01-31).
0x80000503	invalid hour	You have set an incorrect number. Enter a valid number representing hours (0-23).

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Error Number	Error Message	Error Description/User Action
0x80000504	invalid minute	You have set an incorrect number. Enter a valid number representing minutes (0-59).
0x80000505	invalid second	You have set an incorrect number. Enter a valid number representing seconds (0-59).
SNMP Errors		
0x80000600	community already exists	The SNMP community already exists. Add a valid community.
0x80000601	invalid community name	The community string entered was incorrect. Enter a valid community string with a maximum length of 127 characters.
0x80000602	invalid community access	You have tried to pass in an invalid access.
0x80000603	too many communities defined	You have defined too many communities.
0x80000604	invalid SNMP index	You have attempted to run an SNMP operation with an invalid index or UID number (an index or UID is used to identify an SNMP object). Enter a valid number.
0x80000610	destination already exists	You have entered a destination that already exists. Enter a new destination.
0x80000611	invalid trap destination IP	You have entered an incorrect parameter. Enter a new parameter.
0x80000612	too many trap destinations defined	You have defined too many trap destinations. The are only 10 trap destinations.
0x80000613	invalid version	You have set an incorrect version number. Enter a valid version number. Use 1 for SNMPv1. Use 2 for SNMPv2c.
Data Log Errors		
0x80000700	saving data log file	There was an error saving the file.
0x80000701	Invalid data log type	You have set the incorrect data log type. Enter a valid data log.
0x80000702	invalid data log slot	You have set the incorrect data log slot. Enter valid minutes (1-60), Hours (1-24) or Day (1-7).

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Error Number	Error Message	Error Description/User Action
0x80000703	data log has not been used	You have entered a slot number that has not been used. Use a different slot number or wait until the slot is used.
Spectrometer Errors		
0x80000800	spectrometer initializing	The Spectrometer was being initialized. Retry the command in a few seconds.
0x80000801	spectrometer temperature above maximum	The Spectrometer has detected an internal temperature above the maximum rated operating temperature.
0x80000802	spectrometer temperature below minimum	The Spectrometer has detected an internal temperature below the minimum rated operating temperature.
0x80000803	spectrometer saturation error	The Spectrometer has detected an optical power input level above the rated limit.
0x80000804	spectrometer software error	The Spectrometer has reported an internal (software) error.
0x80000805	spectrometer communication error	The Spectrometer was not communicating properly with the Controller.
0x80000806	spectrometer not booted	The Spectrometer was at the boot prompt and was not currently available.
0x80000807	spectrometer reset	The Spectrometer has just reset the CPU and was not currently available.
0x80000906	user account limit reached	An account can not be added, because the maximum number of accounts was reached. The total number of user accounts including the Administrator account is ten.
0x80000908	one *admin* user account allowed	A second *admin* user account can not be added, because the account level policy specifies that only one user account, which is usually the *admin* user account, can have administrative privileges.

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Boot Loader Error Messages

Table C-2 summarizes the errors generated by the Boot Loader and provides a brief description of these errors. All Boot Loader error messages are preceded by !ERROR:

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Table C-2. Boot Loader Error Messages

Error Message	Error Description
IP configuration failed	You did not configure a valid IP address.
invalid software id: <slot>	You have specified an invalid slot number. Specify the correct slot number.
MAC address not configured	The MAC address is not configured. Specify the correct MAC address.
permission denied	You tried to clear the factory application image.
bad identifier	You entered an invalid slot number.
download is not active	You sent the software or download file without first executing a download command.
erase failed	Hardware error caused by trying to erase flash memory.
failed getting route(s)	There is an internal error while reading the IP routing table.
failed to add route	You have not added an IP route on the OWM device. Add the IP route.
failed to delete route	You have not deleted an IP route defined on the OWM device. Delete the IP route.
failed to flush route(s)	The flush command did not flush the IP routing table on the OWM device.
flash error 0x<address> <length>	Hardware error writing to flash memory.
flash error, commit	Error writing to flash memory.
invalid IP address	You set an invalid IP address. Set the correct IP address.
invalid IP destination	You set an invalid IP destination. Set the correct IP destination.
invalid IP gateway	You set an invalid IP gateway. Set the correct IP gateway.
invalid IP netmask	You set an invalid IP netmask. Set the correct IP netmask.
invalid IP route destination	You set an invalid IP route destination. Set the correct IP route destination.
invalid IP route netmask	You set an invalid IP/route netmask. Set the correct IP route netmask.
invalid filename	An invalid file name was specified.
invalid format	The download has encountered a problem with the format of the file being loaded. Verify the format of the file.
invalid record	Download error in the file.

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Table C-2. Boot Loader Error Messages

Error Message	Error Description
ioctl error	Internal error setting the baud rate.
lock error	Internal error locking flash.
network/IP address not configured	You did not configure a valid network IP address.
software block not cleared	Operator failed to clear slot before downloading.
software download is not active	Internal software error.
software erase error	Hardware error erasing flash.
unrecognized record type	Software download file has invalid format.

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APPENDIX D

Alarm and Event Messages

This appendix contains a table of alarm and event messages generated by the OWM.

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ID	Object	Type	Severity	Problem	Description
93000001	optical-channel	communications	critical-alarm	loss-of-signal	critical: minimum channel wavelength
92000001	optical-channel	communications	critical-alarm-clear	loss-of-signal	critical-clear: minimum channel wavelength
83000001	optical-channel	communications	major-alarm	degraded-signal	major: minimum channel wavelength
82000001	optical-channel	communications	major-alarm-clear	degraded-signal	major-clear: minimum channel wavelength
73000001	optical-channel	communications	minor-alarm	degraded-signal	minor: minimum channel wavelength
72000001	optical-channel	communications	minor-alarm-clear	degraded-signal	minor-clear: minimum channel wavelength
93000002	optical-channel	communications	critical-alarm	loss-of-signal	critical: maximum channel wavelength
92000002	optical-channel	communications	critical-alarm-clear	loss-of-signal	critical-clear: maximum channel wavelength
83000002	optical-channel	communications	major-alarm	degraded-signal	major: maximum channel wavelength
82000002	optical-channel	communications	major-alarm-clear	degraded-signal	major-clear: maximum channel wavelength
73000002	optical-channel	communications	minor-alarm	degraded-signal	minor: maximum channel wavelength
72000002	optical-channel	communications	minor-alarm-clear	degraded-signal	minor-clear: maximum channel wavelength
93000003	optical-channel	communications	critical-alarm	loss-of-signal	critical: minimum channel power
92000003	optical-channel	communications	critical-alarm-clear	loss-of-signal	critical-clear: minimum channel power
83000003	optical-channel	communications	major-alarm	degraded-signal	major: minimum channel power
82000003	optical-channel	communications	major-alarm-clear	degraded-signal	major-clear: minimum channel power
73000003	optical-channel	communications	minor-alarm	degraded-signal	minor: minimum channel power

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ID	Object	Type	Severity	Problem	Description
72000003	optical-channel	communications	minor-alarm-clear	degraded-signal	minor-clear: minimum channel power
93000004	optical-channel	communications	critical-alarm	loss-of-signal	critical: maximum channel power
92000004	optical-channel	communications	critical-alarm-clear	loss-of-signal	critical-clear: maximum channel power
83000004	optical-channel	communications	major-alarm	degraded-signal	major: maximum channel power
82000004	optical-channel	communications	major-alarm-clear	degraded-signal	major-clear: maximum channel power
73000004	optical-channel	communications	minor-alarm	degraded-signal	minor: maximum channel power
72000004	optical-channel	communications	minor-alarm-clear	degraded-signal	minor-clear: maximum channel power
93000005	optical-channel	communications	critical-alarm	loss-of-signal	critical: minimum channel OSNR
92000005	optical-channel	communications	critical-alarm-clear	loss-of-signal	critical-clear: minimum channel OSNR
83000005	optical-channel	communications	major-alarm	degraded-signal	major: minimum channel OSNR
82000005	optical-channel	communications	major-alarm-clear	degraded-signal	major-clear: minimum channel OSNR
73000005	optical-channel	communications	minor-alarm	degraded-signal	minor: minimum channel OSNR
72000005	optical-channel	communications	minor-alarm-clear	degraded-signal	minor-clear: minimum channel OSNR
73000006	hardware	environmental	minor-alarm	temperature-unacceptable	minor: minimum internal temperature
72000006	hardware	environmental	minor-alarm-clear	temperature-unacceptable	minor-clear: minimum internal temperature
73000007	hardware	environmental	minor-alarm	temperature-unacceptable	minor: maximum internal temperature
72000007	hardware	environmental	minor-alarm-clear	temperature-unacceptable	minor-clear: maximum internal temperature

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ID	Object	Type	Severity	Problem	Description
73000008	hardware	equipment	minor-alarm	power-problem	minor: power supply error
72000008	hardware	equipment	minor-alarm-clear	power-problem	minor-clear: power supply error
93000009	optical-channel	communications	critical-alarm	degraded-signal	critical: multiple peaks in channel
92000009	optical-channel	communications	critical-alarm-clear	degraded-signal	critical-clear: multiple peaks in channel
31000010	software	security	transient-condition	security	transient: multiple failed logins
73000011	optical-port	communications	minor-alarm	equipment-malfunction	minor: optical switch error
72000011	optical-port	communications	minor-alarm-clear	equipment-malfunction	minor-clear: optical switch error
11000014	software	administration	administrative	notification	admin: alarms acknowledged
11000015	software	administration	administrative	notification	admin: sequencer started
11000016	software	administration	administrative	notification	admin: sequencer stopped
11000019	software	administration	administrative	notification	admin: configuration saved
11000020	software	administration	administrative	notification	admin: configuration reloaded
11000021	optical-channel-map	communications	administrative	notification	admin: device activated
11000022	optical-port	administration	administrative	notification	admin: port activated
11000023	optical-port	administration	administrative	notification	admin: port deactivated
73000024	hardware	equipment	minor-alarm	equipment-malfunction	minor: spectrometer error
72000024	hardware	equipment	minor-alarm-clear	equipment-malfunction	minor-clear: spectrometer error

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ID	Object	Type	Severity	Problem	Description
53000025	software	administration	local-condition	notification	local: Configure Mode
52000025	software	administration	local-condition-clear	notification	local-clear: Configure Mode
11000026	software	administration	administrative	notification	admin: configuration applied
93000027	optical-port	communications	critical-alarm	loss-of-signal	critical: spectrometer saturated
92000027	optical-port	communications	critical-alarm-clear	loss-of-signal	critical-clear: spectrometer saturated
11000028	software	administration	administrative	notification	admin: SNMP system table modified
11000029	software	administration	administrative	notification	admin: spectrometer restarted
53000030	hardware	equipment	local-condition	notification	local: PCMCIA unknown card inserted
52000030	hardware	equipment	local-condition-clear	notification	local-clear: PCMCIA unknown card inserted
73000031	hardware	equipment	minor-alarm	equipment-malfunction	minor: PCMCIA card error
72000031	hardware	equipment	minor-alarm-clear	equipment-malfunction	minor-clear: PCMCIA card error
53000032	hardware	equipment	local-condition	notification	local: PCMCIA ATA card inserted
52000032	hardware	equipment	local-condition-clear	notification	local-clear: PCMCIA ATA card inserted
73000033	hardware	equipment	minor-alarm	equipment-malfunction	minor: spectrometer software unsupported
72000033	hardware	equipment	minor-alarm-clear	equipment-malfunction	minor-clear: spectrometer software unsupported
93000034	optical channel	communications	critical-alarm	degraded-signal	critical: zero peaks in channel

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ID	Object	Type	Severity	Problem	Description
92000034	optical channel	communications	critical-alarm-clear	degraded-signal	critical-clear: zero peaks in channel
73000035	software	administration	remote-alarm	notification	remote: SNTP server not responding
72000035	software	administration	remote-alarm-clear	notification	remote-clear: SNTP server not responding
11000036	software	administration	administrative	notification	admin: SNTP set local time
73000037	hardware/ software	equipment	minor-alarm	equipment malfunction	minor: fault detected
72000037	hardware/ software	equipment	minor-alarm	clear equipment malfunction	minor-clear: fault detected
11000038	software	administration	administrative	notification	admin: benchmarks saved
11000039	software	administration	administrative	notification	admin: hdl not saved - no disk
11000040	software	administration	administrative	notification	admin: hdl error creating directory
11000041	software	administration	administrative	notification	admin: disk log not saved - no space
11000042	software	administration	administrative	notification	admin: disk log error creating/opening file

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Glossary

A

Alarm

Visible or audible signal indicating that an equipment failure or significant event/condition has occurred.

Alarm Severity

An attribute defining the priority of the alarm message.

Attribute

Alarm indication level: critical, major, minor or no alarm.

C

Channel

A sub-unit of transmission capacity within a defined higher level of transmission capacity.

CIT

see Craft Interface Terminal

CLI

see Command Line Interface

Command Line Interface (CLI)

A set of commands issued by the user to configure and retrieve data from the OWM.

CR

see Critical

Craft Interface Terminal (CIT)

The user interface terminal used by craft personnel to communicate with a network element.

Critical (CR)

Alarm that indicates a severe, service-affecting condition.

D

Data

A collection of system parameters and their associated values.

dB

Decibels.

dBm

Decibels relative to a milliwatt.

Decibel

see dBm

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Demultiplexer

A device that splits a combined signal into individual signals at the receiver end of transmission.

Demultiplexing

A process applied to a multiplexed signal for recovering signals combined within it and for restoring the distinct individual channels of these signals.

Dense Wavelength Division Multiplexing (DWDM)

Transmitting more than one signal of different wavelengths simultaneously over a single fiber.

DWDM

see Dense Wavelength Division Multiplexing

E

EDFA

see Erbium-Doped Fiber Amplifier

Erbium-Doped Fiber Amplifier (EDFA)

An optical network element used to increase the power of DWDM signals.

F

FTP

see File Transfer Protocol

File Transfer Protocol

File Transfer Protocol (FTP) is used to transfer configuration and log files. It can also be used to update software.

G

Graphical User Interface (GUI)

The GUI provides a graphical view to the same data as the CLI.

GUI

see Graphical User Interface

H

Histogram

A Histogram is a bar graph of a frequency distribution in which the widths of the bars are proportional to the classes into which the variable has been divided and the heights of the bars are proportional to the class frequencies.

I

IEC

see International Engineering Consortium

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International Engineering Consortium (IEC)

The International Engineering Consortium provides a partnership between academia and industry by providing quality continuing education, research, publications, and service programs for the international information industry.

International Organization for Standardization (ISO)

The International Organization for Standardization provides standards or documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose.

ISO

see International Organization for Standardization

L

LAN

see Local Area Network

Local Area Network (LAN)

A communications network that covers a limited geographic area, is privately owned and user administered, is mostly used for internal transfer of information within a business, is normally contained within a single building or adjacent group of buildings and transmits data at a very rapid speed.

LOS

see Loss of Signal

Loss of Signal (LOS)

The complete absence of an incoming signal.

M

Major (MJ)

Indicates a service-affecting failure, main or unit controller failure or power supply failure.

Management Information Base (MIB)

The OWM MIB consists of MIB-II and private extensions. These extensions provide all numerical and state information available that describes the operating state of the OWM and the optical devices that the OWM is managing.

MIB

see Management Information Base

Minor (MN)

Indicates a non-service-affecting failure of equipment or facility.

MJ

see Major

MN

see Minor

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Multiplexing

A procedure by which multiple lower order path layer signals are adapted into a higher order path or the multiple higher order path layer signals are adapted into a multiplex section.

N

nm

nanometers.

Node

A network element in a ring or, more generally, in any type of network. In a network element supporting interfaces to more than one ring, node refers to an interface that is in a particular ring. Node is also defined as all equipment that is controlled by one system controller. A node is not always directly manageable by a management system.

O

OADM

Optical Add/Drop Multiplexer Units

OPM

see Optical Performance Manager

Optical Add/Drop Multiplexer Units (OADM)

This multiplexer allows network operators to flexibly add/drop/express bi-directional wavelengths anywhere in the network and easily reconfigure as necessary to reduce network planning cycles and rapidly deploy new services.

Optical Line Signal

A multiplexed optical signal containing multiple wavelengths or channels.

Optical Performance Manager (OPM)

A non-intrusive wavelength monitor that enables carriers to "see the light" and proactively manage their networks.

Optical Wavelength Manager (OWM)

An instrument designed to measure optical power, signal wavelength and the optical signal-to-noise ratio (OSNR) in each channel of a DWDM system.

OSNR

Optical signal-to-noise ratio.

OWM

see Optical Wavelength Manager

P

Parameter

A variable that is given a value for a specified application. A constant, variable or expression that is used to pass values between components.

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PCMCIA (Personal Computer Memory Card International Association)

The PCMCIA slot is a credit card-size memory or I/O device.

Port

The physical interface, consisting of both an input and output, where an electrical or optical transmission interface is connected to the system and may be used to carry traffic between network elements.

S

Simple Network Time Protocol (SNTP)

Simple Network Time Protocol (SNTP) can be used to synchronize the OWM system clock with a time server on your network or the Internet.

SMI

see Structure of Management Information

SNMP

The Simple Network Management Protocol (SNMP) is used to access the OWM Management Information Base (MIB).

SNTP

see Simple Network Time Protocol

Spectrometer

The spectrometer is the internal optical measurement device of the unit which captures, digitizes and processes optical signals.

Structure of Management Information (SMI)

The Structure of Management Information is used by SNMP to define the format for managed objects, object data types and defining events.

U

UID

Unique Identification number. All items on the OWM have a UID. The number is unique for all items of a common type. For example, all devices have a number that uniquely identifies it from the other devices. Each channel has its own UID that is unique for the device. However, a channel UID for one device might also be used for a different device.

V

Value

A number, text string or other menu selection associated with a parameter.

Variable

An item of data named by an identifier. Each variable has a type, such as Integer or String and a scope.

X

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