



## **Cisco ONS 15216 EDFA2 Operations Guide**

Release 2.0  
June 2002

### **Corporate Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
<http://www.cisco.com>  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 526-4100

Text Part Number: 78-13908-02

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The following information is for FCC compliance of Class A devices: 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 users will be required to correct the interference at their own expense.

The following information is for FCC compliance of Class B devices: The equipment described in this manual generates and may radiate radio-frequency energy. If it is not installed in accordance with Cisco's installation instructions, it may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in part 15 of the FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

Modifying the equipment without Cisco's written authorization may result in the equipment no longer complying with FCC requirements for Class A or Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the Cisco equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the equipment to one side or the other of the television or radio.
- Move the equipment farther away from the television or radio.
- Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

Modifications to this product not authorized by Cisco Systems, Inc. could void the FCC approval and negate your authority to operate the product.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

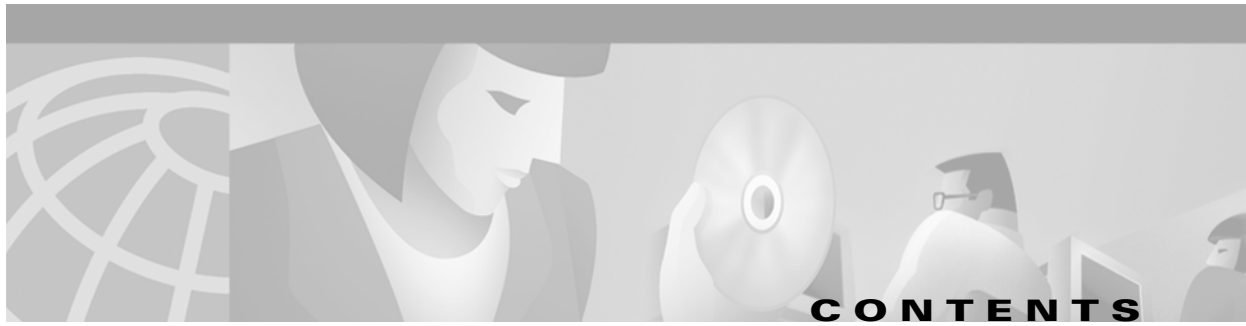
CCIP, the Cisco *Powered* Network mark, the Cisco Systems Verified logo, Cisco Unity, Follow Me Browsing, FormShare, Internet Quotient, iQ Breakthrough, iQ Expertise, iQ FastTrack, the iQ Logo, iQ Net Readiness Scorecard, Networking Academy, ScriptShare, SMARTnet, TransPath, and Voice LAN are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn, Discover All That's Possible, The Fastest Way to Increase Your Internet Quotient, and iQuick Study are service marks of Cisco Systems, Inc.; and Aironet, ASIST, BPX, Catalyst, CCDA, CCDP, CCIE, CCNA, CCNP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, the Cisco IOS logo, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Empowering the Internet Generation, Enterprise/Solver, EtherChannel, EtherSwitch, Fast Step, GigaStack, IOS, IP/TV, LightStream, MGX, MICA, the Networkers logo, Network Registrar, *Packet*, PIX, Post-Routing, Pre-Routing, RateMUX, Registrar, SlideCast, StrataView Plus, Stratm, SwitchProbe, TeleRouter, and VCO are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and certain other countries.

All other trademarks mentioned in this document or Web site are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0203R)

*Cisco ONS 15216 EDFA2 Operations Guide*

Copyright © 2002, Cisco Systems, Inc.

All rights reserved.



**Preface**    **xiii**

- Obtaining Documentation    **xiii**
  - World Wide Web    **xiii**
  - Optical Networking Product Documentation CD-ROM    **xiii**
  - Ordering Documentation    **xiii**
  - Documentation Feedback    **xiv**
- Obtaining Technical Assistance    **xiv**
  - Cisco.com    **xiv**
  - Technical Assistance Center    **xiv**
    - Contacting TAC by Using the Cisco TAC Website    **xv**
    - Contacting TAC by Telephone    **xv**

---

**CHAPTER 1**

**Applications**    **1-1**

- Bandwidth-On-Demand    **1-1**
- Wavelength Protection Switching    **1-1**
- Key Features    **1-3**
  - Constant Gain Mode    **1-3**
  - Gain Flattening    **1-3**
  - Transient Suppression    **1-4**
  - Low Noise    **1-4**
  - SNMP MIBs    **1-4**

---

**CHAPTER 2**

**Technical Specifications**    **2-1**

- Optical Specifications    **2-1**
  - Maximum Input Power    **2-2**
  - Upgrading from a Single Channel to the Maximum Number of Channels    **2-2**
- Electrical Specifications    **2-3**
- Mechanical Specifications    **2-4**
- External Features    **2-4**
- Front Panel    **2-5**

---

**CHAPTER 3**

**Installation**    **3-1**

- Introduction    **3-1**
  - Hardware Description    **3-1**

- Standard Precautions 3-1
- Placement and Power Connection 3-1
  - General Rack Hazards 3-1
  - Rack Installation and Power Supply Procedures 3-2
- Communications 3-2
  - Alarm Relay Contacts (RJ-45) 3-3
  - Alarm Connection Procedure 3-3
    - LED Alarm Definitions and Functions 3-4
  - SC/UPC Optical Ports 3-5
    - Safety Requirements 3-5
    - Optical Connection Procedure 3-6
    - Optical Amplification Operation Verification Procedure 3-6
  - Serial Interface (RS-232) – Local and Remote and Communication via Modem or Telnet 3-7
    - Required Equipment 3-7
    - RS-232 Connection Procedure 3-7
  - Remote Communication Setup 3-11
  - Remote Communication Component Requirements 3-11
  - Modem Signals 3-12
  - Modem Power Up 3-12
  - Configuration Settings 3-13
  - Setting and Saving Modem Settings 3-14
  - PC to ONS 15216 EDFA2 Direct Connection 3-14
  - Telnet Session 3-15
    - Connecting Through Telnet Procedure 3-15

**CHAPTER 4**

**Provisioning 4-1**

- Login Procedure 4-1
- Set the IP Address Procedure 4-2
- Connect Through a Telnet Session Procedure (Optional) 4-3
- Set Power Bus Mode (Simplex or Duplex) 4-3
- Verify Amplifier Operational Status 4-3
- Set Gain 4-4
- Set Alarm Thresholds 4-4
- Set Password 4-11
- Save Changes 4-11
- Logoff 4-11

## CHAPTER 5

**SNMP MIB Installation and Configuration 5-1**

SNMP Overview	5-1
SNMP Components	5-1
ONS 15216 EDFA2 SNMP Elements	5-1
SNMP Agent	5-2
SNMP MIB	5-3
SNMP Manager	5-3
SNMP MIBs and Message Types	5-3
Command Syntax Using the SNMP Agent	5-4
Enabling SNMP Remote Management Community Strings	5-5
Creating a View	5-6
Set View Entry	5-6
Creating a Community Entry	5-7
Set CommunityEntry	5-7
Display CommunityEntry	5-8
Tables and Groups	5-9
cerent15216EdfaCfgGroup Table	5-10
cerent15216EdfaPumpCfgEntry Table	5-11
cerent15216EdfaOverallStatusGroup Table	5-12
cerent15216EdfaOverallControl Table	5-13
cerent15216EdfaPumpStatusEntry	5-13
cerent15216EdfaAlarmEntry Table	5-14
cerent15216EdfaOpGroup Table	5-15
cerent15216EdfaVersionGroup Table	5-16
Setting Up Traps	5-16
Trap Display Command	5-17
Trap Set Command	5-17
Set Agent Trap Enable	5-18
Get Agent Trap Enable	5-18
Retrieving Information	5-18
IP Address	5-18
Date and Time	5-19
Power Gain	5-20
Case Temperature	5-21
Temperature Alarm Threshold	5-21
CtmpMin	5-21
CtmpMax	5-22
Case Temperature Alarm Hysteresis	5-22
CtmpMaxHysteresis	5-22

- CtmpMinHysteresis 5-22
- Power BUS Mode 5-23
  - PowerBusMode 5-23
  - PowerBusDCVoltageMax 5-23
  - PowerBusDCVoltageMin 5-23
- Loss of Input Power Value (Input Power) 5-23
  - InPowerduW 5-23
  - InPowerdBm 5-24
- Loss of Input Power Alarm Threshold 5-24
  - LOSThreshold 5-24
- Loss of Input Power Alarm Hysteresis 5-24
- Loss of Output Power Value (Output Power) 5-25
  - OutPoweruW 5-25
  - OutPowerdBm 5-25
- Loss of Output Power Alarm Setpoint 5-25
  - LpoutSetpoint 5-25
  - LpoutDeviation 5-26
- Loss of Output Power Alarm Hysteresis 5-27
  - LpoutHysteresis 5-27
  - AlarmEntry 5-27

**CHAPTER 6**

**CLI Commands 6-1**

- Configuration Commands 6-3
  - srom cfg boot display Command 6-4
  - srom cfg boot modify Command 6-4
  - srom cfg ip display Command 6-5
  - srom cfg ip modify Command 6-5
  - pdm busmode display Command 6-5
  - pdm busmode modify Command 6-6
  - pdm cfg threshold display Command 6-6
  - pdm cfg threshold bus modify Command 6-6
  - gain gain display Command 6-6
  - gain gain modify Command 6-6
  - voa power input display Command 6-6
- Administrative Commands 6-7
  - clear Command 6-7
  - exit Command 6-7
  - help Command 6-7
  - history Command 6-7

login and logoff Commands	6-8
processor reset Command	6-8
Shell Commands	6-8
shell lines set Command	6-9
shell more disable and enable Commands	6-9
shell rows set Command	6-9
shell status display Command	6-9
FFS Commands	6-9
SNMP Commands	6-10
snmp attribute get Command	6-10
snmp attribute list Command	6-11
snmp attribute set Command	6-12
snmp mib display Command	6-12
snmp mib get Command	6-12
snmp mib list Command	6-13
snmp row display Command	6-13
snmp row get Command	6-14
snmp row set Command	6-14
snmp session community get Command	6-15
snmp session community set Command	6-15
snmp session transmission get Command	6-15
snmp session transmission set Command	6-16
snmp session version get Command	6-16
snmp subtree display Command	6-16
snmp subtree get Command	6-17
snmp subtree list Command	6-17
snmp table display Command	6-18
snmp table get Command	6-19
snmp table list Command	6-19
snmp tree attribute list Command	6-20
User Commands	6-20
user entry create Command	6-21
user entry delete Command	6-21
user file display and user name display Command	6-21
user passwd set Command	6-22
user active list Command	6-22
user active message send Command	6-22
Manufacturing Information Access	6-23
snmp table display local entPhysicalEntry Command	6-23

- snmp table display cerent15216EdfaCommTrapEntry Command 6-23
- Restore Commands 6-24
  - manufacturers restore defaults passwords Command 6-24
  - manufacturer restore defaults all Command 6-24
- Manufacturer Mode 6-24

---

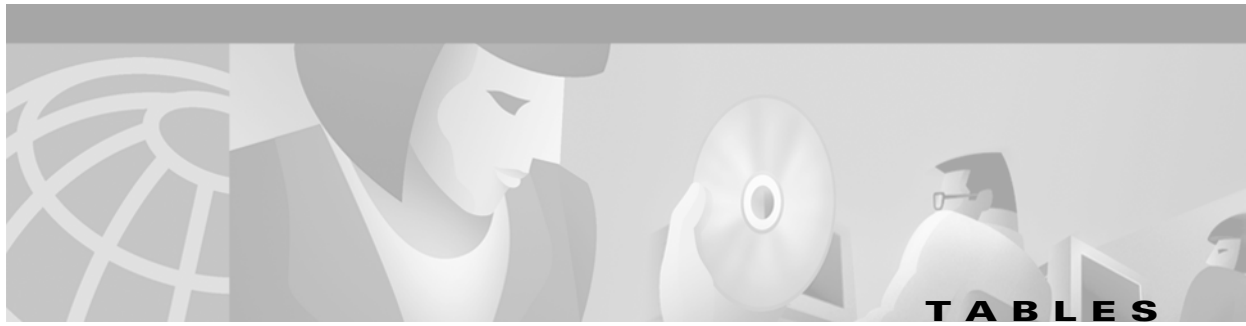
**CHAPTER 7**

- FTP Command Line 7-1**
  - Logging into the FTP Command Line 7-1
  - FTP Commands 7-1

---

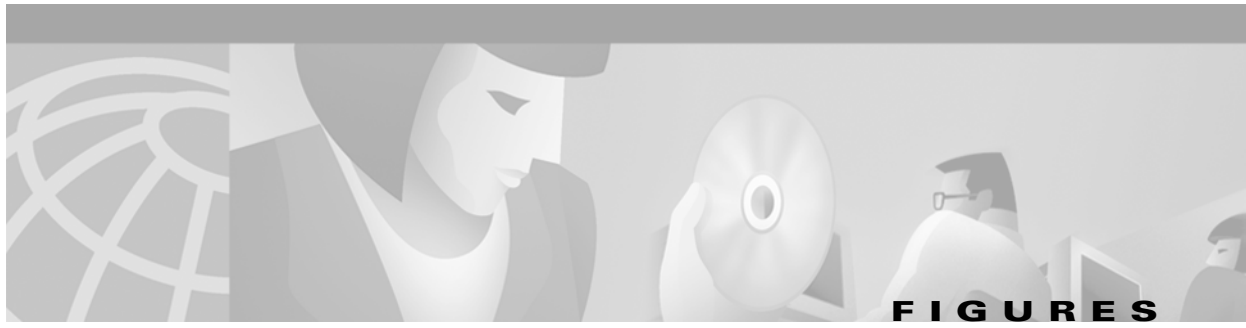
**INDEX**





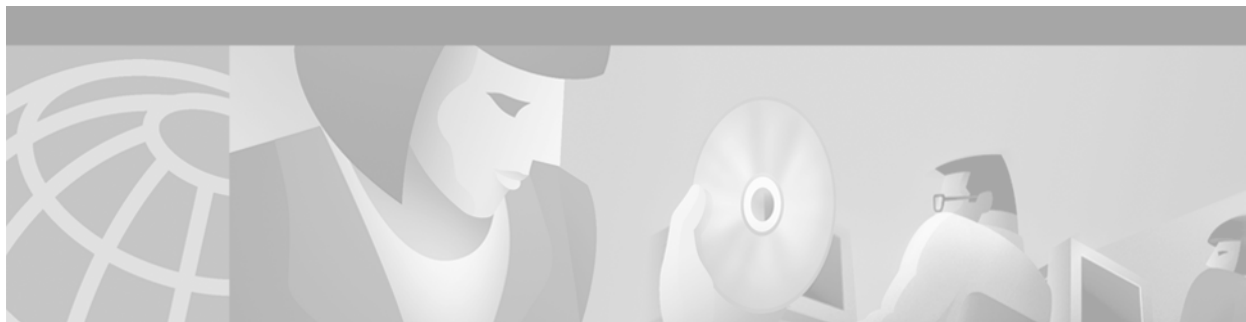
<i>Table 2-1</i>	<a href="#">ONS 15216 EDFA2 Optical Specifications</a>	<b>2-1</b>
<i>Table 2-2</i>	<a href="#">Channel Power (Gain = 13 dBm)</a>	<b>2-2</b>
<i>Table 2-3</i>	<a href="#">ONS 15216 EDFA2 Electrical Specifications</a>	<b>2-3</b>
<i>Table 2-4</i>	<a href="#">ONS 15216 EDFA2 Mechanical Specifications</a>	<b>2-4</b>
<i>Table 2-5</i>	<a href="#">ONS 15216 EDFA2 Front Panel Features</a>	<b>2-6</b>
<i>Table 3-1</i>	<a href="#">RJ-45 Pinout (ALARM OUT)</a>	<b>3-3</b>
<i>Table 3-2</i>	<a href="#">Alarm Definitions</a>	<b>3-3</b>
<i>Table 3-3</i>	<a href="#">Gain Range</a>	<b>3-7</b>
<i>Table 3-4</i>	<a href="#">Equipment Checklist</a>	<b>3-7</b>
<i>Table 3-5</i>	<a href="#">User Levels and Passwords</a>	<b>3-11</b>
<i>Table 3-6</i>	<a href="#">ONS 15216 EDFA2 Communication Components</a>	<b>3-11</b>
<i>Table 3-7</i>	<a href="#">DIP Switch Setting</a>	<b>3-12</b>
<i>Table 3-8</i>	<a href="#">Modem Settings</a>	<b>3-13</b>
<i>Table 3-9</i>	<a href="#">Introductory Commands</a>	<b>3-15</b>
<i>Table 4-1</i>	<a href="#">Alarm Threshold Attribute Definitions</a>	<b>4-6</b>
<i>Table 5-1</i>	<a href="#">SNMP Operation Types</a>	<b>5-4</b>
<i>Table 5-2</i>	<a href="#">Default Community Strings</a>	<b>5-5</b>
<i>Table 5-3</i>	<a href="#">Creating a View</a>	<b>5-7</b>
<i>Table 5-4</i>	<a href="#">Creating a Community Entry</a>	<b>5-8</b>
<i>Table 5-5</i>	<a href="#">SNMP Operation Decimal Values</a>	<b>5-9</b>
<i>Table 5-6</i>	<a href="#">cerent15216EdfaCfgGroup Variable Descriptions</a>	<b>5-10</b>
<i>Table 5-7</i>	<a href="#">cerent15216EdfaPumpCfgEntry Variable Descriptions</a>	<b>5-12</b>
<i>Table 5-8</i>	<a href="#">cerent15216EdfaOverallStatusGroup</a>	<b>5-13</b>
<i>Table 5-9</i>	<a href="#">cerent15216EdfaOverallControl Variable Descriptions</a>	<b>5-13</b>
<i>Table 5-10</i>	<a href="#">cerent15216EdfaPumpStatusEntry Variable Descriptions</a>	<b>5-14</b>
<i>Table 5-11</i>	<a href="#">cerent15216EdfaAlarmEntry Variable Descriptions</a>	<b>5-15</b>
<i>Table 5-12</i>	<a href="#">cerent15216EdfaOpGroup Variable Descriptions</a>	<b>5-15</b>
<i>Table 5-13</i>	<a href="#">cerent15216EdfaVersionGroup</a>	<b>5-16</b>
<i>Table 5-14</i>	<a href="#">Notification Types that Initiate a Trap</a>	<b>5-16</b>
<i>Table 5-15</i>	<a href="#">cerent15216EdfaSromIpMgmtGroup Command Attributes</a>	<b>5-19</b>
<i>Table 5-16</i>	<a href="#">cerent15216EdfaRtcDateAndTime Command Attributes</a>	<b>5-20</b>

*Table 6-1*      [ONS 15216 EDFA2 Supported Commands](#)    **6-1**



<i>Figure 1-1</i>	<a href="#">Wavelength Protection Switching</a>	<b>1-2</b>
<i>Figure 1-2</i>	<a href="#">Cisco ONS 15216 EDFA2 Block Diagram</a>	<b>1-2</b>
<i>Figure 1-3</i>	<a href="#">Gain Flattening Filter</a>	<b>1-4</b>
<i>Figure 2-1</i>	<a href="#">ONS 15216 EDFA2 Dimensions</a>	<b>2-5</b>
<i>Figure 2-2</i>	<a href="#">ONS 15216 EDFA2 Front Panel</a>	<b>2-5</b>
<i>Figure 3-1</i>	<a href="#">ONS 15216 EDFA2 Optical Connections</a>	<b>3-6</b>
<i>Figure 3-2</i>	<a href="#">HyperTerminal Connect To Dialog Box</a>	<b>3-8</b>
<i>Figure 3-3</i>	<a href="#">HyperTerminal COM1 Properties Dialog Box</a>	<b>3-8</b>
<i>Figure 3-4</i>	<a href="#">Optical Amplifier Properties Dialog Box (Connect To Tab)</a>	<b>3-9</b>
<i>Figure 3-5</i>	<a href="#">Optical Amplifier Properties Dialog Box</a>	<b>3-9</b>
<i>Figure 3-6</i>	<a href="#">HyperTerminal ASCII Setup Window</a>	<b>3-10</b>
<i>Figure 3-7</i>	<a href="#">Remote Communication</a>	<b>3-11</b>
<i>Figure 3-8</i>	<a href="#">DB-9 Pinout</a>	<b>3-14</b>
<i>Figure 4-1</i>	<a href="#">ONS 15216 EDFA2 Front Panel</a>	<b>4-5</b>
<i>Figure 5-1</i>	<a href="#">SNMP Elements</a>	<b>5-2</b>
<i>Figure 5-2</i>	<a href="#">SNMP Agent and MIB</a>	<b>5-2</b>





## Preface

---

### Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

#### World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following sites:

- <http://www.cisco.com>
- <http://www-china.cisco.com>
- <http://www-europe.cisco.com>

#### Optical Networking Product Documentation CD-ROM

Optical networking-related documentation, including the *Cisco ONS 15216 EDFA2 Operations Guide*, is available in a CD-ROM package that ships with your product. The Optical Networking Product Documentation CD-ROM, a member of the Cisco Connection Family, is updated as required. Therefore, it might be more current than printed documentation. To order additional copies of the Optical Networking Product Documentation CD-ROM, contact your local sales representative or customer service. The CD-ROM package is available as a single unit or through an annual subscription.

#### Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order printed Cisco product documentation and the Optical Networking Product Documentation CD-ROM from the Networking Products MarketPlace:  
[http://www.cisco.com/cgi-bin/order/order\\_root.pl](http://www.cisco.com/cgi-bin/order/order_root.pl)
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

## Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

You can e-mail your comments to [bug-doc@cisco.com](mailto:bug-doc@cisco.com).

To submit your comments by mail, write to the following address:

Attn Document Resource Connection  
Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-9883

We appreciate your comments.

## Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain documentation, troubleshooting tips, and sample configurations from online tools by using the Cisco Technical Assistance Center (TAC) Web Site. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC Web Site.

### Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world. Cisco.com is a highly integrated internet application and a powerful, easy-to-use tool that provides a broad range of features and services to help you to

- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages
- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

You can self-register on Cisco.com to obtain customized information and service. To access Cisco.com, go to the following URL:

<http://www.cisco.com>

## Technical Assistance Center

The Cisco TAC website is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two types of support are available through the Cisco TAC: the Cisco TAC WebSite and the Cisco TAC Escalation Center.

## Contacting TAC by Using the Cisco TAC Website

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC website:

<http://www.cisco.com/tac>

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

<http://www.cisco.com/register/>

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following website:

<http://www.cisco.com/tac/caseopen>

## Contacting TAC by Telephone

If you have a priority level 1 (P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.







# Applications

---

This manual describes how to install and operate the Cisco ONS 15216 erbium-doped fiber amplifier 2 (EDFA2). The ONS 15216 EDFA2 is an optical amplifier that enables the migration to next generation all-optical networks. The EDFA2 enables bandwidth-on-demand and wavelength protection switching that extend dense wavelength division multiplexing (DWDM) links by hundreds of kilometers.

Using the ONS 15216 EDFA2, you can add or drop optical signals from a span in a DWDM network without negatively affecting (degrading) the other optical signals on the same span.

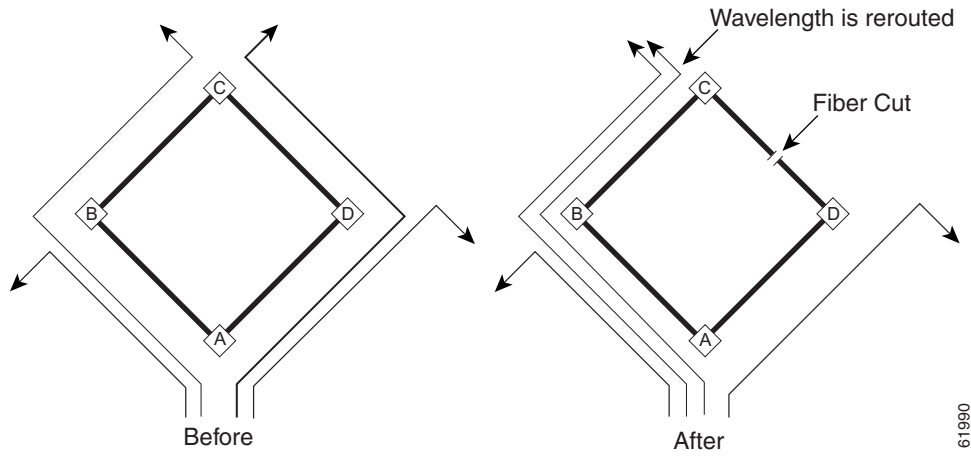
## Bandwidth-On-Demand

The ONS 15216 EDFA2 is a technology for bandwidth-on-demand wavelength services. Depending on the settings and the input power, every wavelength in a ONS 15216 EDFA2 is guaranteed to be amplified by 13 to 22 dB. With ONS 15216 EDFA2 gain control technology, amplification for each wavelength remains constant at all times as wavelengths are added or dropped from an optical fiber. As long as the total input power of all wavelengths is between 4 dBm and -27 dBm, any number of wavelengths can be amplified.

## Wavelength Protection Switching

The ONS 15216 EDFA2 uses wavelength protection switching to restore wavelengths that are lost after a fiber cut. [Figure 1-1](#) shows an example of wavelength protection switching. In this example, two wavelengths are routed clockwise around a metro ring, and two wavelengths are routed counter-clockwise around the same ring. Of the two clockwise wavelengths, only one transits the span linking locations C and D. If a fiber cut occurred on this span, the affected wavelength could be restored by rerouting it (counter-clockwise) around the ring to location D. Wavelength protection switching minimizes the amount of bandwidth allocated for restoration because only the affected wavelength is restored and not the entire fiber.

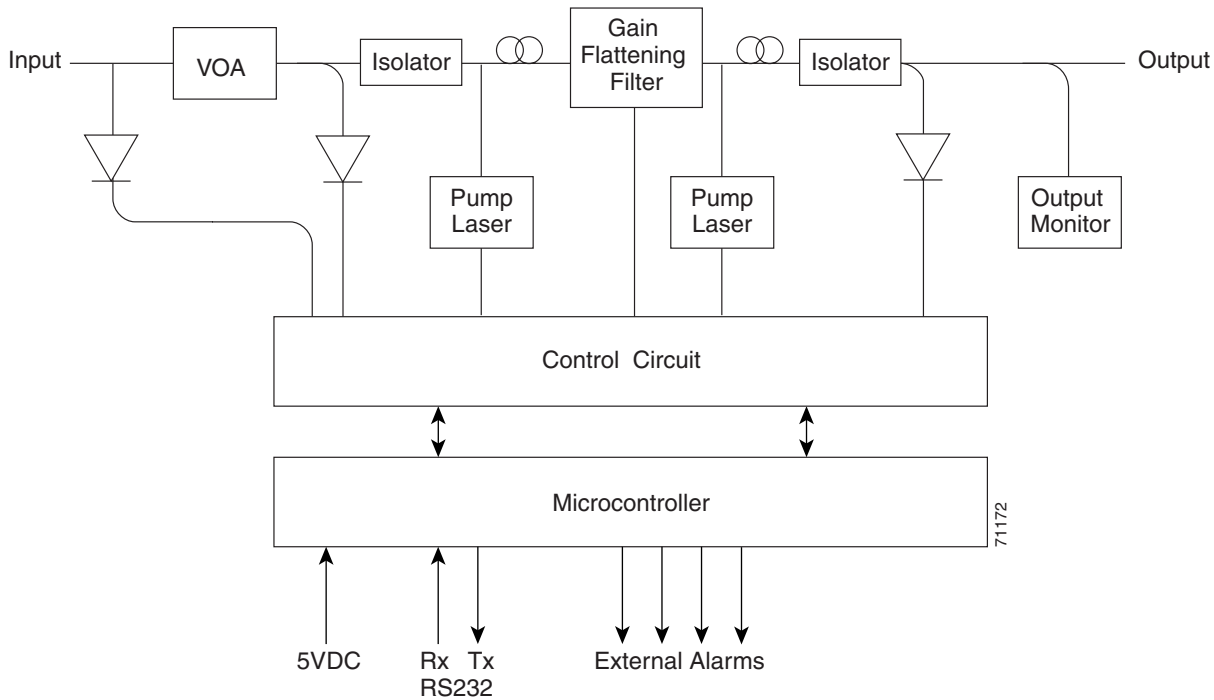
Figure 1-1 Wavelength Protection Switching



After a protection switch occurs, the number of wavelengths on each fiber changes. In the example, the number of counter-clockwise wavelengths increases to three, while the number of clockwise wavelengths decreases to one.

Figure 1-2 shows a block diagram of the ONS 15216 EDFA2.

Figure 1-2 Cisco ONS 15216 EDFA2 Block Diagram



# Key Features

The ONS 15216 EDFA2 has the following key features:

- Adjustable constant gain of 13 to 22 dBm
- Gain flattening < 2 dBm
- Transient suppression
- Low noise figure of < 7 dB at -5 dBm input
- Simple Network Management Protocol (SNMP) MIBs

## Constant Gain Mode

Constant amplification (gain) per wavelength is important for ensuring that variations in power between channels at the receivers is minimized. As wavelengths are added/dropped from an optical fiber, small variations in gain between channels in a span can cause large variations in the power difference between channels at the receivers. The ONS 15216 EDFA2 enables bandwidth-on-demand services by guaranteeing that every wavelength is amplified by a value that can be set between 13 and 22 dBm, no matter how many wavelengths are being amplified.

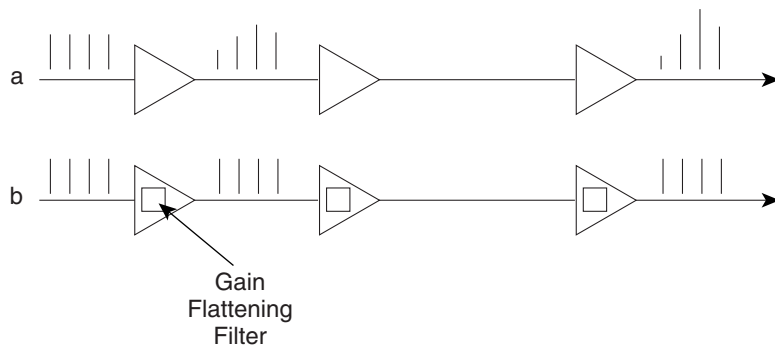
Constant gain mode is achieved using an automatic control circuit that adjusts pump power when changes in input power are detected. The ONS 15216 EDFA2 operates in constant gain mode by default, but since there may be applications where other operating modes may be required, the ONS 15216 EDFA2 can also be set to operate in any one the following modes:

- Constant pump current mode
- Constant pump power mode
- Constant output power mode

## Gain Flattening

[Figure 1-3](#) illustrates the importance of the gain flattening filter in the ONS 15216 EDFA2. As shown in the figure, with fiber (a), a set of channels with equal powers is input to a cascaded network of amplifiers that have vastly different power levels and optical signal-to-noise ratios (OSNR) at the output—without a gain flattening filter. In contrast, with fiber (b), the EDFAs effectively reduce this effect by introducing a gain flattening filter within each amplifier.

**Figure 1-3 Gain Flattening Filter**



61984

## Transient Suppression

Transients in the performance of optical amplifiers are inevitable whenever the number of signals, or the relative power of signals, changes. The ONS 15216 EDFA2 uses transient suppression to reduce the amount of time required by an amplifier to recover from a change. This indicates the suitability of the amplifier for add/drop applications like those described earlier.

## Low Noise

Whenever there is gain in an optical system, noise also occurs. The predominant source of noise in EDFAs is amplified spontaneous emission (ASE). The ONS 15216 EDFA2 has a low noise figure of < 7 dB at -5 dBm input.

## SNMP MIBs

The ONS 15216 EDFA2 SNMP MIB contains definitions of management information that allows network systems to be remotely monitored, configured, and controlled.



# Technical Specifications

This chapter discusses the technical specifications for the Cisco ONS 15216 EDFA2.

## Optical Specifications

ONS 15216 EDFA2 optical specifications are listed and described in [Table 2-1](#).

**Table 2-1 ONS 15216 EDFA2 Optical Specifications**

Requirement	Specification
Input signal wavelength	1530 nm to 1563 nm
Input power (channel total)	-27 dBm to 4 dBm (total all channels) See the “ <a href="#">Maximum Input Power</a> ” section on page 2-2 and “ <a href="#">Upgrading from a Single Channel to the Maximum Number of Channels</a> ” section on page 2-2 for additional information. <b>Note</b> In the event of a fiber cut or loss of connection, and there is no input power, the ONS 15216 EDFA2 has -3.5 dBm of output power. For additional safety information and requirements, see the “ <a href="#">Safety Requirements</a> ” section on page 3-5.
Mode of operation	Unidirectional (Two common fibers: one for Transmit and one for Receive)
Maximum output power	17 dBm
Signal gain per channel	13 dB to 22 dB
Channel gain deviation from setpoint	± 1.25
Gain flattened	< 2 dB (Peak to Valley)
Maximum noise figure	7 dB
Polarization mode dispersion (PMD)	< 0.6 ps
Input/output optical return loss	> 27 dB
Backward ASE power	-30 dBm maximum

**Table 2-1 ONS 15216 EDFA2 Optical Specifications (continued)**

Requirement	Specification
Polarization sensitivity	< 0.5 dB
Automatic gain control (AGC)	The ONS 15216 EDFA2 contains an active gain block with an automatic gain control loop to minimize the effects of output power variations per wavelength upon adding or deleting wavelengths on the same DWDM ring.

## Maximum Input Power

The ONS 15216 EDFA2 is designed to operate at a gain setting between 13 and 22 dB. Each gain setting has a maximum input power. The maximum input power is defined as the output power, 17 dBm, minus the gain setting. For example at a gain setting of 22 dB, the maximum input power is -5 dBm. Prolonged operation beyond the maximum input power can shorten the life of the ONS 15216 EDFA2.

Use of optical attenuators is required to bring total input power to less than the maximum input power when operating in constant gain mode.

## Upgrading from a Single Channel to the Maximum Number of Channels

You can ensure a smooth upgrade path from a single channel to the maximum numbers of channels with a minimum disruption of service if the per-channel power of the single channel is properly set from the start. The per-channel power should be set so that at full channel loading, the total input power is less than the maximum power indicated in [Table 2-3](#). For example, if the maximum number of channels at full loading is 18 dBm and the gain is set to 22 dBm, the maximum per channel power is -17.6 dBm.

Use [Table 2-3](#) to calculate per-channel power as a function of the maximum total number of channels at full loading. Contact Cisco TAC with any questions or concerns regarding maximum input power or setting the upgrade path.

**Table 2-2 Channel Power (Gain = 13 dBm)**

	4	3	2	1	0	-1	-2	-3	-4	-5
<b>Number of Channels at Full Loading</b>	<b>Maximum Power per Channel at Gain Setting (units measured in dBm)</b>									
1	4.0	3.0	2.0	1.0	0.0	-1.0	-2.0	-3.0	-4.0	-5.0
2	1.0	0.0	-1.0	-2.0	-3.0	-4.0	-5.0	-6.0	-7.0	-8.0
3	-0.8	-1.8	-2.8	-3.8	-4.8	-5.8	-6.8	-7.8	-8.8	-9.8
4	-2.0	-3.0	-4.0	-5.0	-6.0	-7.0	-8.0	-9.0	-10.0	-11.0
5	-3.0	-4.0	-5.0	-6.0	-7.0	-8.0	-9.0	-10.0	-11.0	-12.0
6	-3.8	-4.8	-5.8	-6.8	-7.8	-8.8	-9.8	-10.8	-11.8	-12.8
7	-4.5	-5.5	-6.5	-7.5	-8.5	-9.5	-10.5	-11.5	-12.5	-13.5
8	-5.0	-6.0	-7.0	-8.0	-9.0	-10.0	-11.0	-12.0	-13.0	-14.0
9	-5.5	-6.5	-7.5	-8.5	-9.5	-10.5	-11.5	-12.5	-13.5	-14.5

**Table 2-2 Channel Power (Gain = 13 dBm) (continued)**

	4	3	2	1	0	-1	-2	-3	-4	-5
<b>Number of Channels at Full Loading</b>	<b>Maximum Power per Channel at Gain Setting (units measured in dBm)</b>									
10	-6.0	-7.0	-8.0	-9.0	-10.0	-11.0	-12.0	-13.0	-14.0	-15.0
11	-6.4	-7.4	-8.4	-9.4	-10.4	-11.4	-12.4	-13.4	-14.4	-15.4
12	-6.8	-7.8	-8.8	-9.8	-10.8	-11.8	-12.8	-13.8	-14.8	-15.8
13	-7.1	-8.1	-9.1	-10.1	-11.1	-12.1	-13.1	-14.1	-15.1	-16.1
14	-7.5	-8.5	-9.5	-10.5	-11.5	-12.5	-13.5	-14.5	-15.5	-16.5
15	-7.8	-8.8	-9.8	-10.8	-11.8	-12.8	-13.8	-14.8	-15.8	-16.8
16	-8.0	-9.0	-10.0	-11.0	-12.0	-13.0	-14.0	-15.0	-16.0	-17.0
17	-8.3	-9.3	-10.3	-11.3	-12.3	-13.3	-14.3	-15.3	-16.3	-17.3
18	-8.6	-9.6	-10.6	-11.6	-12.6	-13.6	-14.6	-15.6	-16.6	-17.6
19	-8.8	-9.8	-10.8	-11.8	-12.8	-13.8	-14.8	-15.8	-16.8	-17.8
20	-9.0	-10.0	-11.0	-12.0	-13.0	-14.0	-15.0	-16.0	-17.0	-18.0
21	-9.2	-10.2	-11.2	-12.2	-13.2	-14.2	-15.2	-16.2	-17.2	-18.2
22	-9.4	-10.4	-11.4	-12.4	-13.4	-14.4	-15.4	-16.4	-17.4	-18.4
23	-9.6	-10.6	-11.6	-12.6	-13.6	-14.6	-15.6	-16.6	-17.6	-18.6
24	-9.8	-10.8	-11.8	-12.8	-13.8	-14.8	-15.8	-16.8	-17.8	-18.8
25	-10.0	-11.0	-12.0	-13.0	-14.0	-15.0	-16.0	-17.0	-18.0	-19.0
26	-10.1	-11.1	-12.1	-13.1	-14.1	-15.1	-16.1	-17.1	-18.1	-19.1
27	-10.3	-11.3	-12.3	-13.3	-14.3	-15.3	-16.3	-17.3	-18.3	-19.3
28	-10.5	-11.5	-12.5	-13.5	-14.5	-15.5	-16.5	-17.5	-18.5	-19.5
29	-10.6	-11.6	-12.6	-13.6	-14.6	-15.6	-16.6	-17.6	-18.6	-19.6
30	-10.8	-11.8	-12.8	-13.8	-14.8	-15.8	-16.8	-17.8	-18.8	-19.8
31	-10.9	-11.9	-12.9	-13.9	-14.9	-15.9	-16.9	-17.9	-18.9	-19.9
32	-11.1	-12.1	-13.1	-14.1	-15.1	-16.1	-17.1	-18.1	-19.1	-20.1

## Electrical Specifications

The ONS 15216 EDFA2 uses a power supply that meets the electrical specifications listed in [Table 2-3](#).

**Table 2-3 ONS 15216 EDFA2 Electrical Specifications**

Requirement	Specification
Input voltage	-48 VDC
Maximum power consumption	< 25 W at 65°C end of life
Minimum supply voltage	-30 VDC

**Table 2-3 ONS 15216 EDFA2 Electrical Specifications (continued)**

Requirement	Specification
Maximum supply voltage	-60 VDC or under
Maximum current	0.52 A

## Mechanical Specifications

Table 2-4 lists the ONS 15216 EDFA2 mechanical specifications.

**Table 2-4 ONS 15216 EDFA2 Mechanical Specifications**

Specification	Description
Dimensions (H x W x D)	1 3/4 in. x 17 3/16 in. x 11 in. (4.4 cm. x 43.7 cm. x 27.9 cm.)
Weight	5.45 lb (2.47 kg)
Ambient operating temperature	32° to 122° F (0 to 50° C)
Storage temperature	-40 to 158° F (-40 to 70° C)
Humidity operation	Relative humidities of 5 to 95%, non-condensing. With ambient temperatures above 84° F (29° C), the relative humidity may be limited to that corresponding to a specific humidity of 0.024 pounds of water per pound of dry air.
Humidity storage	Relative humidities of 5 to 95%, non-condensing. With ambient temperatures above 84° F (29° C), the relative humidity may be limited to that corresponding to a specific humidity of 0.024 pounds of water per pound of dry air.
Connector types	SC/UPC Bulkhead Connectors
Mean time between failures (MTBF)	7 years as per calculation procedure outlined in TR-NWT-000332, Issue 4, Method 1.

## External Features

The ONS 15216 EDFA2 has the following external features:

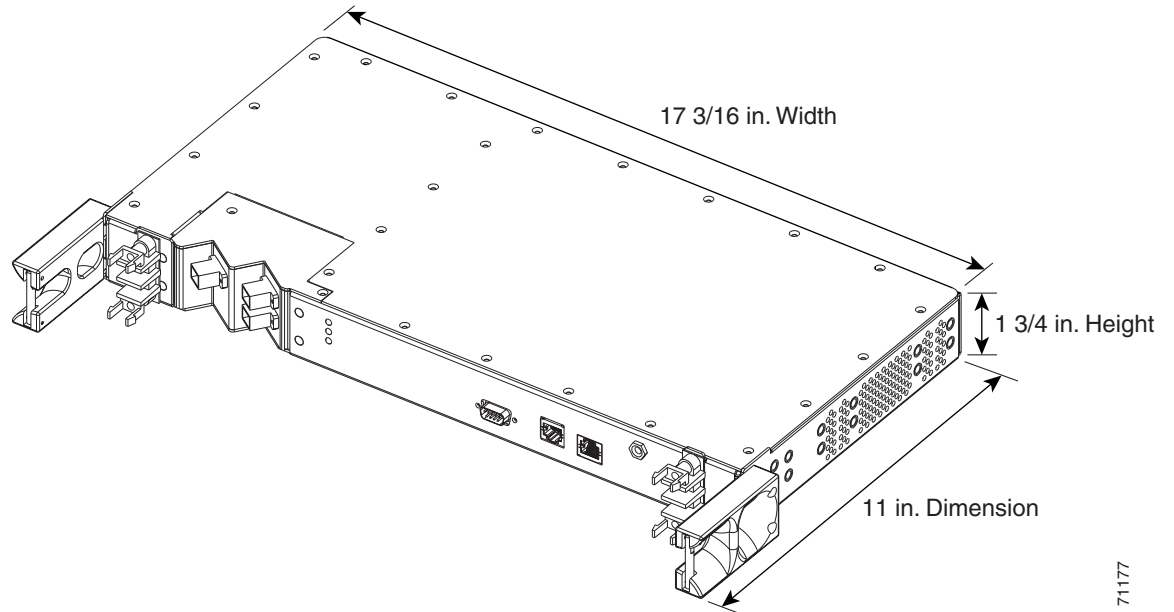
- Front panel LEDs, graphics, and warning displays
- Brackets for rack mounting (including reversible ears that permit front, mid, and rear mounting)
- Rear and side cooling vents
- Access door for fiber cleaning
- Fiber routing and retaining feature
- Two threaded grounding studs on rear and two threaded grounding holes on side
- Screw lug terminal block for power connection
- RJ-45 connector for external alarm connection
- RJ-45 connector for LAN connection



- SC/UPC connectors for optical interface
- DB-9 female connector for craft serial interface connection

Figure 2-1 displays a mechanical outline of the external features and dimensions of the ONS 15216 EDFA2.

Figure 2-1 ONS 15216 EDFA2 Dimensions



71177

## Front Panel

Figure 2-2 shows the ONS 15216 EDFA2 front panel in detail. The front panel provides an all-front access (fibers, power, alarm contact, and management interface) that complies with international standards.

Figure 2-2 ONS 15216 EDFA2 Front Panel

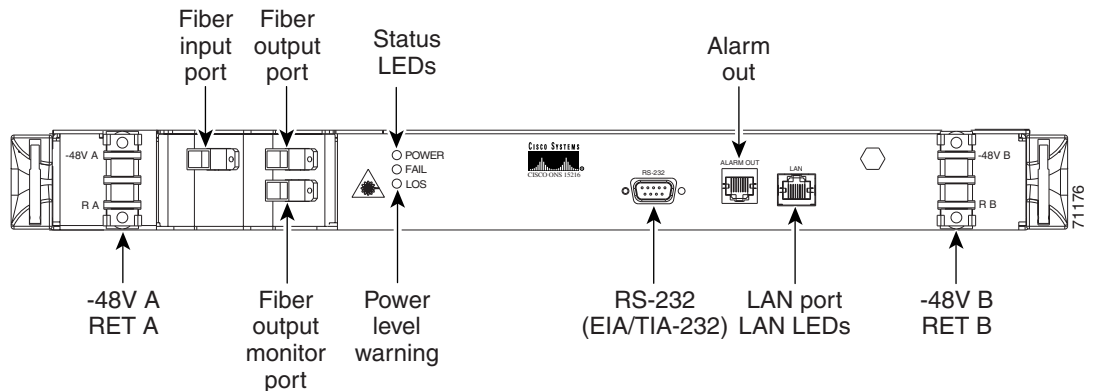


Table 2-5 describes the ONS 15216 EDFA2 front panel features.

**Table 2-5 ONS 15216 EDFA2 Front Panel Features**

Feature	Description
Terminal strip	Terminal strip for supplying power to the ONS 15216 EDFA2. Attach AWG 18 stranded power wires to appropriate terminals.
Threaded grounding holes	Threaded grounding holes (#10/32) to ground the ONS 15216 EDFA2.
Alarm Out	RJ-45 connector used for alarm system connection. (See the <a href="#">“Alarm Relay Contacts (RJ-45)”</a> section on page 3-3 for additional information.)
Serial port connection RS-232	Serial port for local or remote (modem) data communication connection. (See Chapter 4 for additional information.)
Label	Laser warnings, designation labels, and power level warning
Status LEDs	LEDs indicating status of power, fail, loss of signal, Ethernet link availability and Ethernet link traffic. (See the <a href="#">“LED Alarm Definitions and Functions”</a> section on page 3-4.)
Fiber input	SC/UPC fiber input port.
Fiber output	SC/UPC fiber output port.
Monitor output	SC/UPC port for fiber that taps off 1% of output signal for monitoring purposes.
Chassis ground lugs	Rear panel grounding post to attach chassis ground wire using #8/32 nut.
LAN	RJ-45 connector used for 10BaseT Ethernet connection. For more information, see the <a href="#">“Telnet Session”</a> section on page 3-15.



# Installation

---

## Introduction

This chapter contains the installation procedures for the Cisco ONS 15216 EDFA2.

## Hardware Description

The ONS 15216 EDFA2 is logically divided into the following sections:

- Power Section (–48V A, RET A, –48V B, RET B, and Chassis Ground)
- Optical Section (Fiber Input and Output Ports)
- Communication Section (RS-232, LAN, and Alarm Out)

## Standard Precautions

The following standard precautions should be taken when installing the ONS 15216 EDFA2:

- Basic electrical precautions should be taken before powering up the ONS 15216 EDFA2.
- Standard fiber handling and cleaning procedures are considered critical when installing optical networking equipment.
- Eye safety precautions should be observed when handling fiber optic patchcords.

## Placement and Power Connection

### General Rack Hazards

The following potential hazards should be considered when installing the ONS 15216 EDFA2 within a rack:

- **Elevated Operating Ambient Temperature**—If installed in a closed or multi-module rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature.

- **Reduced Air Flow**—Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical Loading**—Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- **Circuit Overloading**—Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- **Reliable Earthing**—Reliable earthing of rack mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (i.e., use of power strip etc.).

## Rack Installation and Power Supply Procedures



### Warning

---

**Before performing any of the following procedures, ensure that the power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.**

---

Follow these steps to install the ONS 15216 EDFA2 into the rack and correctly set up the power supply:

- 
- Step 1** Mount the ONS 15216 EDFA2 in the rack (19 inches or 23 inches reversible ears). Empty rack space is not required above or below the ONS 15216 EDFA2.
  - Step 2** Connect the –48 VDC power cable to the office fuse panel (user-provided).
    - a. 1.0A fusing required (user-provided).
    - b. Use 18 AWG stranded wire (and wire and wire lugs as appropriate).
  - Step 3** Connect power bus A from the fuse panel to the power terminals on the front of the ONS 15216 EDFA2. (The power terminals are located on front right side of the module). See Figure 3-1.
  - Step 4** Repeat Step 3 for power bus B.
  - Step 5** Connect the facility ground to the ONS 15216 EDFA2 side or rear panel ground using #10/32 star washer and 3/4-inch screws (provided on the module).
  - Step 6** Insert 1.0A fuses into the fuse panel (user-provided).  
LEDs should now be illuminated on the ONS 15216 EDFA2.
- 

## Communications

The ONS 15216 EDFA2 can communicate in three ways:

- Alarm relay contacts (RJ-45)
- Serial interface (RS-232)

## Alarm Relay Contacts (RJ-45)

The ONS 15216 EDFA2 RJ-45 port reports alarm status for the following:

- Loss or degradation of electrical power
- Pump laser overheating or excessive pump current, output power, gain, and case temperature
- Loss or degradation optical network

These alarms can be connected to a network operations center (NOC) network management system (NMS) using the following methods:

- ONS 15454 miscellaneous discrete input
- Office alarm panel/system

[Table 3-1](#) provides the RJ-45 alarm pinout. [Table 3-2](#) defines the ONS 15216 EDFA2 alarms.

**Table 3-1 RJ-45 Pinout (ALARM OUT)**

Pinout	Alarm Relay Out
1	Alarm relay 0+ (Power)
2	Alarm relay 0–
3	Alarm relay 1+ (Major)
4	Alarm relay 1–
5	Alarm relay 2+ (Minor)
6	Alarm relay 2–
7	Alarm relay 3+ in simplex or duplex bus mode, 1 bus power failed or out of range
8	Alarm relay 3–

**Table 3-2 Alarm Definitions**

Relay	Description
0	Loss of electrical power
1	Pump laser temperature or bias is out of range; input power is out of tolerance for gain settings
2	Loss of optical input signal or input signal is below threshold
3	Loss of electrical power or out of range for Bus A or Bus B while in duplex mode
Default state	Contacts are open
Alarm state	Contacts are closed

## Alarm Connection Procedure

To set up alarm contacts, follow these steps:

- 
- Step 1** Connect the RJ-45 to the stub-end cable using an #22 AWG solid wire.



---

**Note** cable and connector are not provided.

---

**Step 2** Connect the alarm cable to the alarm system contacts:

- a. Cisco ONS 15454 medium-dependent interface (MDI) wire wrap pins
- b. Central office (CO) alarm panel

Refer to [Alarm Definitions, page 3-3](#) for information concerning alarm contacts. Refer to [LED Alarm Definitions and Functions, page 3-4](#) for information on the ONS 15216 EDFA2 alarm LEDs.

---

## LED Alarm Definitions and Functions

The ONS 15216 EDFA2 has five LEDs

- POWER
- FAIL
- LOS
- Ethernet (2)

Three of these LEDs, POWER, FAIL, and LOS, are located at the left hand side of the ONS 15216 EDFA2 box. The two Ethernet LEDs are located at the top left and right hand sides of the Ethernet socket. When the module is powered on, an LED test is performed.

### POWER LED (Green)

The POWER LED is green. This LED functions as follows:

- **On:** –48 VDC is within tolerance. (Power BUS A and B are powered normally.)
- **Off:** No power or power is out of tolerance from the internal power supply. (Power BUS A and B are not powered.)
- **Flashing:** Power BUS A or B (in duplex mode) has failed or is out of tolerance, or power BUS A (in simplex mode) is out of tolerance.

In the off condition, the first pair of alarm relay contacts in the RJ-45 connector changes from a normally open condition to a closed condition. The LED and alarm automatically reset when the condition clears. (For additional alarm contact closure information, see the “[Alarm Relay Contacts \(RJ-45\)](#)” section on [page 3-3](#).)

### FAIL LED (Red)

The FAIL LED is red. This LED functions as follows:

- **On:** The pump laser bias, pump laser temperature, output power, gain, or case temperature is out of tolerance. (A major internal failure has occurred.)
- **Off:** The pump laser bias or pump laser temperature is in a specified range.

In the on condition, the second pair of alarm relay contacts in the RJ-45 connector changes from a normally open to a closed condition. If an invalid input optical signal is applied to the ONS 15216 EDFA2, the Fail LED is illuminated. The LED and alarm automatically reset when the condition clears.

## LOS LED (Yellow)

The loss of signal (LOS) LED is yellow. This LED functions as follows:

- **On:** The optical input power to the ONS 15216 EDFA2 is below the loss of input threshold. (A LOS threshold decision occurs.)
- **Off:** The optical input power is within the input threshold and/or no –48 VDC is present.

In the on condition, the third pair of alarm relay contacts in the RJ-45 connector changes from a normally open condition to a closed condition. The LED and alarm automatically reset when the condition clears.

## Ethernet Socket LEDs (2)

Two LEDs are located at the top left and right hand sides of the Ethernet socket. These LEDs are both green. These LEDs function as follows:

- If left Ethernet socket LED is on, the link is up.
- If right Ethernet socket LED is on, there is Ethernet traffic.

## SC/UPC Optical Ports

SC/UCP optical ports are as follows:

- Optical input signal to be amplified (INPUT)
  - Input must be between –27 dBm and +4 dBm
- Optically amplified output (OUTPUT)
- Optical monitored output signal (MON OUT)
  - 1% tap of output or 20 dB below output signal

## Safety Requirements



Warning

---

**Procedures that require the fiber connections to be open must only be performed by service personnel trained in laser safety requirements. Use of controls or adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.**

---



Warning

---

**Anyone working with the ONS 15216 EDFA2 must not allow their eyes or body to be exposed to the laser beam or to a reflection from a mirror-like surface. Additionally, viewing the laser output with certain optical instruments (eye loupes, microscopes) within a distance of 100 mm may pose an eye hazard.**

---



Warning

---

**In the event of a fiber cut or loss of connection and there is no input power, the ONS 15216 EDFA2 still has –3.5 dBm of output power.**

---

The SNMP and command-line interface (CLI) commands can be used to increase the accessible level of laser energy, and necessary precautions must be taken to avoid exposure to laser energy when using these commands.

## Optical Connection Procedure



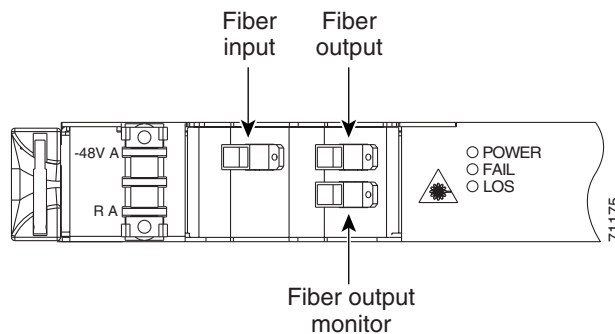
**Warning**

**Follow all directions and warning labels when working with optical fibers. To prevent eye damage, never look directly into a fiber or connector.**

Connect the customer-supplied fiber optic patchcords to the SC/UPC optical ports of the ONS 15216 EDFA2 using the following procedure. Refer to [Figure 3-1](#) while performing this procedure:

- Step 1** Clean both ends of the two fiber optic patchcords.
- Step 2** Connect the first patchcord between the ONS 15216 EDFA2 OUTPUT connector and the FACILITY LINE connection.
  - a. Approximately  $-3.5$  dBm.
- Step 3** Connect the second patchcord to TERMINAL OUTPUT. Measure and record the total optical power:
  - a. DWDM/OADM output
  - b. Terminal transmitter output
- Step 4** If optical power at the end of the TERMINAL OUTPUT patchcord is less than or equal to  $+4$  dBm, connect the end to the ONS 15216 EDFA2 input. If the optical power is greater than  $+4$  dBm, additional optical attenuation is required to bring optical power below  $+4$  dBm.

**Figure 3-1 ONS 15216 EDFA2 Optical Connections**



## Optical Amplification Operation Verification Procedure

To verify ONS 15216 EDFA2 optical amplification, use the following procedure:

- Step 1** Connect an optical power meter to the MON OUT port.
- Step 2** Measure and record the output power. The MON OUT port level is  $-20$  dB less than the signal.
- Step 3** Verify that the ONS 15216 EDFA2 input and output power are within the range shown in [Table 3-3](#).

For example, if the total input power is between  $-27$  dBm and  $-5$  dBm, expect an output power between  $-5$  dBm and  $17$  dBm.



**Table 3-3 Gain Range**

Gain (dB)	Total Input Power (dBm)		Total Output Power (dBm)	
	Min	Max	Min	Max
22	-27	-5	-5	17



**Note** Unless overridden by the user, the gain per channel is automatically set by the ONS 15216 EDFA2. Gain is fixed at 22 dB as long as total input power is less than or equal to -5 dBm. If your input power is higher than -5 dBm, see the “Set Gain” section on page 4-4.

## Serial Interface (RS-232) – Local and Remote and Communication via Modem or Telnet

Communication with the ONS 15216 EDFA2 is accomplished through a serial connection.

### Required Equipment

Establishing a serial communications link with a ONS 15216 EDFA2 requires the equipment listed in [Table 3-4](#).

**Table 3-4 Equipment Checklist**

Hardware	Comments
Laptop, or VT100, running HyperTerminal.	User-provided. HyperTerminal can be found in the Microsoft Windows Accessories menu.
RS-232 cable with DB-9F connectors wired as shown in <a href="#">Figure 3-8</a> .	Provides RS-232 link to ONS 15216 EDFA2.

### RS-232 Connection Procedure

To set up an RS-232 link to the ONS 15216 EDFA2, use the following procedure. (The procedure uses HyperTerminal and a connection via port 1.)

- Step 1** Connect the DB-9F end of the RS-232 data cable (user provided) to the laptop COM port.
- Step 2** Connect the other end of the RS-232 data cable to the RS-232 serial port connection on the front access panel of the ONS 15216 EDFA2.
- Step 3** Open HyperTerminal. (HyperTerminal can be found in the Microsoft Windows Accessories menu.)
- Step 4** Type **Optical Amplifier**, select an icon, and click **OK**.
- Step 5** In the Connect To dialog box ([Figure 3-2](#)), click **Direct to Com1** in the **Connect using** field. Click **OK**.

**Figure 3-2** HyperTerminal Connect To Dialog Box

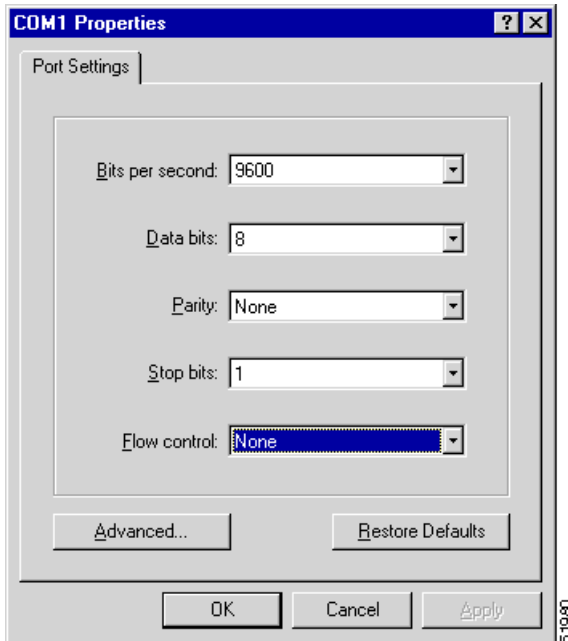


**Step 6** Configure the Port Settings in the COM1 Properties dialog box as shown in [Figure 3-3](#). The Port Settings must be configured as follows:

- Bits per second—19200
- Data bits—8
- Parity—None
- Stop bits—1
- Flow control—None

Click **OK** when done.

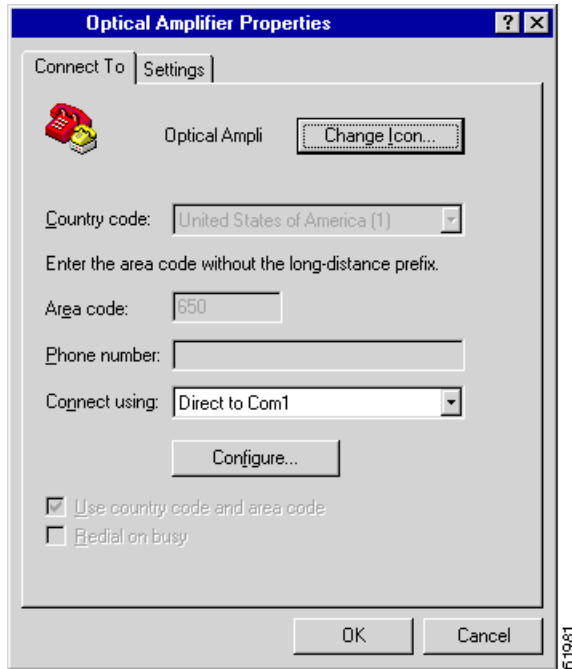
**Figure 3-3** HyperTerminal COM1 Properties Dialog Box



**Step 7** In the HyperTerminal main window, click **File > Properties**.

**Step 8** Click **Connect To** tab in the Optical Amplifier Properties dialog box as shown in [Figure 3-4](#).

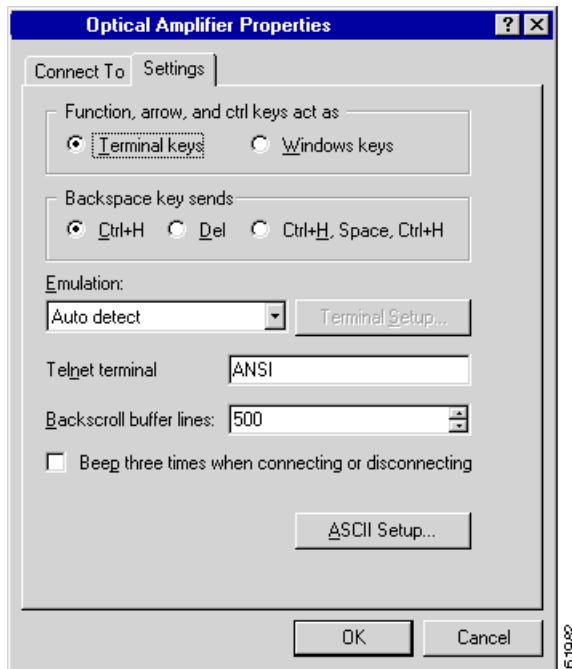
**Figure 3-4** Optical Amplifier Properties Dialog Box (Connect To Tab)



**Step 9** Ensure that Direct to Com1 is selected in the Connect using field.

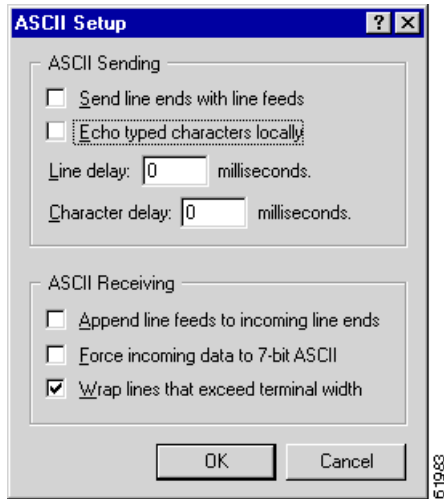
**Step 10** Click **Settings** ([Figure 3-5](#)) and click **ASCII Setup**.

**Figure 3-5** Optical Amplifier Properties Dialog Box



**Step 11** Configure the ASCII Setup window as shown in [Figure 3-6](#). Click **OK** when done.

**Figure 3-6** HyperTerminal ASCII Setup Window



**Step 12** Click **OK** to return to main HyperTerminal window.

The ONS 15216 EDFA2 login window appears ([Example 3-1](#)).

**Example 3-1 ONS 15216 EDFA2 Optical Amplifier Login Window**

```
-- LOGIN ----- Username

      ONS15216 EDFA2 Optical Amplifier

      -----

                        Software Version 2.0.0

      Copyright (c) 2000-2001 Cisco Systems, Inc.

      Username: {           }
      Password: {           }

                        [Login]
```

**Step 13** To access the module and issue commands, enter both a user name and password. Press **Enter** when LOGIN becomes highlighted.

[Example 3-2](#) displays the login response.

**Example 3-2 Login Response**

```
Welcome to ONS15216 EDFA2 Console (v2.0.0)

username:ONS15216 EDFA2>
```

The default user and password for user levels are described in [Table 3-5](#).

**Table 3-5 User Levels and Passwords**

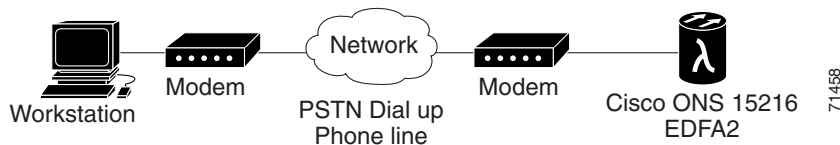
User Level	Password	Description
monitor	ro	Can only display a few status parameters.
operator	rw	Performs the day-to-day operations on the equipment.
CISCO15	by default, there is no password (press <b>Enter</b> )	Administrator who is responsible for configuring the ONS 15216 EDFA2 and performing software upgrades.
root	root	Super user who operates special commands that are reserved for people who know the architecture of the ONS 15216 EDFA2.

An RS-232 link to the ONS 15216 EDFA2 is established. The user can now provision the ONS 15216 EDFA2. For provisioning instructions, see [Chapter 4, “Provisioning.”](#)

## Remote Communication Setup

This section describes the procedure for establishing a remote dial-up connection to the ONS 15216 EDFA2. ONS 15216 EDFA2 remote communication requires two US Robotics 56K Fax modems set up to send data over a two-wire dial-up telephone line. (See [Figure 3-7.](#))

This section assumes the use of the US Robotics 56K Fax modem V.90. Other modem types may require different settings to establish a remote dial-up connection. The user should review their modem documentation to ensure compatibility between US Robotics and other vendor modem types.

**Figure 3-7 Remote Communication**

## Remote Communication Component Requirements

[Table 3-6](#) lists the components required to communicate remotely with a ONS 15216 EDFA2. [Table 3-6](#) is divided into two sections: Remote Site and Local Site. The Remote Site section lists components needed at the site that contains the ONS 15216 EDFA2 and the Local Site section lists components needed at the site where the user is located.

**Table 3-6 ONS 15216 EDFA2 Communication Components**

Component	Notes
Remote Site	
1 ONS 15216 EDFA2	

**Table 3-6 ONS 15216 EDFA2 Communication Components (continued)**

Component	Notes
1 US Robotics 56K Fax modem V.90	The modem to ONS 15216 EDFA2 connection must be set for 19200 baud. The modem to modem connection must be set for 14400 baud.
1 10-ft DB-25M to DB-9F cable	For connection between ONS 15216 EDFA2 and modem.
1 RJ-11 to RJ-11 telephone cable	For connection between the modem and PSTN dial-up telephone line
1 public switched telephone network (PSTN) dial-up telephone line	
Local Site	
1 PC running HyperTerminal	
US Robotics 56K Fax modem V.90	The modem to ONS 15216 EDFA2 connection must be set for 19200 baud. The modem to modem connection must be set for 14400 baud.
1 10-ft DB-25M to DB-9F	For connection between PC COM port and modem.
1 RJ-11 to RJ-11 telephone cable	For connection between the modem and PSTN dial-up telephone line.
1 PSTN dial-up telephone line	

## Modem Signals

The only signals required for communication are TXD (transmit), RXD (receive), and SIGNAL GROUND. By adjusting the modem manufacturer settings, the other signals can be ignored.

## Modem Power Up

The modem has a DIP switch that overrides certain NVRAM settings during a power up. For consistent operation throughout the power cycles, the DIP switches must be set as displayed in [Table 3-7](#).

**Table 3-7 DIP Switch Setting**

DIP Switch Setting	Up (U) or Down (D)	Description
1	D	Data terminal ready override
2	U	Verbal result codes
3	U	Suppress result codes
4	D	No echo, offline commands
5	U	Auto-answer on first ring, or higher if specified in NVRAM

**Table 3-7** *DIP Switch Setting (continued)*

DIP Switch Setting	Up (U) or Down (D)	Description
6	U	Carrier detect normal
7	U	Load NVRAM defaults
8	D	Smart mode

## Configuration Settings

After configuring the DIP switch settings, each modem configuration must then be set using a terminal program such as Microsoft Windows HyperTerminal.

Connect the modem to the PC serial port using a DB-25M to DB-9F modem cable as per the manufacturer recommendations.

Set the terminal communication parameters as follows:

- 19,200 baud
- No parity
- 8 bits per character
- 1 stop bit, and no flow control

[Table 3-8](#) gives a brief description of the modem settings that are stored in NVRAM. These settings survive power supply interruptions. Use these settings to configure each modem.

**Table 3-8** *Modem Settings*

Modem Setting	Description
b0	ITU-T answer sequence
e0	Echo off
f1	Local echo off
m1	Speaker on until CONNECT
q1	Quiet mode; no results code
v1	Verbal codes
x1	Select result codes displayed
y0	Use profile 0 setting in NVRAM
&a3	Enable extra result codes
&b1	Fixed DTE speed
&c1	Normal CD operation
&d0	DTR override
&g0	No guard tone, U.S. and Canada
&h0	Flow control disabled
&i0	Software flow control disabled
&k0	Data compression disabled
&m5	ARQ mode

**Table 3-8 Modem Settings (continued)**

Modem Setting	Description
&n8	Fix highest connect speed to 14,400 bps
&p1	Pulse dialing option
&r1	Ignore Request to Send (RTS)
&s1	Modem controls Data Set Ready (DSR)
&t5	Prohibits remote digital loopback
&u8	Fix lowest connect speed to 14,400 bps
&y1	Break handling; destructive/expedited
&w0	Store configuration 0
s0=1	Auto-answer on first ring
s2=128	Disable escape to command mode

## Setting and Saving Modem Settings

To set and save modem settings, enter the following command to the terminal program and to each modem:

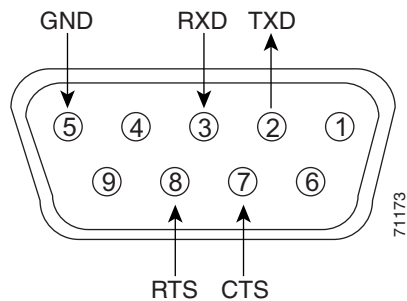
```
atb0e0f1m1q1v1x1y0
at&a3&b1&c1&d0&g0&h0&i0&k0s0=1
at&m5&n8&7p1&r1&s1&t5&u8&y1s2=128
at&w0
```


**Note**

Modem communication is not necessary unless dial-up remote communication is desired.

## PC to ONS 15216 EDFA2 Direct Connection

The ONS 15216 EDFA2 and modem are connected through an RS-232 port using a DB-9 connector. The modem, PC, and ONS 15216 EDFA2 should be physically setup as displayed in [Figure 3-8](#). Use [Figure 3-8](#) to properly connect the ONS 15216 EDFA2 to the modem.

**Figure 3-8 DB-9 Pinout**



Using the terminal program from the PC, enter the **ATDT** command with the appropriate telephone number to call the remote ONS 15216 EDFA2 modem. After the modems synchronize, log into the ONS 15216 EDFA2 using the correct user name and password. Refer to Chapter 5 for additional information on commands.

## Telnet Session

You can connect to the ONS 15216 EDFA2 using Telnet.



### Note

Before communicating and managing the ONS 15216 EDFA2 via the Ethernet port, the user must first enter an IP address. To set an IP address, see [Chapter 4, “Provisioning.”](#)

The following two types of commands can be issued through a Telnet session:

- SNMP MIB Commands (see [Chapter 5, “SNMP MIB Installation and Configuration”](#))
- CLI Commands (see [Chapter 6, “CLI Commands”](#))

## Connecting Through Telnet Procedure

After connecting the ONS 15216 EDFA2 to the network through its RJ-45 port, configure the module to accept SNMP and CLI commands using the following procedure:

- Step 1** The ONS 15216 EDFA2 IP address is factory set at 0.0.0.0. The IP address must be set before the ONS 15216 EDFA2 can be accessed via the Ethernet port.
- Step 2** Connect ONS 15216 EDFA2 to the network via the module RJ-45 port.
- Step 3** At a terminal or workstation, open the Telnet application.



### Note

To send CLI commands over IP, a Telnet client is required. For SNMP management over IP, a generic SNMP manager is required.

- Step 4** Connect to the ONS 15216 EDFA2 using the module IP address.
- The ONS 15216 EDFA2 login window appears as shown in [Example 3-1 on page 3-10](#). To access the module and issue commands, enter both a user name and password. The default user and password for user levels are described in [Table 3-5](#).

The commands in [Table 3-9](#) can be used when first establishing communication with the ONS 15216 EDFA2.

**Table 3-9** *Introductory Commands*

Command	Description
login	When accessing the ONS 15216 EDFA2 via Telnet, the user is prompted for user and password.
help	Provides help for all of the available commands.

*Table 3-9 Introductory Commands (continued)*

<b>Command</b>	<b>Description</b>
<b>snmp table display local entPhysicalEntry</b>	Returns product name, version, etc.
<b>logoff</b>	Closes the current session.



## Provisioning

---

This chapter discusses the provisioning procedures for the Cisco ONS 15216 EDFA2.

The provisioning procedure for the ONS 15216 is as follows:

1. [Login Procedure, page 4-1](#)
2. [Set the IP Address Procedure, page 4-2](#)
3. [Connect Through a Telnet Session Procedure \(Optional\), page 4-3](#)
4. [Set Power Bus Mode \(Simplex or Duplex\), page 4-3](#)
5. [Verify Amplifier Operational Status, page 4-3](#)
6. [Set Gain, page 4-4](#)
7. [Set Alarm Thresholds, page 4-4](#)
8. [Set Password, page 4-11](#)
9. [Save Changes, page 4-11](#)
10. [Logoff, page 4-11](#)

The following sections describe these steps in detail.

## Login Procedure

The login process is required to establish a communication session with the ONS 15216 EDFA2. To complete the provisioning process, this communication session is mandatory.

- 
- |               |  |
|---------------|--|
| <b>Step 1</b> | Connect to the RS-232 port.  |
| <b>Step 2</b> | Open HyperTerminal. (HyperTerminal can be found in the Microsoft Windows Accessories menu.)  |
| <b>Step 3</b> | Log in by entering a user name and password as described in the “ <a href="#">RS-232 Connection Procedure</a> ” section on <a href="#">page 3-7</a> .) <a href="#">Example 4-1</a> shows the ONS 15216 EDFA2 Optical Amplifier Login window. |
| <b>Step 4</b> | If the user name or password is not correct, the user is returned to the user name prompt. <a href="#">Example 4-2</a> displays the login response.  |
-

**Example 4-1 ONS 15216 EDFA2 Optical Amplifier Login Window**

```
-- LOGIN ----- user name

      ONS15216 EDFA2 Optical Amplifier
      -----

      Software Version 2.0.0

      Copyright (c) 2000-2001 Cisco Systems, Inc.

      user name: {           }
      Password: {           }

      [Login]
```

**Example 4-2 Login Response**

```
Welcome to ONS15216 EDFA2 Console (v2.0.0)

Cisco15216Edfa:ONS15216 EDFA2>
```

## Set the IP Address Procedure

For connection of the ONS 15216 EDFA2 to a LAN, it is mandatory to set the ONS 15216 IP address. After the login step is completed, setting of the IP address is initially accomplished through a local serial communication interface (CLI) using the RS-232 port on the front of the module and a PC serial COM port.

- 
- Step 1** Use the **snmp row set local cerent15216EdfaSromIpMgmtGroup** command to set the IP address, subnet mask, gateway address, and host name. If you do not have an IP address, subnet mask, gateway address, or host name, contact your network administrator.
  - Step 2** At the command prompt, enter the **snmp row set local cerent15216EdfaSromIpMgmtGroup** command (displayed in [Example 4-3](#)) and press Enter.

**Example 4-3 Setting IP Address, Subnet Mask, Gateway Address, and Community ID**

```
Cisco15216Edfa:ONS15216 EDFA2> snmp row set local cerent15216EdfaSromIpMgmtGroup

cerent15216EdfaSromIpMgmtEnetAddress 0.0.0.0
cerent15216EdfaSromIpMgmtEnetSubNetMask 0.0.0.0
cerent15216EdfaSromIpMgmtDefaultRouterAddress 0.0.0.0
cerent15216EdfaSromIpMgmthost name "host name"
Cisco15216Edfa:ONS15216 EDFA2>
```

Because **row set** is being used in this command, the user is prompted row by row to enter the IP address, the subnet mask, the gateway address, and the community ID (host name).

---

You have now assigned the IP address to the ONS 15216 EDFA. You must save these changes prior to terminating the session. You must also reboot the system to make the IP address active. Use the **processor reset** command. (See the “[processor reset Command](#)” section on page 6-8.)

## Connect Through a Telnet Session Procedure (Optional)

Provisioning of the ONS 15216 EDFA2 can be accomplished entirely through the RS-232 port using CLI or SNMP commands. After an IP address is assigned, it is easier to provision the ONS 15216 EDFA2 using Telnet or an SNMP manager. A Telnet client is needed for CLI commands over IP. A generic SNMP manager is required for SNMP management over IP. After connecting the ONS 15216 EDFA2 to the network through its RJ-45 port, the user can configure the module to accept SNMP and CLI commands via Telnet using the following procedure:

**Note**

To perform this procedure, the ONS 15216 EDFA2 must be connected to the network via the RJ-45 port.

- Step 1** Click **Start> Run**.
- Step 2** Type **Telnet** followed by the ONS 15216 EDFA2 IP address.
- Step 3** Log in again, using the instructions in [Login Procedure, page 4-1](#).  
You are now connected via Telnet.

## Set Power Bus Mode (Simplex or Duplex)

The ONS 15216 EDFA2 allows users to set a simplex (one power source–Bus A) or duplex (redundant power source–Bus A and Bus B) power bus mode. Use the **snmp attribute set local cerent15216EdfaPowerBusMode** command to set the desired power bus mode. The default mode is duplex. See [Example 4-4](#).

**Example 4-4 snmp row set local cerent15216EdfaCfgGroup Command**

```
Cisco15216Edfa:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaPowerBusMode simplex  
Cisco15216Edfa:ONS15216 EDFA2>
```

## Verify Amplifier Operational Status

To ensure that the amplifier is working correctly on the optical level, you must verify the amplifier operational status. Use the **snmp table display local cerent15216EdfaOverallStatusGroup** command to verify amplifier operational status. [Example 4-5](#) displays the output of this command.

**Example 4-5** *snmp table display local cerent15216EdfaOverallStatusGroup*

```
Cisco15216Edfa:ONS15216 EDFA2> snmp table display local cerent15216EdfaOverallStatusGroup

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaOverallStatusGroup ::=
{
    cerent15216EdfaInPoweruW = 316
    cerent15216EdfaInPowerdBm = -5;
    cerent15216EdfaOutPowermW = 50;
    cerent15216EdfaOutPowerdBm = 17;
};
```

The input power should be consistent with the input power measured during the optical connection procedure. See the “[Optical Connection Procedure](#)” section on page 3-6 for more information. The output power value should be 22 dB greater than the input, assuming that the default gain setting is 22 dB.

**Note**

An input power higher than -5 dBm will return a Gain Out of Range alarm that can be cleared by correctly setting the gain value. For more information, refer to [Table 2-2](#).

## Set Gain

To ensure that the ONS 15216 EDFA2 output signal is received by the transceiver in the network element, it is important that the gain is set correctly.

The desired output power per channel is dependent on the number of channels traversed in the amplifier. The user sets the gain of the amplifier depending on the input power level, the network application, and the required receiver specifications necessary for error-free operation. Gain range is provided in [Table 3-3](#).

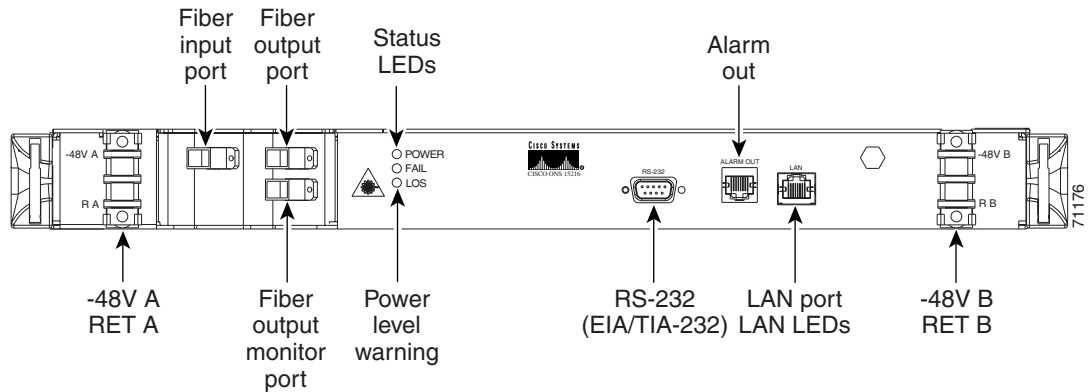
To set the amplifier gain, enter the snmp attribute **set local cerent15216EdfaConstGainOverallGain {<gain #>}**, where <gain #> is the gain value multiplied by ten. For example, if the gain value is 20 dB, the gain # would be set to 200.

**Note**

Prior to changing or implementing gain changes, consult with a Cisco Systems Engineer to ensure proper network operation.

## Set Alarm Thresholds

Alarm thresholds are set so that the network operator can be notified when valid alarms occur via the RJ-45 ALARM OUT and RJ-45 LAN ports on the front panel of the ONS 15216 EDFA2. (See [Figure 4-1](#).)

**Figure 4-1 ONS 15216 EDFA2 Front Panel**

Alarms are reported for the following conditions:

- Loss or degradation of electrical power
- Pump laser overheating, excessive pump current
- Loss or degradation of optical input

Alarms can be connected to a NOC NMS via a network element miscellaneous discrete input and/or office alarm panel/system.

For a full description of alarm threshold command attributes, refer to Chapter 6 SNMP commands.

To display the alarm thresholds, use the **snmp table display local cerent15216EdfaCfgGroup** command (Example 4-6). This command returns the current alarm threshold default values.

#### Example 4-6 **snmp table display local cerent15216EdfaCfgGroup** Command

```
Cisco15216Edfa:ONS15216 EDFA2> snmp table display local cerent15216EdfaCfgGroup

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaCfgGroup ::=
{
cerent15216EdfaCfgSaved = false;
cerent15216EdfaLpoutSetpoint = 0;
cerent15216EdfaLpoutDeviation = 200;
cerent15216EdfaLpoutHysteresis = 100;
cerent15216EdfaLOSThreshold = -2600;
cerent15216EdfaLOSHysteresis = 100;
cerent15216EdfaCtmpMin = -5;
cerent15216EdfaCtmpMinHysteresis = 1;
cerent15216EdfaCtmpMax = 65;
cerent15216EdfaCtmpMaxHysteresis = 1;
cerent15216EdfaCLEI = "";
cerent15216EdfaPowerBusMode = duplex;
cerent15216EdfaPowerBusDCVoltageMin = 400;
cerent15216EdfaPowerBusDCVoltageMax = 570;
};
Cisco15216Edfa:ONS15216 EDFA2>
```

To set the alarm thresholds, use the **snmp row set local cerent15216EdfaCfgGroup** command. After this command is entered, the user is prompted to modify each attribute, row by row, until all attributes are set. Alarm threshold attributes are described in Table 4-1.

**Table 4-1 Alarm Threshold Attribute Definitions**

<b>Attribute</b>	<b>Variable Definition</b>	<b>Syntax</b>	<b>Maximum Access</b>	<b>Description</b>
cerent15216EdfaCf gSaved	Configuration Saved Status	True Value	Read-only	Indicates whether the current configuration has been saved. The value can be true or false. If false, the configuration is not saved.
cerent15216EdfaL poutSetpoint	Loss of Output Power Setpoint	Integer (0 to 1000)	Read-only	Can be disregarded when operating amplifier in factory default, constant gain mode. Setpoint object is only valid when amplifier is used in constant output power modes of operation.
cerent15216EdfaL poutDeviation	Loss of Power Output Deviation	Integer (0 to 1000)	Read-write	Can be disregarded when operating amplifier in factory default, constant gain mode. Deviation object is only valid when amplifier is used in constant output power modes of operation.
cerent15216EdfaL poutHysteresis	Loss of Power Output Hysteresis	Integer (0 to 1000)	Read-write	Can be disregarded when operating amplifier in factory default, constant gain mode. Hysteresis object is only valid when amplifier is used in constant output power modes of operation.



Table 4-1 Alarm Threshold Attribute Definitions (continued)

Attribute	Variable Definition	Syntax	Maximum Access	Description
cerent15216EdfaL OSThreshold	Loss of Input Signal Threshold	Integer (-3100 to -1500)	Read-write	Notifies operations personnel if the optical input signal of the ONS 15216 EDFA2 drops below a level that impacts proper operation of optical network. Set this attribute at a value that is appropriate for the intended application so that the alarm condition is meaningful. Consult with a Cisco Systems Engineer to determine the threshold value for your application. As a guideline, Cisco recommends setting the threshold value at 3 dBm below the current input power level of the amplifier. Valid entries are between -3100 and -1500 dBm times 100. For example, if the total input power of the amplifier is -24 dBm and the loss of input power threshold required is -27 dBm, the loss of input power alarm threshold is -2700.

Table 4-1 Alarm Threshold Attribute Definitions (continued)

Attribute	Variable Definition	Syntax	Maximum Access	Description
cerent15216EdfaL OSHysteresis	Loss of Input Signal Hysteresis	Integer (0 to 1000)	Read-write	Used to set the amount the input signal must increase above the LOS Threshold level before the alarm is cleared. This attribute, in conjunction with the loss of input signal alarm threshold, enables efficient clearing of alarms. Set this attribute at a value that is appropriate for the application so that the alarm condition will clear when input is stable. Consult with Cisco Systems Engineer to determine the correct value for your application. As a guideline, Cisco recommends setting the value 1 dBm above the LOS Threshold value. With this setting, the module will clear the alarm if it detects a signal level of 1 dBm above the current LOS Threshold value. Valid entries are between 0 and 1000 and are in dBm times 100. For example, if the hysteresis required is 1 dBm, the power alarm hysteresis is 100.
cerent15216EdfaCt mpMin	Case temperature minimum	Integer (-10 to 10)	Read-write	Notifies operations personnel notification if the case temperature of the ONS 15216 EDFA2 drops below a level that impacts proper operation of the optical network. The minimum case temperature should be set at a value that is appropriate for the intended application and within product specifications. Users should consult with a Cisco Systems Engineer to determine the threshold value for their application. As a guideline, Cisco recommends that minimum case temperature be set at 1°C. Valid entries are between -10 and 10°C.

Table 4-1 Alarm Threshold Attribute Definitions (continued)

Attribute	Variable Definition	Syntax	Maximum Access	Description
cerent15216EdfaPowerBusDCVoltageMin	Power bus voltage minimum	Integer (0 to 70)	Read-write	Minimum allowable power bus DC voltage. The default minimum power bus voltage is set at -40 VDC. Valid entries are between 0 and 70 and are in volts times 10. For example, if the voltage required is -50 VDC, the power bus DC voltage is 500.
cerent15216EdfaPowerBusDCVoltageMax	Power bus voltage maximum	Integer (0 to 70)	Read-write	Maximum allowable power bus DC voltage. The default maximum power bus voltage is set at -57 VDC. For example, if the voltage required is -50 VDC, the power bus DC voltage is 500.
cerent15216EdfaCtMpMinHysteresis	Case Temperature Hysteresis	Integer (0 to 10)	Read-write	Used to set the amount the case temperature of the module must rise above the minimum case temperature alarm level before the alarm is cleared. This attribute, in conjunction with the case temperature minimum, enables efficient clearing of alarms. Set the hysteresis at a value that is appropriate for the application so that the alarm condition will clear when the input is stable. The user should consult with Cisco Systems Engineer in order to determine the value for their application. As a guideline, Cisco recommends that the hysteresis value be set at 1°C. Valid entries are between 0 and 10°C.

Table 4-1 Alarm Threshold Attribute Definitions (continued)

Attribute	Variable Definition	Syntax	Maximum Access	Description
cerent15216EdfaCt mpMax		Integer (20 to 70)	Read-write	Notifies operations personnel if the case temperature of the ONS 15216 EDFA2 is at a level that may impact proper operation of the optical network. Set the maximum case temperature at a value that is appropriate for intended application and within product specifications. Consult with a Cisco Systems Engineer to determine the threshold value for your application. As a guideline, Cisco recommends that minimum case temperature value be set at 50°C. Valid entries are between 20 and 70°C.
cerent15216EdfaCt mpMaxHysteresis		Integer (0 to 10)	Read-write	Used to set the amount the case temperature of module must drop below the maximum case temperature alarm level before the alarm is cleared. This attribute, in conjunction with the case temperature minimum, enables efficient clearing of alarms. Set the hysteresis at a value that is appropriate for the application. If an alarm occurs, the case temperature must return to 1°C below the set value to clear the alarm. Consult with a Cisco Systems Engineer to determine the value for your application. As a guideline, Cisco recommends setting the value at 1°C. Valid entries are between 0 and 10°C. Setting this value to 0 disables this option.
cerent15216EdfaC LEI		Display String (0 to 10 characters)	Read-only	Indicates the factory setting of the Common Language Equipment Identifier (CLEI) code (established by Telcordia) of the Cisco ONS 15216 EDFA2. This attribute can be accessed, but it cannot be changed by the user.

# Set Password

To restrict access to the ONS 15216 EDFA2, use the **user passwd modify** command to change the default user password. [Example 4-7](#) displays the **user passwd modify** syntax. Enter the **user passwd modify** command followed by a space, the default password followed by a space, and the new password (as displayed in [Example 4-7](#)).

With the exception of the monitor level (read-only) user, the user can only modify the password for their assigned level. For additional information on user levels, refer to [Table 3-5](#).

## Example 4-7 Changing Password

```
Cisco15216Edfa:ONS15216 EDFA2> user passwd modify old password new password
```



### Note

The default user name for the administrator level is CISCO15 with no default password. To start a session for this user name, press Enter.

# Save Changes

To ensure that your provisioning changes are set, you must save your changes prior to terminating the session. To save changes, use the **snmp attribute set local cerent15216EdfaOpSaveConfig perform** command ([Example 4-8](#)). [Example 4-9](#) displays the command response.

## Example 4-8 snmp attribute set local cerent15216EdfaOpSaveConfig Command

```
Cisco15216Edfa:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaOpSaveConfig
idle
perform
abort
```

## Example 4-9 snmp attribute set local cerent15216EdfaOpSaveConfig Command Response

```
Cisco15216Edfa:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaOpSaveConfig
perform
Cisco15216Edfa:ONS15216 EDFA2>
```

Your changes are now saved.

# Logoff

At the end of a session, the user must log off of the Cisco ONS 15216 EDFA2. To logoff, simply use the **logoff** command. This is shown in [Example 4-10](#).

## Example 4-10 logoff Command

```
Cisco15216Edfa:ONS15216 EDFA2> logoff
```





# SNMP MIB Installation and Configuration

This chapter explains how to read and understand SNMP MIB as it relates to the ONS 15216 EDFA2. This chapter is a reference of all ONS 15216 EDFA2 SNMP commands that are used in a network management system (NMS). For provisioning the ONS 15216 EDFA2, see [Chapter 4, “Provisioning”](#).

## SNMP Overview

SNMP is an application-layer communication protocol that allows network devices to retrieve and modify the value of management information, as well as provide event notification to an NMS.

The ONS 15216 EDFA2 SNMP implementation uses standard Internet Engineering Task Force (IETF) MIBs to convey inventory, fault, and performance management information.

SNMP allows limited management of the ONS 15216 EDFA2 by a generic, third-party SNMP manager (for example, HP OpenView Network Node manager [NNM] or Open Systems Interconnection [OSI] NetExpert).

The ONS 15216 EDFA2 supports SNMP Version 1 (SNMPv1) and SNMP Version 2c (SNMPv2c) protocols.

## SNMP Components

An SNMP-managed network consists of three primary components:

- Managed devices
- Agents
- Management systems

A managed device is a network node 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. Managed devices include routers, access servers, switches, bridges, hubs, computer hosts, and network elements such as the ONS 15216 EDFA2.

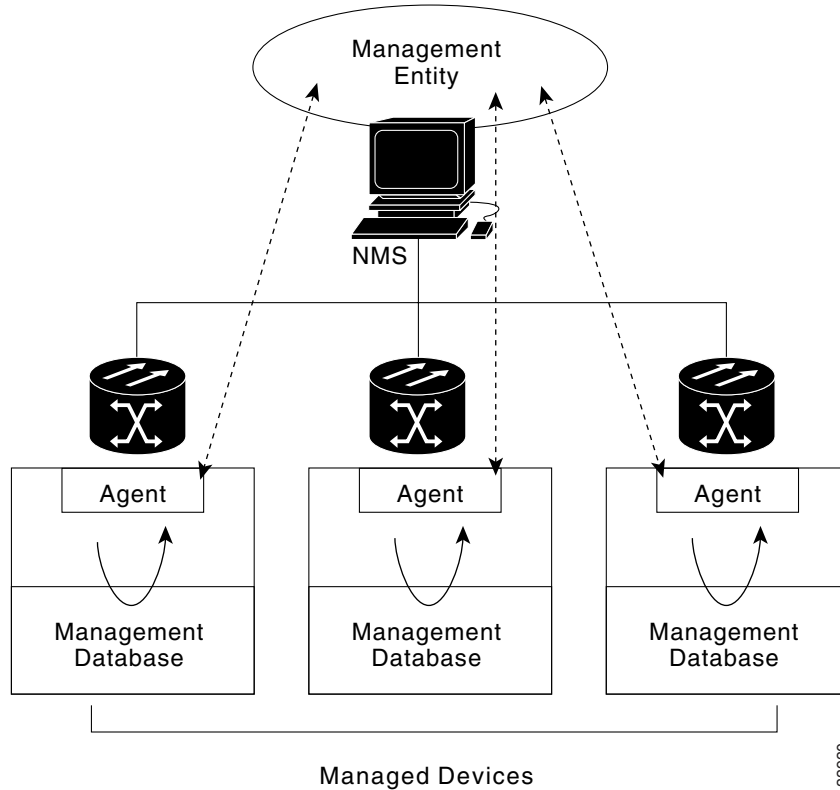
## ONS 15216 EDFA2 SNMP Elements

The following three SNMP elements are used with the ONS 15216 EDFA2:

- SNMP agent

- SNMP MIB
- SNMP manager

Figure 5-1 SNMP Elements

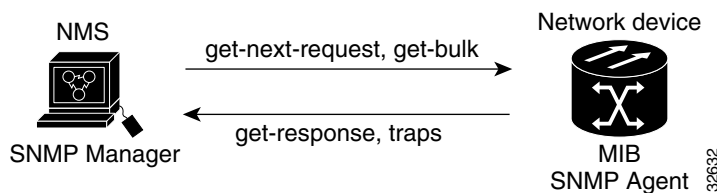


## SNMP Agent

An agent is an entity that assumes an operation role to receive, process, and respond to requests, as well as generated event reports. The SNMP agent gathers data from the MIB, which is the repository for device parameter and network data. To respond to requests, the agent must have network management information access. To generate reports, an agent must be notified of internal events.

Cisco provides both an SNMP agent (installed on the ONS 15216 EDFA2) and SNMP MIB to monitor the ONS 15216 EDFA2. The SNMP agent software and MIB are pre-installed on each module.

Figure 5-2 SNMP Agent and MIB





## SNMP MIB

The SNMP MIB (CERENT-15216-EDFA-MIB.mib) is a file written in ASN.1 syntax. This MIB specifies what ONS 15216 EDFA2 information needs to be monitored. This MIB is pre-installed on the SNMP agent and is accessible via the CLI.

The cerent15216Edfa.mib and other MIBs can also be installed on a third-party SNMP manager located at a network management center. The SNMP manager at the network management center or the SNMP manager, accessible via the CLI, (see [SNMP Manager, page 5-3](#)) uses the SNMP MIBs to communicate with the SNMP agent.

## SNMP Manager

The ONS 15216 EDFA2 comes with a pre-installed SNMP manager accessible via the CLI. This SNMP manager can be accessed and used to communicate with the SNMP agent that is also pre-installed on each ONS 15216 EDFA2. This manual displays examples of issuing SNMP commands to the amplifier using the built-in SNMP manager.

### Third-party, Vendor-Specific SNMP Managers

SNMP managers from third-party vendors running on a separate computer located at a network management center are often used to manage network elements. If a third-party SNMP manager is used, it must be able to communicate with the SNMP agent pre-installed on the ONS 15216 EDFA2.

If a third-party SNMP manager is used, it is assumed that the SNMP manager is pre-installed prior to the SNMP MIB installation. Each vendor-specific SNMP manager has a unique set of instructions for SNMP MIB installation. For directions on loading the SNMP MIBs, refer to SNMP manager documentation.

Cisco does not provide or recommend a standard third-party SNMP manager.

## SNMP MIBs and Message Types

SNMP operations can be quite powerful. A manager can retrieve or modify the value of management information accessible by an agent, an agent can report an event to a manager, and the manager can inform another manager of the value of management information on an agent. Using retrieval and modification operations, a manager can cause an agent to perform an action or execute a command. The manager can also create new and delete existing instances of management information.

An MIB is a hierarchically-organized collection of information. Network-management protocols, such as SNMP, gain access to these MIBs. MIBs consist of managed objects and are identified by object identifiers (OID).

The ONS 15216 EDFA2 SNMP agent communicates with an SNMP management application (a third-party application or the built-in SNMP manager) using SNMP messages.

[Table 5-1](#) describes SNMP operation types.

**Table 5-1** SNMP Operation Types

Operation	Description
get-request	Retrieves a value from a specific variable.
get-next-request	Retrieves the value following the named variable; this operation is often used to retrieve variables in a Table. With this operation, an SNMP agent does not need to know the exact variable name. The SNMP manager searches sequentially to find the needed variable in the MIB.
get-response	The reply to a get-request, get-next-request, get-bulk-request, or set-request sent by an NMS.
get-bulk-request	Similar to a get-next-request, but this operation fills the get-response with up to the max-repetition number of get-next interactions.
trap	An unsolicited message sent by an SNMP agent to an SNMP manager indicating that an event has occurred.
set-request	Sets a value of a specific variable.

## Command Syntax Using the SNMP Agent

Although Cisco has its own separate SNMP manager (Cisco Transport Manager [CTM]), communication with the ONS 15216 EDFA2 is also possible using the built-in SNMP manager, its agent, and the MIB. (See [Figure 5-1](#).)

The commands and command syntax displayed in this manual are the result of using the built-in ONS 15216 EDFA2 SNMP manager included with the CLI card.

Commands can be issued via Telnet over a LAN or directly through the RS-232 port on the module. (See [Chapter 3, “Installation”](#).) After setting up a connection to the module and entering a password and user name, the following prompt appears:

```
hostname:ONS15216 EDFA2>
```

To communicate with the module using SNMP, the command must begin with “snmp”.



### Note

To view a list of possible SNMP operations, enter “snmp” followed by a space and press the **Tab** key.

### Example 5-1 snmp Command Followed by the Tab Key

```
hostname:ONS15216 EDFA2> snmp
agent
attribute
host
mib
pdu
row
session
subtree
table
trap
tree
```

Continue to enter a specific operation from the list until the complete command is created. (See [Example 5-2](#).)

**Example 5-2 snmp Table display Command**

```
hostname:ONS15216 EDFA2> snmp table display local cerent
cerent15216EdfaCommunityEntry
cerent15216EdfaCommTrapEntry
cerent15216EdfaViewEntry
cerent15216EdfaAgentControlGroup
cerent15216EdfaActionOpGroup
cerent15216EdfaLogEventControl
cerent15216EdfaLogEventEntry
cerent15216EdfaBootEntry
cerent15216EdfaBootImageEntry
cerent15216EdfaRtcDateAndTime
cerent15216EdfaSromIpMgmtGroup
cerent15216EdfaSromRingGroup
cerent15216EdfaCfgGroup
cerent15216EdfaOverallControl
cerent15216EdfaPumpCfgEntry
cerent15216EdfaOverallStatusGroup
cerent15216EdfaPumpStatusEntry
cerent15216EdfaAlarmEntry
cerent15216EdfaVersionGroup
cerent15216EdfaOpGroup
hostname:ONS15216 EDFA2> snmp Table display local cerent15216Edfa
```

Use these commands to set up community strings ([Enabling SNMP Remote Management Community Strings, page 5-5](#)) and traps ([cerent15216EdfaVersionGroup Table, page 5-16](#)).

## Enabling SNMP Remote Management Community Strings

SNMP communities are groupings of workstations and servers (or gateways) that can manage the ONS 15216 EDFA2. NMS's also use SNMP communities to enforce security. SNMP enforces security through password-like community strings. Access to the SNMP agent and the ONS 15216 EDFA2 can be limited by both IP address and community string.

The CLI SNMP manager (local SNMP manager) must be used to setup remote management (via a Telnet connection or terminal server). A third-party, vendor-specific SNMP manager cannot be used to setup remote management.

The process for setting up community entries consists of:

- [Creating a View, page 5-6](#)
- [Creating a Community Entry, page 5-7](#)

The ONS 15216 EDFA2 has the two default community strings listed in [Table 5-2](#).

**Table 5-2 Default Community Strings**

Community String	Default Privileges
public	read operations for all MIBs
private	read and write operations for all MIBs

The privileges assigned to the default strings can be modified or new communities with custom privileges can be created.

## Creating a View

The following command describes how to set a view entry. A view defines and restricts the MIB attributes that a particular community can access. The view entry and the community entry are set to factory defaults. Users should consult with a Cisco Systems Engineer before modifying these settings.

### Set View Entry

**Command:** `snmp row set local cerent15216EdfaViewEntry`

**Syntax:** `snmp row set local cerent15216EdfaViewEntry view index # subtree`

**Description:** To create a community entry, a view must first be created. A MIB view can restrict the MIBs that a particular community can access. To create a view, type the command. # is an integer (1 to 2048) assigned to this view entry and *subtree* is the MIB subtree to which this view applies. Multiple view entries can be used for each view index.

This command creates a new row in the ViewEntry Table. The SNMP manager prompts the user for each attribute.

To display a list of possible values, press the **Spacebar** followed by the **Tab** key. (See [Example 5-3](#).)

#### Example 5-3 cerent15216EdfaViewEntry Set Command

```
hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaViewEntry cerent

cerent15216EdfaViewMask '0'H
cerent15216EdfaViewType included
cerent15216EdfaViewStatus
    active
    notInService
    notReady
    createAndGo
    createAndWait
    destroy
cerent15216EdfaViewStatus createAndGo
hostname:ONS15216 EDFA2> snmp row display local cerent15216EdfaViewEntry 1 cerent
CLASS cerent15216Edfa-AGENT-MIB.cerent15216EdfaViewEntry ::=
{
    cerent15216EdfaViewIndex = 1;
    cerent15216EdfaViewSubtree = { cerent };
    cerent15216EdfaViewMask = '00'H;
    cerent15216EdfaViewType = included;
    cerent15216EdfaViewStatus = active;
```

Access to the ONS 15216 EDFA2 can be restricted by IP address or community string using this command.

[Table 5-3](#) describes the command and MIB view prompts.

**Table 5-3 Creating a View**

Data Prompt	Command	Description
cerent15216EdfaView Index	snmp row set local cerent15216EdfaViewEntry 1 zeroDotZero	View Index: A unique value for each MIB view.  This value is the number entered with the command.
cerent15216EdfaView SubTree	Sub-Tree Object Identifier	Sub-Tree Object Identifier: An object identifier that designates a sub-tree element in the MIB hierarchy. zeroDotZero specifies the entire CLI MIB hierarchy.
cerent15216EdfaView Mask	'O'H	A bit mask that identifies objects in the subtree.
cerent15216EdfaView Type	included	A flag that specifies the status of the view. Valid entries are included and excluded.
cerent15216EdfaView Status	createAndGo	If the entry currently exists, use active (createAndGo cannot be used if any entry exists).

## Creating a Community Entry

SNMP communities are groupings of workstations and servers (or gateways) that can manage the ONS 15216 EDFA2. NMS's use SNMP communities to enforce security. Because access to the SNMP agent is controlled by a community entry, every SNMP agent must be configured to recognize one or more community names, and to provide the appropriate level of access to managers according to the community name. The following commands describe the commands for displaying or setting community entries. Users should consult with a Cisco Systems Engineer before modifying these settings.

### Set CommunityEntry

**Command:** `snmp row set local cerent15216EdfaCommunityEntry`

**Syntax:** `snmp row set local cerent15216EdfaCommunityEntry community index`

**Description:** After creating a view, use the `snmp row set local cerent15216EdfaCommunityEntry` command to create a community entry for that view.

The SNMP manager prompts the user for each attribute. Press the **Spacebar** and then the **Tab** key after a prompt to view possible data inputs ([Example 5-4](#)). Refer to [Table 5-4](#) for information concerning data for each prompt.

#### **Example 5-4 cerent15216EdfaCommunityEntry Set Command**

```
hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaCommunityEntry 1

cerent15216EdfaCommName " "
cerent15216EdfaCommViewIndex 0
cerent15216EdfaCommPrivileges 35
cerent15216EdfaCommSrcIPAddr 0.0.0.0
```

```

cerent15216EdfaCommNetMask 0.0.0.0
cerent15216EdfaCommStatus 0
    cerent15216EdfaCommStatus OBJECT-TYPE
        SYNTAX INTEGER
        {
            active(1),
            notInService(2),
            notReady(3),
            createAndGo(4),
            createAndWait(5),
            destroy(6)
        }
    MAX-ACCESS read-create
    DESCRIPTION
    ::= { cerent15216EdfaCommunityEntry 7 }

```

Table 5-4 displays the definitions for the community entry values.

**Table 5-4** *Creating a Community Entry*

Data Prompt	Description
cerent15216EdfaCommIndex	Community Index: An index that uniquely identifies a particular SNMP community. This community index is part of the command. In <a href="#">Example 5-4</a> , it is “1”.
cerent15216EdfaCommName	Community Name: The community string.
cerent15216EdfaCommViewIndex	View Index: The view index specifies which MIBs this particular community string can access.
cerent15216EdfaCommPrivileges	Privileges: A bitmap of access privileges that govern what management operations a particular community can perform. These privileges are expressed as a sum of values, where each value represents a particular operation. Refer to <a href="#">Table 5-5</a> for the SNMP Operation Decimal Values.
cerent15216EdfaCommSrcIPAddr	Source IP Address: The IP address from which network management traffic for this community originates.
cerent15216EdfaCommNetMask	NetMask: The subnet mask for the source IP address.
cerent15216EdfaCommStatus	Status: The status of this conceptual row in the community table. Use createAndGo to create a new row. Use active to modify an existing row.

## Display CommunityEntry

**Command:** `snmp row display local cerent15216EdfaCommunityEntry`

**Syntax:** `snmp row display local cerent15216EdfaCommunityEntry community index`

**Description:** After creating a community string, use this command to view its parameters. The number in the command refers to the community index number created in the previous section.

### Example 5-5 *cerent15216EdfaCommunityEntry Display Command*

```

hostname:ONS15216 EDFA2> snmp row display local cerent15216EdfaCommunityEntry 1

CLASS cerent15216Edfa-AGENT-MIB.cerent15216EdfaCommunityEntry ::=

```

```

{
  cerent15216EdfaCommIndex = 1;
  cerent15216EdfaCommName = "private";
  cerent15216EdfaCommViewIndex = 1;
  cerent15216EdfaCommPrivileges = 255;
  cerent15216EdfaCommSrcIPAddr = 0.0.0.0;
  cerent15216EdfaCommNetMask = 255.255.255.255;
  cerent15216EdfaCommStatus = active;
};

```

Table 5-5 displays the decimal values for the following SNMP operations.

**Table 5-5 SNMP Operation Decimal Values**

SNMP Operation	Decimal Values
Get	1
GetNext	2
Response (enable for all community strings)	4
Set	8
SNMPv1-Trap	16
GetBulk	32
Inform (enable for all community strings)	64
SNMPv2-Trap (enable for all community strings)	128

For example, 255 is the sum of all decimal values and specifies access to all SNMP operations. This sum is the default private community. 247 is the sum for all SNMP operations with the exception of the Set operation. This sum is the default public community.

## Tables and Groups

The `cerent15216Edfa.mib` contains several key tables that are used to review and provision the ONS 15216 EDFA2. The following tables are listed and described in the following sections:

- [cerent15216EdfaCfgGroup Table, page 5-10](#)
- [Use the `snmp attribute set local cerent15216EdfaOpSaveConfig perform` command to save changes., page 5-11](#)
- [cerent15216EdfaOverallStatusGroup Table, page 5-12](#)
- [cerent15216EdfaOverallControl Table, page 5-13](#)
- [cerent15216EdfaPumpStatusEntry, page 5-13](#)
- [cerent15216EdfaAlarmEntry Table, page 5-14](#)
- [cerent15216EdfaOpGroup Table, page 5-15](#)
- [cerent15216EdfaVersionGroup Table, page 5-16](#)

## cerent15216EdfaCfgGroup Table

The cerent15216EdfaCfgGroup Table is used to set or get alarm threshold configuration. The associated table command provides a summary of all alarm thresholds. See [Table 5-6](#) for variable definitions. For more information on alarm thresholds, see the [“Set Alarm Thresholds”](#) section on page 4-4.

**Table 5-6** cerent15216EdfaCfgGroup Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216EdfaCfgSaved	True Value	Read-only	Indicates whether the current configuration has been saved.
cerent15216EdfaLpoutSetpoint	Integer (0 to 1000)	Read-only	Laser pump output power setpoint for the Lpout alarm (*10 mW).  This is set when the cerent15216EdfaPumpCfgC onstOutPower attribute is set for pump 2.
cerent15216EdfaLpoutDeviation	Integer (0 to 1000)	Read-write	Amount that the output power must deviate from the setpoint to set the Lpout alarm (*100 dBm).
cerent15216EdfaLpoutHysteresis	Integer (0 to 1000)	Read-write	Amount that the output power must move towards the setpoint before the Lpout alarm is cleared (*100 dBm).
cerent15216EdfaLOSThreshold	Integer (-3100 to -1500)	Read-write	Loss of signal threshold (*100 dBm).
cerent15216EdfaLOSHysteresis	Integer (0 to 1000)	Read-write	Amount above cerent15216EdfaLOSThreshold that the input signal must rise before the Lpin alarm is cleared (*100 dBm).
cerent15216EdfaCtmpMin	Integer (-10 to 10)	Read-write	Minimum allowable case temperature in degrees Celsius.
cerent15216EdfaCtmpMinHysteresis	Integer (0 to 10)	Read-write	Amount above cerent15216EdfaCtmpMin that the case temperature must rise before the Ctmp alarm is cleared in degrees Celsius.
cerent15216EdfaCtmpMax	Integer (20 to 70)	Read-write	Maximum allowable case temperature in degrees Celsius.



**Table 5-6** *cerent15216EdfaCfgGroup Variable Descriptions (continued)*

Variable	Syntax	Maximum Access	Description
cerent15216EdfaCtmpMaxHysteresis	Integer (0 to 10)	Read-write	Amount below cerent15216EdfaCtmpMax that the case temperature must drop before the Ctmp alarm is cleared in degrees Celsius.
cerent15216EdfaPowerBusDCVoltageMin	Integer (0 to 70)	Read-write	Minimum allowable power bus DC voltage. The default minimum power bus voltage is set at -40 VDC. Valid entries are between 0 and 70 and are in V times -10. For example, if the voltage required is -50 VDC, the power bus DC voltage is 500.
cerent15216EdfaPowerBusDCVoltageMax	Integer (0 to 70)	Read-write	Maximum allowable power bus DC voltage. The default maximum power bus voltage is set at -57 VDC. Valid entries are between 0 and 70 and are in V times -10. For example, if the voltage required is -50 VDC, the power bus DC voltage is 500.

Use the `snmp` attribute set `local cerent15216EdfaOpSaveConfig perform` command to save changes.

## cerent15216EdfaPumpCfgEntry Table

The `cerent15216EdfaPumpCfgEntry` table is used to set or get pump operation mode configuration. The associated table command displays a settings summary or allows you to set pumps. See [Table 5-7](#) for variable definitions. The factory default mode of operation for the ONS 15216 EDFA2 is constant gain temperature compensated. Cisco recommends that users contact Cisco Engineering prior to changing this mode of operation.

**Table 5-7** *cerent15216EdfaPumpCfgEntry Variable Descriptions*

Variable	Syntax	Maximum Access	Description
cerent15216EdfaPumpCfgPumpNum	cerent15216EdfaPumpNumber	Not Accessible	Laser pump number (1 or 2).
cerent15216EdfaPumpCfgControlMode	cerent15216EdfaControlMode	Read-write	Laser pump control mode. When the mode is set directly to constCurrent, constPower, or constOutputPower, the current value of ConstPumpCurrent, ConstPumpPower, or ConstOutPower is used as the constant parameter for the new mode.
cerent15216EdfaPumpCfgConstPumpCurrent	Integer (0 to 300)	Read-write	Laser pump constant pump current (mA). The current that is used when the control mode is changed to constCurrent.
cerent15216EdfaPumpCfgConstPumpPower	Integer (0 to 100)	Read-write	Laser pump constant pump power (mW). The power that is used when the control mode is changed to constPumpPower.
cerent15216EdfaPumpCfgConstOutputPower	Integer (0 to 650)	Read-write	Laser pump constant output power (*10 mW). The power that is used when the control mode is changed to constOutputPower.

## cerent15216EdfaOverallStatusGroup Table

The cerent15216EdfaOverallStatusGroup Table allows users to display the input and output of the ONS 15216 EDFA2 amplifier. [Table 5-8](#) describes cerent15216EdfaOverallStatusGroup Table variables.

**Table 5-8** *cerent15216EdfaOverallStatusGroup*

Variable	Syntax	Maximum Access	Description
cerent15216EdfaInPoweruW	Integer (0 to 99999)	Read-only	EDFA input power (*10 microwatts)
cerent15216EdfaInPowerdBm	Integer (-99999 to 99999)	Read-only	EDFA input power (*100 dBm)
cerent15216EdfaOutPowermW	Integer (0 to 999999)	Read-only	EDFA output power (*100 mW)
cerent15216EdfaOutPowerdBm	Integer (-999999 to 99999)	Read-only	EDFA output power (*100 dBm)

## cerent15216EdfaOverallControl Table

The cerent15216EdfaOverallControl Table allows the user to display and configure overall gain and preattenuation. [Table 5-9](#) describes cerent15216EdfaOverallControl variables.

**Table 5-9** *cerent15216EdfaOverallControl Variable Descriptions*

Variable	Syntax	Maximum Access	Description
cerent15216EdfaConstGainOverallGain	Integer (130 to 220)	Read-write	The overall gain (*10 dBm) that is used when the control mode in the PumpCfgTable is set to constGain or constOutputPower.
cerent15216EdfaVariableGainPreAttenuation	Integer (10 to 100)	Read-write	The preattenuation (*10 dBm) that is used when the control mode in the PumpCfgTable is neither constGain nor constOutputPower.

## cerent15216EdfaPumpStatusEntry

The cerent15216EdfaPumpStatusEntry Table is used to display optical amplification module data. [Table 5-10](#) displays information regarding the cerent15216EdfaPumpStatusEntry Table variables.

Table 5-10 *cerent15216EdfaPumpStatusEntry Variable Descriptions*

Variable	Syntax	Maximum Access	Description
cerent15216EdfaPumpStatusPumpNum	cerent15216EdfaPumpNumber	Read-only	Laser pump number
cerent15216EdfaPumpStatusLaserChipTemp	Integer (-9999 to 9999)	Read-only	Laser chip temperature (*10°C)
cerent15216EdfaPumpStatusLaserChipTempSetpoint	Integer (0 to 999)	Read-only	Laser chip temperature setpoint (*10°C)
cerent15216EdfaPumpStatusLaserTECCurrent	Integer (0 to 99999)	Read-only	Laser TEC current (mA)
cerent15216EdfaPumpStatusLaserPower	Integer (0 to 99999)	Read-only	Laser power (*100 mW)
cerent15216EdfaPumpStatusLaserCurrent	Integer (0 to 999999)	Read-only	Laser current (*100 mA)
cerent15216EdfaPumpStatusAmbientTemp	Integer (-9999 to 9999)	Read-only	Ambient temperature (*100°C)
cerent15216EdfaPumpStatusDCVoltage	Integer (0 to 9999)	Read-only	DC voltage (*10V)
cerent15216EdfaPumpStatusInPowerW	Integer (0 to 99999)	Read-only	Input power (*10 microwatts)
cerent15216EdfaPumpStatusInPowerdBm	Integer (-999999 to 999999)	Read-only	Input power (*100 dBm)
cerent15216EdfaPumpStatusOutPowermW	Integer (0 to 999999)	Read-only	Output power (*100 mW)
cerent15216EdfaPumpStatusOutPowerdBm	Integer (-99999 to 99999)	Read-only	Output power (*100 dBm)
cerent15216EdfaPumpStatusGain <sup>1</sup>	Integer (-9999 to 9999)	Read-only	Gain (*10 dBm)

<sup>1</sup>. The value of the cerent15216EdfaPumpStatusGain variable should always be around 23 dB. This variable is the internal amplifier module gain. The cerent15216EdfaPumpStatusGain variable should not be confused with the cerent15216EdfaConstGainOverallGain variable that is used to set the gain of the ONS 15216 EDFA2.

## cerent15216EdfaAlarmEntry Table

The cerent15216EdfaAlarmEntry Table is used to display alarm status. The associated table command provides a summary of all alarms. [Table 5-11](#) describes the cerent15216EdfaAlarmEntry Table variables.

**Table 5-11** *cerent15216EdfaAlarmEntry Variable Descriptions*

Variable	Syntax	Maximum Access	Description
cerent15216EdfaAlarmIndex	cerent15216EdfaIndex	Not Accessible	A unique value to identify this entry.
cerent15216EdfaAlarmID	AutonomousType	Read-only	The alarm this entry refers to.
cerent15216EdfaAlarmPriority	cerent15216EdfaAlarmPriority	Read-only	The priority of this alarm.
cerent15216EdfaAlarmState	cerent15216EdfaAlarmState	Read-only	The reporting state of this alarm.
cerent15216EdfaAlarmEnableStatus	cerent15216EdfaControl	Read-write	If the alarm is enabled/disabled.
cerent15216EdfaAlarmDateAndTime	Cerent15216EdfaDateAndTimeString	Read-only	The local date and time when the alarm entered its current state.

## cerent15216EdfaOpGroup Table

The cerent15216EdfaOpGroup Table is used to display or set operation actions, such as saving configuration or loading new software. The individual variables in [Table 5-12](#) are generally used instead of the Table command. That is, when performing a cutover command, the user would use the **snmp attribute set local cerent15216EdfaOpCutover perform** command.

**Table 5-12** *cerent15216EdfaOpGroup Variable Descriptions*

Variable	Syntax	Maximum Access	Description
cerent15216EdfaOpStatus	cerent15216EdfaActionStatus	Read-only	The status of the current operation.
cerent15216EdfaOpResult	Integer	Read-only	This value is used to save the error result (if any) of the last operation. Success is indicated by a value of 0.
cerent15216EdfaOpRequestId	Integer	Read-write	The request identifier for this operation. This is provided to allow managers to match actions and results.
cerent15216EdfaOpCutover	cerent15216EdfaAction	Read-write	When “perform” is written to this object, firmware is executed from the current plane and the alternate plane status is changed to the default active plane.
cerent15216EdfaOpLoad	cerent15216EdfaAction	Read-write	When “perform” is written to this object, new firmware is downloaded. Before setting this attribute, the source of the new firmware should be specified by setting cerent15216EdfaOpSrcFileName and cerent15216EdfaOpTftpSrvAddr.

**Table 5-12** *cerent15216EdfaOpGroup Variable Descriptions (continued)*

Variable	Syntax	Maximum Access	Description
cerent15216EdfaOpSrcFileName	DisplayString (SIZE (0 to 127))	Read-write	Source file name for the Load operation.
cerent15216EdfaOpTftpSrvAddr	IpAddress	Read-write	TFTP file server address for the Load operation.
cerent15216EdfaOpReset	cerent15216EdfaAction	Read-write	When “perform” is written to this object, a software reset is performed.
cerent15216EdfaOpSaveConfig	cerent15216EdfaAction	Read-write	To save the configuration of the optical module, write “perform” to this object.

## cerent15216EdfaVersionGroup Table

The cerent15216EdfaVersionGroup Table allows users to display the currently loaded image and the image to be loaded after cutover. [Table 5-13](#) describes cerent15216EdfaVersionGroup Table variables.

**Table 5-13** *cerent15216EdfaVersionGroup*

Variable	Syntax	Maximum Access	Description
cerent15216EdfaCurrentVersion	DisplayString (0 to 255 characters)	Read-only	The version of the currently loaded image.
cerent15216EdfaAlternateVersion	DisplayString (0 to 255 characters)	Read-only	The version of the image to be loaded after a cutover is performed.

## Setting Up Traps

Traps are asynchronous notifications sent from the ONS 15216 EDFA2 to a predetermined location (IP address, subnet mask, etc.). A community entry must be created prior to remotely setting up traps using either Telnet or a terminal server. [Table 5-14](#) displays the alarm notification types in the cerent15216Edfa.mib that initiate a trap.

**Table 5-14** *Notification Types that Initiate a Trap*

Notification	MIB Items	Description
cerent15216EdfaOpFinished	cerent15216EdfaOpSaveConfig cerent15216EdfaOpCutover cerent15216EdfaOpLoad cerent15216EdfaOpReset	“CerentOp Finished” This trap indicates that an operation has completed or, in the case of cerent15216EdfaOpReset, the operation is about to be performed.
cerent15216EdfaAlarmActivated	cerent15216EdfaAlarmID cerent15216EdfaAlarmPriority cerent15216EdfaAlarmDateAndTime	“Alarm Activate” A notification indicating that an alarm has changed to an active state.
cerent15216EdfaAlarmCleared	cerent15216EdfaAlarmID cerent15216EdfaAlarmPriority cerent15216EdfaAlarmDateAndTime	“Alarm Cleared” A notification indicating that an alarm has changed to a cleared state.

## Trap Display Command

**Command:** `snmp Table display local cerent15216EdfaCommTrapEntry`

**Syntax:** `snmp Table display local cerent15216EdfaCommTrapEntry #`

**Description:** Displays the communities for traps.

### Example 5-6 `cerent15216EdfaCommTrapEntry Display Command`

```
hostname:ONS15216 EDFA2> snmp Table display local cerent15216EdfaCommTrapEntry
```

```
CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaCommTrapEntry ::=
{
    cerent15216EdfaCommTrapIndex = 0;
    cerent15216EdfaCommTrapCommunity = "";
    cerent15216EdfaCommTrapDestIPAddress = 0.0.0.0;
    cerent15216EdfaCommTrapDestUDPPort = 0;
    cerent15216EdfaCommTrapViewIndex = 0;
    cerent15216EdfaCommTrapVersion = 0;
    cerent15216EdfaCommTrapStatus = notReady;
};

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaCommTrapEntry ::=
{
    cerent15216EdfaCommTrapIndex = 1;
    cerent15216EdfaCommTrapCommunity = "private";
    cerent15216EdfaCommTrapDestIPAddress = 172.22.87.50;
    cerent15216EdfaCommTrapDestUDPPort = 162;
    cerent15216EdfaCommTrapViewIndex = 1;
    cerent15216EdfaCommTrapVersion = v2;
    cerent15216EdfaCommTrapStatus = active;
};
```

## Trap Set Command

**Command:** `snmp row set local cerent15216EdfaCommTrapEntry`

**Syntax:** `snmp row set local cerent15216EdfaCommTrapEntry #`

**Description:** The command followed by a community number permits the user to set the parameters for the SNMP trap. [Example 5-7](#) displays the prompts that appear after entering this command.

Prompts appear for the following settings:

- `cerent15216EdfaCommTrapCommunity`: The trap destination community name.
- `cerent15216EdfaCommTrapDestIPAddress`: The trap destination IP address.
- `cerent15216EdfaCommTrapDestUDPPort`: The trap destination UDP port.
- `cerent15216EdfaCommTrapViewIndex`: The trap destination MIB view index. A trap may be sent to this destination if it is contained in this MIB view. A 0 implies no MIB view.
- `cerent15216EdfaCommTrapVersion`: The trap version number.
- `cerent15216EdfaCommTrapStatus`: The status of this conceptual row in the `cerent15216EdfaCommunityTrapTable`.

If the data needs to be changed, enter new data after the prompt.

**Example 5-7 cerent15216EdfaCommTrapEntry Set Command**

```

hostname:ONS15216 EDFA2> snmp row set local CommTrapEntry 1

cerent15216EdfaCommTrapCommunity ""
cerent15216EdfaCommTrapDestIPAddress 0.0.0.0
cerent15216EdfaCommTrapDestUDPPort 162
cerent15216EdfaCommTrapViewIndex 0
cerent15216EdfaCommTrapVersion v1
cerent15216EdfaCommTrapStatus 0
cerent15216EdfaCommTrapStatus OBJECT-TYPE
    SYNTAX INTEGER
    {
        active(1),
        notInService(2),
        notReady(3),
        createAndGo(4),
        createAndWait(5),
        destroy(6)
    }
    MAX-ACCESS read-create
    DESCRIPTION

 ::= { cerent15216EdfaCommTrapEntry 7 }

```

## Set Agent Trap Enable

**Command:** `snmp attribute set local cerent15216EdfaAgentTrapEnable`

**Syntax:** `snmp attribute set local cerent15216EdfaAgentTrapEnable control`

**Description:** Enables or disables SNMP traps depending on whether the parameter control is “enabled” or “disabled”.

## Get Agent Trap Enable

**Command:** `snmp attribute get local cerent15216EdfaAgentTrapEnable`

**Syntax:** `snmp attribute get local cerent15216EdfaAgentTrapEnable`

**Description:** Ensures that the SNMP traps are enabled. The system responds with “enabled”.

## Retrieving Information

The following SNMP commands access ONS 15216 EDFA2 information.

### IP Address

**Command:** `snmp Table display local cerent15216EdfaSromIpMgmtGroup`

**Syntax:** `snmp Table display local cerent15216EdfaSromIpMgmtGroup`

**Description:** Displays the ONS 15216 EDFA2 IP address.

The following SNMP commands display the ONS 15216 EDFA2’s IP address and other networking information:



- **snmp row display local cerent15216EdfaSromIpMgmtGroup command (Example 5-8)**

**Example 5-8 cerent15216EdfaSromIpMgmtGroup Display Command**

```
hostname:ONS15216 EDFA2> snmp row display local cerent15216EdfaSromIpMgmtGroup

CLASS cerent15216Edfa-SROM-IP-ADDRESS-MIB.cerent15216EdfaSromIpMgmtGroup ::=
{
    cerent15216EdfaSromIpMgmtEnetAddress = 172.22.82.19;
    cerent15216EdfaSromIpMgmtEnetSubNetMask = 255.255.0.0;
    cerent15216EdfaSromIpMgmtDefaultRouterAddress = 172.22.82.1;
    cerent15216EdfaSromIpMgmtHostName = "Hostname";
}
```

Table 5-15 describes the other attributes displayed by these commands.

**Table 5-15 cerent15216EdfaSromIpMgmtGroup Command Attributes**

Attribute	Description
cerent15216EdfaSromIpMgmtEnetAddress	The IP address used by the system Ethernet management port. If set to 0.0.0.0 IP traffic is not supported over the Ethernet interface. The system must have at least one IP address, either for the Ethernet management port, or for IP over ATM.
cerent15216EdfaSromIpMgmtEnetSubNetMask	The IP subnetwork mask for the Ethernet management port.
cerent15216EdfaSromIpMgmtHostName	The host name of the system.

## Date and Time

**Command:** `snmp attribute get local cerent15216EdfaRtcDateAndTime`

**Syntax:** `snmp attribute get local cerent15216EdfaRtcDateAndTime`

**Description:** Displays the date and time for the ONS 15216 EDFA2.

The following SNMP commands display the date and time for the ONS 15216 EDFA2 and other time data:

- **snmp row display local cerent15216EdfaRtcDateAndTime command**

Example 5-9 displays the ONS 15216 EDFA2 command for displaying the date and time.

**Example 5-9 cerent15216EdfaRtcDateAndTime Display Command**

```
hostname:ONS15216 EDFA2> snmp row display local cerent15216EdfaRtcDateAndTime

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaRtcDateAndTime ::=
{
    cerent15216EdfaRtcDateAndTimeLocal = '07d1060711242d052d07c4'H;
    cerent15216EdfaRtcDateAndTimeGMT = '07d1060717242d052b0000'H;
    cerent15216EdfaRtcDateAndTimeLocalString = "2001-6-7,17:36:45.5 -7:-60";
    cerent15216EdfaRtcDateAndTimeGMTString = "2001-6-7,23:36:45.5 +0:0";
    cerent15216EdfaRtcDateAndTimeTimezone = -7;
    cerent15216EdfaRtcDateAndTimeSaving = -60;
    cerent15216EdfaRtcDateAndTimeFormsString = "06/07/2001 17:36:45";
};
```

Table 5-16 describes the attributes displayed by these commands.

**Table 5-16** *cerent15216EdfaRtcDateAndTime Command Attributes*

Attribute	Description
cerent15216EdfaRtcDateAndTimeLocal	The current local time. Setting this value changes the time according to the cerent15216EdfaRtcDateAndTimeTimezone and cerent15216EdfaRtcDateAndTimeSaving values. The time zone and saving fields of this attribute are in the set command.
cerent15216EdfaRtcDateAndTimeGMT	The current GMT time.
cerent15216EdfaRtcDateAndTimeLocalString	The current local time.
cerent15216EdfaRtcDateAndTimeGMTString	The current GMT time.
cerent15216EdfaRtcDateAndTimeTimezone	The time zone in hours from GMT.
cerent15216EdfaRtcDateAndTimeSaving	The current daylight saving offset in minutes.
cerent15216EdfaRtcDateAndTimeFormsString	The current local time.

## Power Gain

**Command:** `snmp attribute get local cerentEdfa15216EdfaConstGainOverallGain`

**Syntax:** `snmp attribute get local cerentEdfa15216EdfaConstGainOverallGain #`

**Description:** Displays the ONS 15216 EDFA2 overall power gain when the EDFA is in a constant gain mode.

The following commands access overall power gain when in the constant gain mode:

- `snmp row display local cerent15216EdfaOverallControl` command
- `snmp row get local cerent15216EdfaOverallControl` command

The cerent15216EdfaConstGainOverallGain attribute in cerent15216EdfaOverallControl display command shows the ONS 15216 EDFA2 power gain (Example 5-10).

### Example 5-10 *cerent15216EdfaOverallControl Display Command*

```
hostname:ONS15216 EDFA2>snmp row display local cerent15216EdfaOverallControl

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaOverallControl ::= {
    cerent15216EdfaConstGainOverallGain = 230;
    cerent15216EdfaVariableGainPreAttenuation = 0;
};
```

For information about all of the parameters in the cerent15216EdfaStatusGroup, refer to Table 5-8.

## Case Temperature

**Command:** `snmp attribute get local cerent15216EdfaPumpStatusAmbientTemp`

**Syntax:** `snmp attribute get local cerent15216EdfaPumpStatusAmbientTemp pump#`

**Description:** Displays case temperature value (where # is the pump number).

The following commands display the temperature value (where # is the pump number) and other pump status data:

- `snmp row display local cerent15216EdfaPumpStatusAmbientTemp pump #` command

The `cerent15216EdfaPumpStatusAmbientTemp` attribute of the `cerentEdfaPumpStatusEntry` display command shows the case temperature (Example 5-11).

### Example 5-11 `cerent15216EdfaPumpStatusEntry` Display Command

```
hostname:ONS15216 EDFA2> snmp row display local cerent15216EdfaPumpStatusEntry 1
```

```
CLASS cerent15216Edfa--MIB.cerent15216EdfaPumpStatusEntry ::=
{
    cerent15216EdfaPumpStatusPumpNum = 1;
    cerent15216EdfaPumpStatusLaserChipTemp = 260;
    cerent15216EdfaPumpStatusLaserChipTempSetpoint = 260;
    cerent15216EdfaPumpStatusLaserTECCurrent = 20;
    cerent15216EdfaPumpStatusLaserPower = 8503;
    cerent15216EdfaPumpStatusLaserCurrent = 17010;
    cerent15216EdfaPumpStatusAmbientTemp = 2272;
    cerent15216EdfaPumpStatusDCVoltage = 52;
    cerent15216EdfaPumpStatusInPoweruW = 1;
    cerent15216EdfaPumpStatusInPowerdBm = -4003;
    cerent15216EdfaPumpStatusOutPowermW = 3195;
    cerent15216EdfaPumpStatusOutPowerdBm = 1504;
    cerent15216EdfaPumpStatusGain = 550;
};
```

Refer to [Table 5-10](#) for information about all of the parameters in the `cerent15216EdfaPumpStatusEntry` Table.

## Temperature Alarm Threshold

### CtmpMin

**Command:** `snmp attribute get local cerent15216EdfaCtmpMin`

**Syntax:** `snmp attribute get local cerent15216EdfaCtmpMin`

**Description:** This command displays minimum case temperature alarm threshold.

## CtmpMax

**Command:** `snmp attribute get local cerent15216EdfaCtmpMax`

**Syntax:** `snmp attribute get local cerent15216EdfaCtmpMax`

**Description:** This command displays maximum case temperature alarm threshold.

The following commands display case temperature alarm threshold and other temperature data:

- `snmp row display local cerent15216EdfaCfgGroup` command

### Example 5-12 cerent15216EdfaCfgGroup Display Command

```
hostname:ONS15216 EDFA2> snmp row display local cerent15216EdfaCfgGroup

CLASS cerent15216Edfa--MIB.cerent15216EdfaCfgGroup ::=
{
    cerent15216EdfaCfgSaved = true;
    cerent15216EdfaLpoutSetpoint = 1000;
    cerent15216EdfaLpoutDeviation = 200;
    cerent15216EdfaLpoutHysteresis = 100;
    cerent15216EdfaLOSThreshold = -2400;
    cerent15216EdfaLOSHysteresis = 100;
    cerent15216EdfaCtmpMin = 5;
    cerent15216EdfaCtmpMinHysteresis = 1;
    cerent15216EdfaCtmpMax = 65;
    cerent15216EdfaCtmpMaxHysteresis = 1;
};
```

Refer to [Table 5-8](#) for information about all of the parameters in cerent15216EdfaStatusGroup.

## Case Temperature Alarm Hysteresis

### CtmpMaxHysteresis

**Command:** `snmp attribute get local cerent15216EdfaCtmpMaxHysteresis`

**Syntax:** `snmp attribute get local cerent15216EdfaCtmpMaxHysteresis`

**Description:** Displays maximum case temperature alarm hysteresis.

The cerent15216EdfaCtmpMaxHysteresis attribute in the cerent15216EdfaCfgGroup display command shows the maximum case hysteresis temperature alarm threshold ([Example 5-12](#)). Refer to [Table 5-6](#) for information about all of the parameters in cerent15216EdfaCfgGroup.

### CtmpMinHysteresis

**Command:** `snmp attribute get local cerent15216EdfaCtmpMinHysteresis`

**Syntax:** `snmp attribute get local cerent15216EdfaCtmpMinHysteresis`

**Description:** Displays the minimum case hysteresis temperature alarm threshold.

The following commands display case temperature alarm hysteresis and other data:

- `snmp row display local cerent15216EdfaCfgGroup` command

The cerent15216EdfaCfgGroup command is shown in [Example 5-12](#). For information about all of the parameters in the cerent15216EdfaCfgGroup table, see [Table 5-6](#).

## Power BUS Mode

### PowerBusMode

**Command:** `snmp attribute get local cerent15216EdfaPowerBusMode`

**Syntax:** `snmp attribute get local cerent15216EdfaPowerBusMode`

**Description:** Displays the power bus mode (simplex or duplex).

The following commands display power bus voltage and other data:

- `snmp row display local cerent15216EdfaCfgGroup` command

### PowerBusDCVoltageMax

**Command:** `snmp attribute get local cerent15216EdfaPowerBusDCVoltageMax`

**Syntax:** `snmp attribute get local cerent15216EdfaPowerBusDCVoltageMax`

**Description:** Displays the maximum allowable power bus DC voltage (multiplied by –10V).

The following commands display power bus voltage and other data:

- `snmp row display local cerent15216EdfaCfgGroup` command

### PowerBusDCVoltageMin

**Command:** `snmp attribute get local cerent15216EdfaPowerBusDCVoltageMin`

**Syntax:** `snmp attribute get local cerent15216EdfaPowerBusDCVoltageMin`

**Description:** Displays the minimum allowable power bus DC voltage (multiplied by –10V).

The following commands display power bus voltage and other data:

- `snmp row display local cerent15216EdfaCfgGroup` command

## Loss of Input Power Value (Input Power)

### InPowerduW

**Command:** `snmp attribute get local cerent15216EdfaInPoweruW`

**Syntax:** `snmp attribute get local cerent15216EdfaInPoweruW`

**Description:** Displays loss of input power value and displays the data in microwatts.

The following command displays the Cisco ONS 15216 EDFA's input power value and other status information:

- `snmp row display local cerent15216EdfaOverallStatusGroup` command

For information about all of the parameters in the `cerent15216EdfaOverallStatusGroup` table, see [Table 5-8](#).

## InPowerdBm

**Command:** `snmp attribute get local cerent15216EdfaInPowerdBm`

**Syntax:** `snmp attribute get local cerent15216EdfaInPowerdBm`

**Description:** Displays the ONS 15216 EDFA2 loss of input power value in dBm.

The following command displays input power value and other status information:

- `snmp row display local cerent15216EdfaOverallStatusGroup` command

Refer to [Table 5-8](#) for information about all of the parameters in the `cerent15216EdfaOverallStatusGroup` Table.

## Loss of Input Power Alarm Threshold

### LOSThreshold

**Command:** `snmp attribute get local cerent15216EdfaLOSThreshold`

**Syntax:** `snmp attribute get local cerent15216EdfaLOSThreshold`

**Description:** Displays the loss of input power alarm threshold.

The following commands display the loss of input power alarm threshold and other laser power and temperature data:

- `snmp row display local cerent15216EdfaCfgGroup` command

The `cerent15216EdfaLOSThreshold` attribute in the `cerent15216EdfaCfgGroup` display command shows the loss of input power alarm threshold ([Example 5-12](#)).

For information about all of the parameters in the `cerent15216EdfaCfgGroup` table, refer to [Table 5-6](#).

## Loss of Input Power Alarm Hysteresis

**Command:** `snmp attribute get local cerent15216EdfaLOSHysteresis`

**Syntax:** `snmp attribute get local cerent15216EdfaLOSHysteresis`

**Description:** Displays the loss of input power value.

The following commands display the loss of input power hysteresis value and other laser power and temperature data:

- `snmp row display local cerent15216EdfaCfgGroup` command

The `cerent15216EdfaLOSHysteresis` attribute in the `cerent15216EdfaCfgGroup` display command shows the loss of input power alarm threshold ([Example 5-12](#)). For information about all of the parameters in the `cerent15216EdfaCfgGroup` table, refer to [Table 5-6](#).

## Loss of Output Power Value (Output Power)

### OutPoweruW

**Command:** `snmp attribute get local cerent15216EdfaOutPoweruW`

**Syntax:** `snmp attribute get local cerent15216EdfaOutPoweruW`

**Description:** Displays loss of output power value in microwatts.

The **snmp row display local cerent15216EdfaOverallStatusGroup command** displays the Cisco ONS 15216 EDFA2 loss of output power value and additional pump status. For information about all of the parameters in the `cerent15216EdfaOverallStatusGroup` table, refer to [Table 5-8](#).

### OutPowerdBm

**Command:** `snmp attribute get local cerent15216EdfaOutPowerdBm`

**Syntax:** `snmp attribute get local cerent15216EdfaOutPowerdBm`

**Description:** Displays loss of output power value in dBm. This command displays loss of output power value and additional pump status data.

For information about all of the parameters in the `cerent15216EdfaOverallStatusGroup` table, refer to [Table 5-8](#).

## Loss of Output Power Alarm Setpoint

### LpoutSetpoint

**Command:** `snmp attribute get local cerent15216EdfaLpoutSetpoint`

**Syntax:** `snmp attribute get local cerent15216EdfaLpoutSetpoint`

**Description:** This attribute notifies network operations personnel notification if the output power of the ONS 15216 EDFA2 drops below a level that impacts proper operation of the optical network.

Typically, network operations personnel should set the loss of output power alarm threshold at a value that is appropriate for the intended network application so that the alarm condition is meaningful. Consult with a Cisco Systems Engineer to determine threshold value for your application. As a guideline, Cisco recommends that loss of output power alarm threshold value be set at 1 dBm below the current output power level of the amplifier.

When the ONS 15216 EDFA2 is set to constant gain operation (factory default), the value for loss of output power alarm threshold cannot be changed. To display the loss of output power alarm threshold and other power and temperature alarm data, use the **snmp table display local cerent15216EdfaCfgGroup** command (shown in [Example 5-12](#)). This command returns the current alarm threshold default values.

## LpoutDeviation

**Command:** `snmp attribute get local cerent15216EdfaLpoutDeviation`

**Syntax:** `snmp attribute get local cerent15216EdfaLpoutDeviation`

**Description:** This attribute is not required when operating in factory default, constant gain mode. Setting of the loss of output power alarm deviation is only necessary when the amplifier is used in constant output power.

This attribute is used to set the amount by which the output power must vary from the threshold setpoint before the alarm is activated. This attribute, in conjunction with the loss of output power alarm threshold and hysteresis, enables notification of network operations personnel if the output power of the ONS 15216 EDFA2 drops below a level that would impact proper operation of the optical network.

Typically, network operations personnel should set the loss of output power alarm deviation at a value that is appropriate for the intended network application so that the alarm condition is meaningful. Consult with a Cisco Systems Engineer to determine the deviation value for your application. As a guideline, Cisco recommends that the loss of output power alarm deviation value be set at 2 dBm. The module triggers an alarm if it detects a signal level of 2 dBm below the current output power alarm level threshold value set for the amplifier.

When the ONS 15216 EDFA2 is set to constant gain operation (factory default), the value for the loss of output power alarm threshold cannot be changed. To display the loss of output power alarm deviation and other power and temperature alarm data, use the **snmp table display local cerent15216EdfaCfgGroup** command as shown in [Example 5-12](#). This command returns the current alarm threshold default values.

To set the loss of output power alarm deviation when the ONS 15216 EDFA2 is configured for operation in constant output power or constant pump power operation mode, type **snmp attribute set local cerent15216EdfaLpoutDeviation** at the command prompt followed by a number (as shown in [Example 5-13](#)). Valid entries are between 0 and 1000 and are in dBm times 100. For example, if the loss of output power deviation required were 0.2 dBm, the number input as the loss of output power alarm deviation would be 20.

The user is prompted to modify the attribute. If no changes are required, press **Enter** to return to command prompt.

### Example 5-13 `cerent15216EdfaLpoutDeviation Set Command`

```
Username:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaLpoutDeviation 20
```

```
Username:ONS15216 EDFA2> snmp row display local cerent15216EdfaCfgGroup
```

```
CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaCfgGroup ::=
{
  cerent15216EdfaCfgSaved = true;
  cerent15216EdfaLpoutSetpoint = 400;
  cerent15216EdfaLpoutDeviation = 20;
  cerent15216EdfaLpoutHysteresis = 100;
  cerent15216EdfaLOSThreshold = -3000;
  cerent15216EdfaLOSHysteresis = 100;
  cerent15216EdfaCtmpMin = 1;
  cerent15216EdfaCtmpMinHysteresis = 1;
  cerent15216EdfaCtmpMax = 65;
  cerent15216EdfaCtmpMaxHysteresis = 1;
  cerent15216EdfaCLEI = "";
}
```



Changes must be saved before terminating the session. See the “[Save Changes](#)” section on page 4-11.

## Loss of Output Power Alarm Hysteresis

### LpoutHysteresis

**Command:** `snmp attribute get local cerent15216EdfaLpoutHysteresis`

**Syntax:** `snmp attribute get local cerent15216EdfaLpoutHysteresis`

**Description:** This attribute is not required when operating in factory default, constant gain mode. Setting of the loss of output power alarm deviation is only necessary when the amplifier is used in constant output power or constant pump power modes of operation.

This attribute is used to set the amount by which the output power must increase from the threshold setpoint before the alarm is cleared. This attribute, in conjunction with the loss of output power alarm threshold and deviation, enables efficient processing and clearing of the alarm condition.

Typically, network operations personnel should set the loss of output power alarm hysteresis at a value that is appropriate for the intended network application so that the alarm condition is meaningful. Consult with Cisco Systems Engineer to determine the hysteresis value for your application. As a guideline, Cisco recommends that loss of output power alarm hysteresis value be set at 0.2 dBm. The module clears the alarm if it detects a signal level of 0.2 dBm above the current output power alarm level threshold value set for the amplifier.

When ONS 15216 EDFA2 is set to constant gain operation (factory default), the value for loss of output power alarm threshold cannot be changed. To display the loss of output power alarm deviation and other power and temperature alarm data, use the **snmp Table display local cerent15216EdfaCfgGroup** command as shown in [Example 5-12](#). This command returns the current alarm threshold default values.

To set the loss of output power alarm hysteresis when Cisco ONS 15216 is configured for operation in constant output power or constant pump power operation mode, type **snmp attribute set local cerent15216EdfaLpoutHysteresis** at the command prompt followed by a number. Valid entries are between 0 and 1000 and are in dBm times 100. For example, if the loss of output power hysteresis required were 0.2 dBm, the number input as loss of output power alarm hysteresis would be 200.

The user is prompted to modify the attribute. If changes are not required, press **Enter** to return to command prompt.

Changes must be saved before terminating the session. See the “[Save Changes](#)” section on page 4-11.

### AlarmEntry

**Command:** `snmp Table display local cerent15216EdfaAlarmEntry`

**Syntax:** `snmp Table display local cerent15216EdfaAlarmEntry`

**Description:** Accesses the alarm status. Example 5-22 shows the **cerent15216EdfaAlarmEntry display** command.

**Example 5-14 cerent15216EdfaAlarmEntry Display Command**

```
hostname:ONS15216 EDFA2> snmp table display local cerent15216EdfaAlarmEntry
```

```
CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaAlarmEntry ::=
{
cerent15216EdfaAlarmID.1 = lcrnt1;
cerent15216EdfaAlarmID.2 = lcrnt2;
cerent15216EdfaAlarmID.3 = ltmp1;
cerent15216EdfaAlarmID.4 = ltmp2;
cerent15216EdfaAlarmID.5 = lpout;
cerent15216EdfaAlarmID.6 = lpin;
cerent15216EdfaAlarmID.7 = gain;
cerent15216EdfaAlarmID.8 = ctmp;
cerent15216EdfaAlarmID.9 = powerBusA;
cerent15216EdfaAlarmID.10 = powerBusB;
cerent15216EdfaAlarmID.11 = isolationDiode;
```

For information about all of the parameters in the cerent15216EdfaAlarmEntry table, refer to [Table 5-11](#).



## CLI Commands

This chapter is a reference of all CLI commands that are used in advanced setup and troubleshooting. For provisioning the ONS 15216 EDFA2, see [Chapter 4, “Provisioning”](#).

The commands discussed in this chapter are available to default users. There are four default users, operator, Cisco15 (admin), root, and monitor. Each user level has a different password and a different set of commands available. For default user and password for user levels, see [Table 3-5 on page 3-11](#).

[Table 6-1](#) lists all CLI commands supported by the ONS 15216 EDFA2. Each command is discussed in more detail after the table.

**Table 6-1 ONS 15216 EDFA2 Supported Commands**

Command	Description
<code>srom cfg boot display</code>	Displays the serial ROM boot content. See <a href="#">srom cfg boot display Command, page 6-4</a> .
<code>srom cfg boot modify</code>	Modifies the serial ROM boot contents. See <a href="#">srom cfg boot modify Command, page 6-4</a> .
<code>srom cfg ip display</code>	Displays the serial ROM IP contents. See <a href="#">srom cfg ip display Command, page 6-5</a> .
<code>srom cfg ip modify</code>	Modifies the serial ROM IP contents. See <a href="#">srom cfg ip modify Command, page 6-5</a> .
<code>pdm busmode display</code>	Displays the bus mode (simplex or duplex). See <a href="#">pdm busmode display Command, page 6-5</a> .
<code>pdm busmode modify</code>	Modifies the bus mode (simplex or duplex). See <a href="#">pdm busmode modify Command, page 6-6</a> .
<code>pdm cfg threshold display</code>	Displays power voltage threshold. See <a href="#">pdm cfg threshold display Command, page 6-6</a> .
<code>pdm cfg threshold bus modify</code>	Modifies power bus voltage. See <a href="#">pdm cfg threshold bus modify Command, page 6-6</a> .
<code>clear</code>	Clears the shell screen. See <a href="#">clear Command, page 6-7</a> .
<code>exit</code>	Exits the shell. See <a href="#">exit Command, page 6-7</a> .
<code>help</code>	Gives help about commands. See <a href="#">help Command, page 6-7</a> .
<code>history</code>	Displays the history list. See <a href="#">history Command, page 6-7</a> .

Table 6-1 ONS 15216 EDFA2 Supported Commands (continued)

Command	Description
<b>login</b>	Allows the user to log into shell. See <a href="#">login and logoff Commands</a> , page 6-8.
<b>logoff</b>	Allows the user to log off of the shell. See <a href="#">login and logoff Commands</a> , page 6-8.
<b>processor reset</b>	Resets the CPU. See <a href="#">processor reset Command</a> , page 6-8.
<b>shell lines set</b>	Sets the number of shell lines. See <a href="#">shell lines set Command</a> , page 6-9.
<b>shell more disable</b>	Disables more. See <a href="#">shell more disable and enable Commands</a> , page 6-9.
<b>shell more enable</b>	Enables more. See <a href="#">shell more disable and enable Commands</a> , page 6-9.
<b>shell rows set</b>	Sets the number of shell rows. See <a href="#">shell rows set Command</a> , page 6-9.
<b>shell status display</b>	Displays the shell status. See <a href="#">shell status display Command</a> , page 6-9.
<b>snmp attribute get</b>	Gets an attribute. See <a href="#">snmp attribute get Command</a> , page 6-10.
<b>snmp attribute list</b>	Lists an attribute. See <a href="#">snmp attribute list Command</a> , page 6-11.
<b>snmp attribute set</b>	Sets an attribute. See <a href="#">snmp attribute set Command</a> , page 6-12.
<b>snmp mib display</b>	Displays a MIB. See <a href="#">snmp mib display Command</a> , page 6-12.
<b>snmp mib get</b>	Gets a MIB. See <a href="#">snmp mib get Command</a> , page 6-12.
<b>snmp mib list</b>	Lists a MIB. See <a href="#">snmp mib list Command</a> , page 6-13.
<b>snmp row display</b>	Displays a row. See <a href="#">snmp row display Command</a> , page 6-13.
<b>snmp row get</b>	Gets a row. See <a href="#">snmp row get Command</a> , page 6-14.
<b>snmp row set</b>	Sets a row. See <a href="#">snmp row set Command</a> , page 6-14.
<b>snmp session community get</b>	Displays the default SNMP session communities. See <a href="#">snmp session community get Command</a> , page 6-15.
<b>snmp session community set</b>	Sets the default SNMP session communities. See <a href="#">snmp session community set Command</a> , page 6-15.
<b>snmp session transmission get</b>	Displays the default SNMP session parameters. See <a href="#">snmp session transmission get Command</a> , page 6-15.
<b>snmp session transmission set</b>	Sets the default SNMP session parameters. See <a href="#">snmp session transmission set Command</a> , page 6-16.
<b>snmp session version get</b>	Displays the default SNMP session version. See <a href="#">snmp session version get Command</a> , page 6-16.

**Table 6-1 ONS 15216 EDFA2 Supported Commands (continued)**

Command	Description
<b>snmp subtree display</b>	Displays a subtree. See <a href="#">snmp subtree display Command</a> , page 6-16.
<b>snmp subtree get</b>	Gets a subtree. See <a href="#">snmp subtree get Command</a> , page 6-17.
<b>snmp subtree list</b>	Lists a subtree. See <a href="#">snmp subtree list Command</a> , page 6-17.
<b>snmp table display</b>	Displays a table. See <a href="#">snmp table display Command</a> , page 6-18.
<b>snmp table get</b>	Gets a table. See <a href="#">snmp table get Command</a> , page 6-19.
<b>snmp table list</b>	Lists a table. See <a href="#">snmp table list Command</a> , page 6-19.
<b>snmp tree attribute list</b>	Lists the attributes in the MIB. See <a href="#">snmp tree attribute list Command</a> , page 6-20.
<b>user entry create</b>	Creates a new user. See <a href="#">user entry create Command</a> , page 6-21.
<b>user entry delete</b>	Deletes the user. See <a href="#">user entry delete Command</a> , page 6-21.
<b>user file display</b>	Displays the user names and information. See <a href="#">user file display and user name display Command</a> , page 6-21.
<b>user name display</b>	Displays the user name. See <a href="#">user file display and user name display Command</a> , page 6-21.
<b>user active list</b>	Lists the active users. See <a href="#">user active list Command</a> , page 6-22.
<b>user active message send</b>	Sends the message to all active users. See <a href="#">user active message send Command</a> , page 6-22.
<b>user password set</b>	Sets the user password. See <a href="#">user passwd set Command</a> , page 6-22.
<b>gain gain modify</b>	Modifies gain setting. See <a href="#">gain gain modify Command</a> , page 6-6.
<b>voa power input display</b>	Displays VOA power input. See <a href="#">voa power input display Command</a> , page 6-6.

## Configuration Commands

The following commands are useful in configuring the ONS 15216 EDFA2:

- [srom cfg boot display Command](#), page 6-4
- [srom cfg boot modify Command](#), page 6-4
- [srom cfg ip display Command](#), page 6-5
- [srom cfg ip modify Command](#), page 6-5
- [pdm busmode display Command](#), page 6-5
- [pdm busmode modify Command](#), page 6-6

- [pdm cfg threshold display Command, page 6-6](#)
- [pdm cfg threshold bus modify Command, page 6-6](#)
- [Administrative Commands, page 6-7](#)
- [gain gain modify Command, page 6-6](#)
- [voa power input display Command, page 6-6](#)

## srom cfg boot display Command

**Command:** `srom cfg boot display`

**Syntax:** `srom cfg boot display`

**Description:** Displays the serial ROM boot contents. Data displayed includes the IP address and file names. See [Example 6-1](#).

### Example 6-1 srom cfg boot display Command

```
hostname:ONS15216 EDFA2> srom cfg boot display
```

```

Boot Count 4
  Boot Record 0 type 2 Flash
    IP Address 0.0.0.0
    Filename 15216EdfaSw_x.x.x_bin
  Boot Record 1 type 2 Flash
    IP Address 0.0.0.0
    Filename 15216EdfaSw_y.y.y_bin
  Boot Record 2 type 2 Flash
    IP Address 0.0.0.0
    Filename
  Boot Record 3 type 2 Flash
    IP Address 0.0.0.0
    Filename
CRC-32 8bd3cb56
```

## srom cfg boot modify Command

**Command:** `srom cfg boot modify`

**Syntax:** `srom cfg boot modify`

**Description:** Modifies the contents of the ROM boot. See [Example 6-2](#).

### Example 6-2 srom cfg boot modify Command

```
hostname:ONS15216 EDFA2> srom cfg boot modify
```

```

Boot Count = 4

  Boot Record 0 type 1 TFTP
  2
  Filename = users/name/15216EdfaSw_x.x.x_bin
  15216EdfaSw_x.x.x_bin
  Boot Record 1 type 2 Flash
  2
  Filename = orion427
  15216EdfaSw_y.y.y_bin
```

```
Boot Record 2 type 2 Flash
```

```
Boot Record 3 type 2 Flash
```

**Note**


---

Boot type = TFTP and boot type 2 = Flash.

---

## srom cfg ip display Command

**Command:** `srom cfg ip display`

**Syntax:** `srom cfg ip display`

**Description:** Displays the serial ROM IP contents. The ROM IP contents are shown, including IP address, subnet mask, default router address, and hostname. See [Example 6-3](#).

### Example 6-3 srom cfg ip display Command

```
hostname:ONS15216 EDFA2> srom cfg ip display

Shelf ID = 1
IP Address = 192.168.60.168
Subnet Mask = 255.255.255.0
Default Router IP Address = 192.168.60.254
Hostname = hostname
SW Config = 0x00000000
CRC32 = 0x54f863a2
```

## srom cfg ip modify Command

**Command:** `srom cfg ip modify`

**Syntax:** `srom cfg ip modify`

**Description:** Modifies the serial ROM IP contents. The user is prompted, row by row, to change the items listed in [Example 6-4](#).

### Example 6-4 srom cfg ip modify Command

```
hostname:ONS15216 EDFA2> srom cfg ip modify

Shelf ID = 1

IP Address = 192.168.60.168

Subnet Mask = 255.255.255.0

Default Router IP Address = 192.168.60.254

Hostname = hostname

SW Config = 0x00000000
```

## pdm busmode display Command

**Command:** `pdm busmode display`

**Syntax:** `pdm busmode display`

**Description:** Displays power bus mode (simplex or duplex).

## pdm busmode modify Command

**Command:** `pdm busmode modify`

**Syntax:** `pdm busmode modify {simplex | duplex}`

**Description:** Modifies power bus mode to simplex (single power source—Bus A) or duplex (redundant power source—Bus A and B).

## pdm cfg threshold display Command

**Command:** `pdm cfg threshold display`

**Syntax:** `pdm cfg threshold display`

**Description:** Displays the minimum and maximum allowable power bus DC voltage.

## pdm cfg threshold bus modify Command

**Command:** `pdm cfg threshold bus modify`

**Syntax:** `pdm cfg threshold modify`

**Description:** Modifies minimum and maximum allowable power bus DC voltage.

## gain gain display Command

**Command:** `gain gain display`

**Syntax:** `gain gain display`

**Description:** Displays the gain setting for the ONS 15216 EDFA2.

## gain gain modify Command

**Command:** `gain gain modify`

**Syntax:** `gain gain modify`

**Description:** Modifies the gain setting for the ONS 15216 EDFA2.

## voa power input display Command

**Command:** `voa power input display`

**Syntax:** `voa power input display`

**Description:** Displays voa power input.



# Administrative Commands

The following commands are useful in administering the ONS 15216 EDFA2:

- [clear Command, page 6-7](#)
- [exit Command, page 6-7](#)
- [clear Command, page 6-7](#)
- [history Command, page 6-7](#)
- [login and logoff Commands, page 6-8](#)
- [login and logoff Commands, page 6-8](#)
- [processor reset Command, page 6-8](#)

## clear Command

**Command:** `clear`

**Syntax:** `clear`

**Description:** Clears content from the terminal window. An empty screen with a cursor appears.

## exit Command

**Command:** `exit`

**Syntax:** `exit`

**Description:** Ends the session with the ONS 15216 EDFA2.

## help Command

**Command:** `help`

**Syntax:** `help`

**Description:** Displays a list of all CLI commands for current user security level. See [Example 6-5](#).

**Example 6-5 help Command**

```
hostname:ONS15216 EDFA2> help
```

## history Command

**Command:** `history`

**Syntax:** `history`

**Description:** Displays a list of commands issued by the user during that specific session. See [Example 6-6](#).

**Example 6-6 history Command**

```
hostname:ONS15216 EDFA2> history

user active list
user active message send hi
user file display
user entry create
user entry delete albert
user file display
user name display
user passwd set
help
history
```

## login and logoff Commands

**Command:** `login` or `logoff`**Syntax:** `login` or `logoff`

**Description:** Used to access and exit communication with the ONS 15216 EDFA2. Logging into the module requires both a user name and a password. Only use these commands if you have stopped the booting process or are displaying the format for logging into the module. Type the command, the first few letters of the attribute, and press the **Tab** key to view a list of attributes that can be set. See [Example 6-7](#).

**Example 6-7 login Command**

```
hostname:ONS15216 EDFA2> login

Parameters
  user_name      (string[0..16])      name of user
  password      (string[0..16])      password of user
```

## processor reset Command

**Command:** `processor reset`**Syntax:** `processor reset`

**Description:** Resets the processor on the CLI card. Although the performance of the amplifier is not affected, communication with the module is ended and the user must log in again.

## Shell Commands

The following commands are useful in working with the shell within the ONS 15216 EDFA2 SNMP manager:

- [shell lines set Command, page 6-9](#)
- [shell more disable and enable Commands, page 6-9](#)
- [shell more disable and enable Commands, page 6-9](#)
- [shell rows set Command, page 6-9](#)

- [shell status display Command, page 6-9](#)

## shell lines set Command

**Command:** `shell lines set`

**Syntax:** `shell lines set lines`

**Description:** Sets the number of lines when working within the shell.

## shell more disable and enable Commands

**Command:** `shell more enable` or `shell more disable`

**Syntax:** `shell more {enable | disable}`

**Description:** The `shell more enable` command enables the more function, limiting the output that appears on the screen. When the more function is enabled, press **Enter** to view additional information on the screen.

The `shell more disable` command disables the more function.

## shell rows set Command

**Command:** `shell rows set`

**Syntax:** `shell rows set row`

**Description:** Sets the number of rows of data that can be viewed on the screen without pressing Enter. Up to 40 lines per screen can be set.

## shell status display Command

**Command:** `shell status display`

**Syntax:** `shell status display`

**Description:** Displays the current shell settings, including the number of shell lines, the number of shell rows, and whether the more setting is enabled or disabled. See [Example 6-8](#).

### **Example 6-8 shell status display Command**

```
hostname:ONS15216 EDFA2> shell status display
```

```
Shell Lines: 22  
Shell Rows : 80  
More       : On
```

## FFS Commands

The FFS file command allows the user to manage the number of files that are on the ONS 15216 EDFA2 Flash memory. Never erase the following files:

- 2 current versions of software (15216EdfaSw\_*x.x.x*)
- snmp.cfg

Because the snmp.cfg file contains important SNMP attributes, deleting this file would mean that the community and view tables would have to be reset before a remote user could access the ONS 15216 EDFA2 via SNMP.

**Note**

EDFA software image files are named using a special naming convention. Do not to change the file name when image files are downloaded from an FTP server onto the box in the field when using the FTP command shell of the ONS 15216 EDFA2.

## SNMP Commands

The SNMP commands are useful in working with the SNMP protocol to provision and configure the ONS 15216 EDFA2. When issuing these SNMP commands, the command syntax requires that the command must be followed by either the ONS 15216 EDFA2 IP address or the word "local".

SNMP commands are listed as follows:

- [snmp attribute get Command, page 6-10](#)
- [snmp attribute list Command, page 6-11](#)
- [snmp attribute set Command, page 6-12](#)
- [snmp mib display Command, page 6-12](#)
- [snmp mib get Command, page 6-12](#)
- [snmp row display Command, page 6-13](#)
- [snmp row get Command, page 6-14](#)
- [snmp row set Command, page 6-14](#)
- [snmp session community get Command, page 6-15](#)
- [snmp session community set Command, page 6-15](#)
- [snmp session transmission set Command, page 6-16](#)
- [snmp session transmission get Command, page 6-15](#)
- [snmp session version get Command, page 6-16](#)
- [snmp subtree display Command, page 6-16](#)
- [snmp subtree get Command, page 6-17](#)
- [snmp table display Command, page 6-18](#)
- [snmp table get Command, page 6-19](#)
- [snmp table list Command, page 6-19](#)

### snmp attribute get Command

**Command:** `snmp attribute get`

**Syntax:** `snmp attribute get hostname {attribute_name | index}`

**Description:** Accesses and displays a specific MIB attribute. See [Example 6-9](#).

**Example 6-9 snmp attribute get Command**

```
hostname:ONS15216 EDFA2> snmp attribute get local sysDescr

attributes
  sysDescr                "ONS15216 vx.x.x ONS15216 vx.x.x, Serial No
00000000100520, MAC Addr 0010b4000b12"
```

Type the command, the first few letters of the attribute, and press Tab to view a list of attributes that can be set. See [Example 6-10](#).

**Example 6-10 snmp attribute get Command List**

```
hostname:ONS15216 EDFA2> snmp attribute get local cerent

cerent15216EdfaCommIndex
cerent15216EdfaCommName
cerent15216EdfaCommViewIndex
cerent15216EdfaCommPrivileges
cerent15216EdfaCommSrcIPAddr
cerent15216EdfaCommNetMask
cerent15216EdfaCommStatus
cerent15216EdfaCommTrapIndex
cerent15216EdfaCommTrapCommunity
cerent15216EdfaCommTrapDestIPAddress
cerent15216EdfaCommTrapDestUDPPort
cerent15216EdfaCommTrapViewIndex
cerent15216EdfaCommTrapVersion
cerent15216EdfaCommTrapStatus
cerent15216EdfaViewIndex
cerent15216EdfaViewSubtree
cerent15216EdfaViewMask
cerent15216EdfaViewType
cerent15216EdfaViewStatus
cerent15216EdfaAgentTrapEnable
...
```

## snmp attribute list Command

**Command:** `snmp attribute list`

**Syntax:** `snmp attribute list {hostname attribute_name}`

**Description:** Lists the attribute value of an attribute for all table rows. See [Example 6-11](#).

**Example 6-11 snmp attribute list Command**

```
hostname:ONS15216 EDFA2> snmp attribute list local cerent15216EdfaAlarmID
cerent15216EdfaAlarmID.1 = lcrnt1;
cerent15216EdfaAlarmID.2 = lcrnt2;
cerent15216EdfaAlarmID.3 = ltmp1;
cerent15216EdfaAlarmID.4 = ltmp2;
cerent15216EdfaAlarmID.5 = lpout;
cerent15216EdfaAlarmID.6 = lpin;
cerent15216EdfaAlarmID.7 = gain;
cerent15216EdfaAlarmID.8 = ctmp;
```

```
cerent15216EdfaAlarmID.9 = powerBusA;
cerent15216EdfaAlarmID.10 = powerBusB;
cerent15216EdfaAlarmID.11 = isolationDiode;
Systest:ONS15216 EDFA2>
```

## snmp attribute set Command

**Command:** `snmp attribute set`

**Syntax:** `snmp attribute set hostname {attribute_name | index | new_value}`

**Description:** Sets the attribute for a MIB item. Type the command, the first few letters of the attribute, and press **Tab** to view a list of attributes that can be set. See [Example 6-12](#).

### Example 6-12 snmp attribute set Command

```
hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaAgentTrapEnable enabled
sysContact
sysName
sysLocation
ifAdminStatus
atIfIndex
atPhysAddress
atNetAddress
ipForwarding
ipDefaultTTL
ipRouteDest
ipRouteIfIndex
ipRouteMetric1
ipRouteMetric2
ipRouteMetric3
ipRouteMetric4
ipRouteNextHop
ipRouteType
ipRouteAge
ipRouteMask
ipRouteMetric5
...
```

## snmp mib display Command

**Command:** `snmp mib display`

**Syntax:** `snmp mib display {hostname | -all}`

**Description:** Displays all writable MIB attributes (or all accessible attributes if the -all option is used).

## snmp mib get Command

**Command:** `snmp mib get`

**Syntax:** `snmp mib get hostname`

**Description:** Displays all MIB attributes. The data is output in two columns. The first column lists the attributes and indices and the second column lists the data. See [Example 6-13](#).

**Example 6-13 snmp mib get Command**

```

hostname:ONS15216 EDFA2> snmp mib get local

attributes
  sysDescr"mntuboot v0.0.0 ONS15216 EDFA2 v1.3.0, MAC Addr 0010b4000525"
  sysObjectIDcerent15216EdfaNode
  sysUpTime24703705
  sysContact          " "
  sysName             "Username"
  sysLocation         " "
  sysServices         0
  sysORLastChange    90

index
  sysORIndex          1
attributes
  sysORID             snmpBasicCompliance
  sysORDescr          " "
  sysORUpTime         24704075

```

## snmp mib list Command

**Command:** `snmp mib list`**Syntax:** `snmp mib list {hostname}`**Description:** Displays the values of all attributes supported by the SNMP agent. [Example 6-14](#).**Example 6-14 snmp mib list Command**

```

hostname:ONS15216 EDFA2> snmp mib list local

sysDescr.0 = "Cisco-2.1 v5.3.0 Cisco v0.0.0, Serial No 00000000100520, MAC Addr 0010b4000b12";
sysObjectID.0 = { cerent15216EdfaHwProdCisco };
sysUpTime.0 = 1226870;
sysContact.0 = "";
sysName.0 = "Cisco";
sysLocation.0 = "";
sysServices.0 = 0;
sysORLastChange.0 = 175;
sysORID.1 = { snmpBasicCompliance };
sysORID.2 = { rs232Compliance };
sysORDescr.1 = "";
sysORDescr.2 = "";
sysORUpTime.1 = 1226875;
sysORUpTime.2 = 1226875;
ifIndex.300 = 300;
ifIndex.302 = 302;
ifIndex.350 = 350;

```

## snmp row display Command

**Command:** `snmp row display`**Syntax:** `snmp row display hostname {row_name | index}`

**Description:** Displays a row. Use this command to obtain information to use with other commands. Type the command, the first few letters of the attribute, and press **Tab** to view a list of attributes that can be set. Type an attribute from the list to view its row data. See [Example 6-15](#).

#### Example 6-15 snmp row display Command

```
hostname:ONS15216 EDFA2> snmp row display local cerent15216Edfa

cerent15216EdfaCfgGroup
cerent15216EdfaPumpCfgEntry
cerent15216EdfaAlarmControl
cerent15216EdfaStatusGroup
cerent15216EdfaPumpStatusEntry
cerent15216EdfaAlarmEntry
cerent15216EdfaOpGroup
hostname:ONS15216 EDFA2> snmp row display local cerent15216EdfaCfgGroup

CLASS CERENT-MIB.cerent15216EdfaCfgGroup ::=
{
    cerent15216EdfaCfgSaved = true;
    cerent15216EdfaLpoutSetpoint = 1000;
    cerent15216EdfaLpoutDeviation = 200;
    cerent15216EdfaLpoutHysteresis = 100;
    cerent15216EdfaLOSThreshold = -2400;
    cerent15216EdfaLOSHysteresis = 100;
    cerent15216EdfaCtmpMin = 5;
    cerent15216EdfaCtmpMinHysteresis = 1;
    cerent15216EdfaCtmpMax = 65;
    cerent15216EdfaCtmpMaxHysteresis = 1;
```

## snmp row get Command

**Command:** `snmp row get`

**Syntax:** `snmp row get hostname {row_name | index}`

**Description:** Accesses a row. Use this command to obtain information to use with other commands. See [Example 6-16](#).

#### Example 6-16 snmp get row Command

```
hostname:ONS15216 EDFA2> snmp row get local cerent15216EdfaCfgGroup

CfgSa Lpo Lpo Lpo LOST LOS C C Ct C
true 1000 200 100 -2400 100 5 1 65 1
```

## snmp row set Command

**Command:** `snmp row set`

**Syntax:** `snmp row set hostname {row_name | index}`

**Description:** Sets data within a row. Use the `snmp row display` command first to view the contents of data within a row. See [Example 6-17](#).



**Example 6-17 snmp row set Command**

```
hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaAlarmEntry 1
cerent15216EdfaAlarmEnableStatus disabled
```

## snmp session community get Command

**Command:** `snmp session community get`

**Syntax:** `snmp session community get hostname`

**Description:** Displays the default SNMP session communities. See [Example 6-18](#).

**Example 6-18 snmp session community get Command**

```
hostname:ONS15216 EDFA2> snmp session community get local
host name: local
read string: public
write string: private
```

## snmp session community set Command

**Command:** `snmp session community set`

**Syntax:** `snmp session community set hostname write_community read_community`

**Description:** Sets the default SNMP session communities. See [Example 6-19](#).

**Example 6-19 snmp session community set Command**

```
hostname:ONS15216 EDFA2> snmp session community set local private public
write (string[0..32]) write community string
```

## snmp session transmission get Command

**Command:** `snmp session transmission get`

**Syntax:** `snmp session transmission get hostname`

**Description:** Displays the default SNMP session parameters. The number of retries is the number of the attempts made to log in. The time-out period is in minutes. See [Example 6-20](#).

**Example 6-20 snmp session transmission get Command**

```
hostname:ONS15216 EDFA2> snmp session transmission get local
host name: 172.22.82.19
number of retries: 2
timeout period: 2
```

## snmp session transmission set Command

**Command:** `snmp session transmission set`

**Syntax:** `snmp session transmission set hostname retries timeout`

**Description:** Sets the number of login retries and the time-out period for the module.

## snmp session version get Command

**Command:** `snmp session version get`

**Syntax:** `snmp session version get hostname`

**Description:** Displays the SNMP version for the session. See [Example 6-21](#).

### Example 6-21 snmp session version get Command

```
hostname:ONS15216 EDFA2> snmp session version get local

host      172.22.82.19
version v1
```

## snmp subtree display Command

**Command:** `snmp subtree display`

**Syntax:** `snmp subtree display hostname subtree`

**Description:** Displays the attributes below a node in a SNMP tree. See [Example 6-22](#).

### Example 6-22 snmp subtree display Command

```
hostname:ONS15216 EDFA2> snmp subtree display local

      Root
      ccitt
      zeroDotZero
      iso
      org
      dod
      internet
      directory
      mgmt
      mib-2
      system
      sysDescr
      sysObjectID
      sysUpTime
      sysContact
      sysName
      sysLocation
      sysServices
      sysORLastChange
      sysORTable
      ...
hostname:ONS15216 EDFA2> snmp subtree display local Root

BEGIN-HOST "testhost" 0.0.0.0 "write"
```

```

CLASS SNMPv2-MIB.system ::=
{
    sysDescr = "ONS15216 vx.x.x orion1 vx.x.x, Serial No 00000000100520, MAC A
ddr 0010b4000b12";
    sysObjectID = { cerent15216EdfaHwProdOrion1 };
    sysUpTime = 25248245;
    sysContact = "";
    sysName = "";
    sysLocation = "";
    sysServices = 0;
    sysORLastChange = 175;
};

CLASS SNMPv2-MIB.sysOREntry ::=
{
    sysORIndex = 1;
    sysORID = { snmpBasicCompliance };
    sysORDescr = "";
    sysORUpTime = 25248470;
};

```

## snmp subtree get Command

**Command:** `snmp subtree get`

**Syntax:** `snmp subtree get hostname subtree`

**Description:** Accesses a subtree. See [Example 6-23](#).

### Example 6-23 snmp subtree get Command

```

hostname:ONS15216 EDFA2> snmp subtree get local sysDescr

index
  sysORIndex                1
attributes
  sysORID                   snmpBasicCompliance
  sysORDescr                 " "
  sysORUpTime                25254295

index
  sysORIndex                2
attributes
  sysORID                   rs232Compliance
  sysORDescr                 " "
  sysORUpTime                25254295

```

## snmp subtree list Command

**Command:** `snmp subtree list`

**Syntax:** `snmp subtree list hostname`

**Description:** Lists the attributes below a node in a SNMP tree. See [Example 6-24](#).

### Example 6-24 snmp subtree list Command

```

hostname:ONS15216 EDFA2> snmp subtree list local

```

```

Root
ccitt
zeroDotZero
iso
org
dod
internet
directory
mgmt
mib-2
system
sysDescr
sysObjectID
sysUpTime
sysContact
sysName
sysLocation
sysServices
sysORLastChange
sysORTable
...

```

```
hostname:ONS15216 EDFA2> snmp subtree list local internet
```

```

sysDescr.0 = "ONS15216 v5.3.0 orion1 v0.0.0, Serial No 00000000100520, MAC Addr 0010b4000b12";
sysObjectID.0 = { anHwProdCisco };
sysUpTime.0 = 25256805;
sysContact.0 = "";
sysName.0 = "";
sysLocation.0 = "";
sysServices.0 = 0;
sysORLastChange.0 = 175;
sysORID.1 = { snmpBasicCompliance };

```

## snmp table display Command

**Command:** `snmp table display`

**Syntax:** `snmp table display hostname`

**Description:** Displays table data for the ONS 15216 EDFA2. [Example 6-25](#) displays the command entered without a table. After typing the command without a table and pressing the **Tab** key, a list of tables appears. Type the command with a table name to display the table and its data. Data displayed using this command are per rows. Attributes are grouped together in rows. See [Example 6-25](#).

### **Example 6-25 snmp table display Command**

```
hostname:ONS15216 EDFA2> snmp table display local
```

```

system
sysOREntry
interfaces
ifEntry
atEntry
ip
ipAddrEntry
ipRouteEntry
ipNetToMediaEntry

```

```

ipForward
ipForwardEntry
ipCidrRouteEntry
icmp
tcp
tcpConnEntry
udp
udpEntry
egp
egpNeighEntry
dot3StatsEntry
...
hostname:ONS15216 EDFA2> snmp table display local system

CLASS SNMPv2-MIB.system ::=
{
    sysDescr = "orion-2.1 v5.3.0 orion1 v0.0.0, Serial No 00000000100520, MAC A
ddr 0010b4000b12";
    sysObjectID = { cerent15216EdfaHwProdCisco };
    sysUpTime = 324230;
    sysContact = "";
    sysName = "orion-2.0";
    sysLocation = "";
    sysServices = 0;
    sysORLastChange = 175;
};

```

## snmp table get Command

**Command:** `snmp table get`

**Syntax:** `snmp table get hostname table`

**Description:** Accesses table data. See [Example 6-26](#).

### Example 6-26 snmp table get Command

```

hostname:ONS15216 EDFA2> snmp table get local system

attributes
  sysDescr          "ONS15216 vx.x.x ONS15216 v0.0.0, Serial No
00000000100520, MAC Addr 0010b4000b12"
  sysObjectID      anHwProdOrion1
  sysUpTime        327550
  sysContact       " "
  sysName          "orion-2.0"
  sysLocation      " "
  sysServices      0
  sysORLastChange  175

```

## snmp table list Command

**Command:** `snmp table list`

**Syntax:** `snmp table list`

**Description:** Lists all the data within a table. [Example 6-27](#) below displays the command for the UDP (User Datagram Protocol) table. This command displays data by attribute.

**Example 6-27 snmp table list Command**

```

hostname:ONS15216 EDFA2> snmp table list local udp

udpInDatagrams.0 = 11341;
udpNoPorts.0 = 135;
udpInErrors.0 = 1983;
udpOutDatagrams.0 = 9233;
udpLocalAddress.0.0.0.0.7 = 0.0.0.0;
udpLocalAddress.172.22.82.19.161 = 172.22.82.19;
udpLocalPort.0.0.0.0.7 = 7;
udpLocalPort.172.22.82.19.161 = 161;

```

## snmp tree attribute list Command

**Command:** `snmp tree attribute list`**Syntax:** `snmp tree attribute list`**Description:** Lists all the attributes implemented by the SNMP agent. See [Example 6-28](#).**Example 6-28 snmp tree attribute list Command**

```

hostname:ONS15216 EDFA2> snmp tree attribute list

sysDescr
sysObjectID
sysUpTime
sysContact
sysName
sysLocation
sysServices
sysORLastChange
sysORIndex
sysORID
sysORDescr
sysORUpTime
ifNumber
ifIndex
ifDescr
ifType
ifMtu
ifSpeed
ifPhysAddress
ifAdminStatus
ifOperStatus
...

```

## User Commands

The following commands are useful in setting up and maintaining user accounts for the ONS 15216 EDFA2:

- [user entry create Command, page 6-21](#)
- [user entry delete Command, page 6-21](#)
- [user file display and user name display Command, page 6-21](#)
- [user file display and user name display Command, page 6-21](#)

- [user passwd set Command, page 6-22](#)
- [user active list Command, page 6-22](#)
- [user active message send Command, page 6-22](#)

## user entry create Command

**Command:** `user entry create`

**Syntax:** `user entry create name level password type`

**Description:** Creates new users. The following parameters are required to create a new user: user name, user level, password, type.

Each user has a privilege level. The privilege level is set by entering a number between 0 and 100. By entering the number 100, the user is granted the maximum privileges for the ONS 15216 EDFA2. Each user also has a type. Although there are two types of users; `run_forms` and `run_shell`, select `run_shell` when creating a user. See [Example 6-29](#).

### Example 6-29 user entry create Command

```
hostname:ONS15216 EDFA2> user entry create

Parameters
  user_name      (string[0..16])      name of user
  user_level     (integer[0..100])    privilege level
  password       (string[0..16])      password of user
  type           (string[0..16])      type of user
hostname:ONS15216 EDFA2> user entry create john 50 rosebud
run_shell
run_forms
hostname:ONS15216 EDFA2> user entry create john 50 rosebud run_shell
```

## user entry delete Command

**Command:** `user entry delete`

**Syntax:** `user entry delete name`

**Description:** Delete users. See [Example 6-30](#).

### Example 6-30 user entry delete Command

```
hostname:ONS15216 EDFA2> user entry delete

Parameters
  user_name      (string[0..16])      name of user
hostname:ONS15216 EDFA2> user entry delete username
```

## user file display and user name display Command

**Command:** `user file display` or `user name display`

**Syntax:** `user file display` or `user name display`

**Description:** Type the **user file display** command to display a list of all the users and user information. Type the **user name display** command to display the name of the current user. There can be up to 100 different security levels. The number 100 sets the maximum level of privileges and the number 0 sets the lowest level of privileges.

For information about user levels, see [Table 3-5 on page 3-11](#).

The password for each user should be changed immediately after logging in as that default user. See [Example 6-31](#).

**Example 6-31 user file display and user name display Commands**

```
hostname:ONS15216 EDFA2> user file display
```

User	Level	Type
root	50	run_shell
monitor	20	run_forms
operator	30	run_forms
admin	40	run_forms
CISCO15		40 run_forms

## user passwd set Command

**Command:** `user passwd set`

**Syntax:** `user passwd set old_password new_password`

**Description:** Sets the password. To change a password, type the active password, a space, and then the new password. Typing the command without the passwords displays the parameters for this command. Type the command, the first few letters of the attribute, and press **Tab** to view a list of attributes that can be set. See [Example 6-32](#).

**Example 6-32 user passwd set Command**

```
hostname:ONS15216 EDFA2> user passwd set rw secret
```

## user active list Command

**Command:** `user active list`

**Syntax:** `user active list`

**Description:** Displays a list of the active users. See [Example 6-33](#).

**Example 6-33 user active list Command**

```
hostname:ONS15216 EDFA2> user active list
```

```
Users
CISCO15
```

## user active message send Command

**Command:** `user active message send`



**Syntax:** *user active message send message*

**Description:** Sends a message to all current users on the system. See [Example 6-34](#).

**Example 6-34 user active message send Command**

```
hostname:ONS15216 EDFA2> user active message send

Parameters
  message          (string[0..32])          message to send

hostname:ONS15216 EDFA2> user active message send "hello world"

*** Broadcast Message:
*** hello world
```

## Manufacturing Information Access

### snmp table display local entPhysicalEntry Command

**Command:** `snmp table display local entPhysicalEntry`

**Syntax:** *snmp table display local cerent15216EdfaCommTrapEntry*

**Description:** Displays the trap destination database. See [Example 6-35](#).

**Example 6-35 snmp table display local cerent15216EdfaCommTrapEntry Command**

```
hostname:ONS15216 EDFA2> snmp table display local cerent15216EdfaCommTrapEntry

CLASS ENTITY-MIB.entPhysicalEntry ::=
{
    entPhysicalIndex = 1;
    entPhysicalDescr = "ONS15216 EDFA2";
    entPhysicalVendorType = { cerent15216EdfaChassis };
    entPhysicalContainedIn = 0;
    entPhysicalClass = chassis;
    entPhysicalParentRelPos = -1;
    entPhysicalName = "hostname";
    entPhysicalHardwareRev = "v3.0.0";
    entPhysicalFirmwareRev = "v1.2.0";
    entPhysicalSoftwareRev = "v1.3.0";
    entPhysicalSerialNum = "DIT0533000P";
    entPhysicalMfgName = "Cisco";
    entPhysicalModelName = "511112";
    entPhysicalAlias = "";
    entPhysicalAssetID = "";
    entPhysicalIsFRU = true;
};
```

### snmp table display cerent15216EdfaCommTrapEntry Command

**Command:** `snmp table display cerent15216EdfaCommTrapEntry`

**Syntax:** *snmp table display cerent15216EdfaCommTrapEntry*

**Description:** Displays specific manufacturing information.

## Restore Commands

### manufacturers restore defaults passwords Command

**Command:** `manufacturer restore defaults passwords`

**Syntax:** *manufacturer restore defaults passwords*

**Description:** Restores the manufacturing factory default passwords to the ONS 15216 EDFA2.

### manufacturer restore defaults all Command

**Command:** `manufacturer restore defaults all`

**Syntax:** *manufacturer restore defaults all*

**Description:** Restores the manufacturing factory settings to the ONS 15216 EDFA2.

## Manufacturer Mode

The user root has a **manufacturer mode enable** command that raises the root access level to the fifth and highest manufacturer level to allow undocumented commands that are used only for manufacturing purposes.



Warning

---

**Customers are strongly cautioned not to use this mode.**

---



## FTP Command Line

---

This chapter discusses the Cisco ONS 15216 FTP command line and explains how to get and send image and configuration files between an FTP server and the Cisco ONS 15216.

### Logging into the FTP Command Line

To start an FTP session, use the following command:

```
ftp>network host ftp server ip address
```

To log off, type **quit** at the FTP command line. This command disconnects the user from the remote server and exits the FTP shell.

### FTP Commands

Typing the help command in FTP command line mode displays a list of all FTP commands. See [Example 7-1](#).

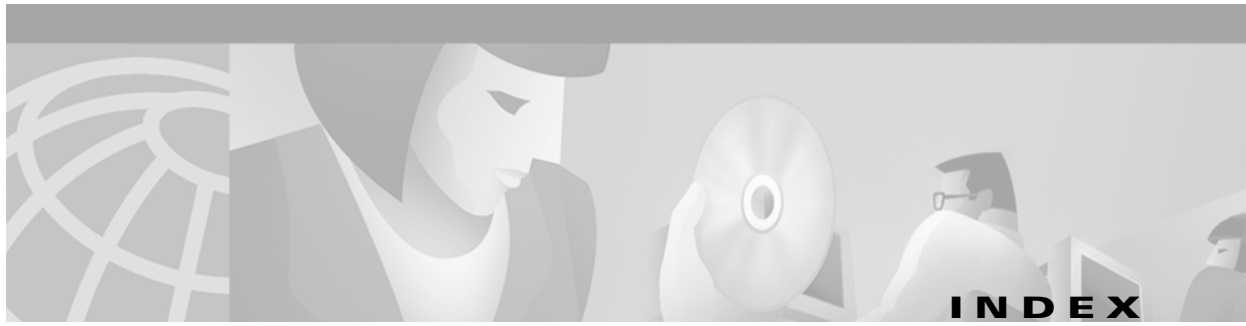
#### **Example 7-1 FTP Help Command**

```
ftp> help
```

```
Available commands (optional parameters are in []):
```

```
cd dir Change remote directory to dir.  
cdup Change remote directory to parent.  
close Close ftp connection and quitftp shell.  
get remote_file Get remote_file from remote server and save as  
    local_file.  
lls List local files.  
login [username]Login to remote server as username (prompted for  
    password).  
ls [expr]Detailed listing of remote files matching expr.  
nls [expr]Name only listing of remote files matching expr.  
open ip_addressOpen a connection to server at ip_address and port.  
put local_fileSend local_file to remote server and save as remote_file.  
pwd Show current remote directory.  
quit lose ftp connection and quit ftp shell.  
type t Set type to t, either I image/binary or A ascii.
```





---

## A

Administrative Commands [6-7](#)  
alarm contacts [3-3](#)  
alarm out [2-6](#)  
Alarm Status [5-27](#)  
amplified spontaneous emission [1-4](#)  
automatic gain control [2-2](#)

---

## B

backward amplified spontaneous emission [2-1](#)  
bandwidth-on-demand [1-1](#)

---

## C

Case Temperature Alarm Threshold [5-21](#)  
Case Temperature Value [5-21](#)  
cfg srom boot modify Command [6-4](#)  
cfg srom ip display Command [6-5](#)  
cfg srom ip modify Command [6-5](#)  
channel power [2-2](#)  
Command Syntax Using the SNMP Agent [5-4](#)  
Configuration Commands [6-3](#)  
connector types [2-4](#)  
constant gain [1-3](#)  
Creating a View [5-6](#)

---

## D

DB-9 [3-7, 3-14](#)

---

## E

EDFA SNMP Elements [5-1](#)  
electrical precautions [3-1](#)  
electrical specifications [2-3](#)  
equipment checklist [3-7](#)  
exit [6-7](#)

---

## F

fiber input [2-6](#)  
fiber output [2-6](#)  
front panel [2-5](#)  
    LEDs [3-4](#)

---

## G

gain flatness [1-3, 2-1](#)  
gain flattening [1-3](#)  
grounding [2-6](#)

---

## H

help [6-7](#)  
history [6-7](#)  
humidity operation [2-4](#)  
HyperTerminal [3-7, 3-13](#)

---

## I

IP Address of Cisco ONS 15216 [5-18](#)

**L**

## LED

LOS [3-5](#)power [3-4](#)login and logoff [6-8](#)Loss of Output Power Alarm Hysteresis [5-27](#)Loss of Output Power Alarm Threshold [5-25](#)**M**manufacturer restore defaults all [6-24](#)Manufacturing Information Access [6-23](#)mechanical specifications [2-4](#)modem configuration settings [3-13](#)modem power up [3-12](#)NVRAM settings [3-12](#)modem signals [3-12](#)monitor output [2-6](#)MTBF [2-4](#)**N**noise [1-3, 2-1](#)**O**optical specifications [2-1](#)Orion-S1723 optical specifications [2-1](#)**P**polarization mode dispersion [2-1](#)Power Gain [5-20](#)processor reset [6-8](#)**R**

## rack

general hazards [3-1](#)remote communications [3-11](#)Restore and Changing Default User Password [6-24](#)Restore Manufacturing Setting [6-24](#)RS-232 [2-6, 3-7, 3-11, 3-14](#)**S**safety precautions [3-1, 3-5](#)commands [3-5](#)eye protection [3-5](#)radiation exposure [3-5](#)trained personnel [3-5](#)SC/UPC optical ports [3-6](#)serial communications [3-7](#)serial connection [2-6, 3-7](#)Shell Commands [6-8](#)shell lines set [6-9](#)shell more disable and enable [6-9](#)signal-to-noise ratio [1-3](#)SNMP Agent [5-2](#)

snmp attribute get local

cerent15216EdfaOutPoweruW [5-25](#)

snmp attribute get local

cerentEdfa15216EdfaConstGainOverallGain [5-20](#)snmp attribute list [6-11](#)snmp attribute set [6-12](#)SNMP Commands-Retrieving Information [5-18](#)SNMP Manager [5-3](#)SNMP MIB [5-3](#)snmp mib display [6-12](#)snmp mib get [6-12](#)snmp mib list [6-13](#)SNMP MIBs and Message Types [5-3](#)snmp row set [6-14](#)

snmp row set local cerent15216EdfaViewEntry { }  
     zeroDotZero [5-6](#)

snmp session community get [6-15](#)

snmp session community set [6-15](#)

snmp session transmission get [6-15](#)

snmp session transmission set [6-16](#)

snmp session version get [6-16](#)

snmp subtree display [6-16](#)

snmp subtree get [6-17](#)

snmp subtree list [6-17](#)

snmp table display [6-18](#)

snmp table display  
     cerent15216EdfaCommTrapEntry [6-23](#)

snmp table display local entPhysicalEntry [6-23](#)

snmp table get [6-19](#)

snmp table list [6-19](#)

specifications

- electrical [2-3](#)
- mechanical [2-4](#)
- optical [2-1](#)

srom cfg boot display [6-4](#)

srom cfg boot modify [6-4](#)

---

## T

temperature [2-4](#)

Third-party, Vender Specific SNMP Managers [5-3](#)

transient suppression [1-3](#)

---

## U

user active list [6-22](#)

user active message send [6-22](#)

user entry create [6-21](#)

user entry delete [6-21](#)

user file display and user name display [6-21](#)

user passwd modify [6-24](#)

user passwd set [6-22](#)

US Robotics 56K Fax modem V.90 [3-11](#)

---

## V

voltage

- input [2-3](#)
- maximum supply [2-4](#)
- minimum supply [2-3](#)

