CISCO SYSTEMS

Cisco ONS 15216 EDFA2/EDFA2-A Operations Guide

Product and Software Release 2.4
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CONTENTS

Cisco ONS 15216 EDFA2/EDFA2-A Operations Guide, R2.4

F I G U R E S

T A B L E S

About this Guide

This section explains the objectives, intended audience, and organization of this publication and describes the conventions that convey instructions and other information.

This section provides the following information:

- Document Objectives
- Audience
- Document Organization
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Document Objectives

The *Cisco ONS 15216 EDFA2 Operations Guide* explains how to install and operate the Cisco ONS 15216 Erbium-Doped Fiber Amplifier 2 (EDFA2/EDFA2-A).

Audience

To use this publication, you should be familiar with Cisco or equivalent optical transmission hardware and cabling, telecommunications hardware and cabling, electronic circuitry and wiring practices, and preferably have experience as a telecommunications technician.

Document Organization

This Cisco ONS 15216 EDFA2/EDFA2-A Operations Guide, R2.4 is organized into the following chapters:

- Chapter 1, "Applications" provides common applications for the Cisco ONS 15216 EDFA2/EDFA2-A.

- Chapter 2, "Technical Specifications" provides technical specifications for the Cisco ONS 15216 EDFA2/EDFA2-A.
- Chapter 3, "Installation" provides installation procedures for the Cisco ONS 15216 EDFA2/EDFA2-A.
- Chapter 4, "Provisioning with ASH and SNMP" provides provisioning procedures for the Cisco ONS 15216 EDFA2/EDFA2-A using SNMP and the ASH shell.
- Chapter 5, "SNMP MIB Configuration" explains how to read and understand SNMP MIB as it relates to the Cisco ONS 15216 EDFA2/EDFA2-A.
- Chapter 6, "ASH Commands" provides a reference of ASH commands that are used in advanced setup and troubleshooting for the ONS 15216 EDFA2/EDFA2-A.
- Chapter 7, "File Transfers" explains how to get and send image and configuration files between an FTP or TFTP server and the ONS 15216 EDFA2/EDFA2-A.
- Chapter 8, "Provisioning with TL1" provides provisioning procedures for the Cisco ONS 15216 EDFA2/EDFA2-A using TL1 commands in the TL1 shell.
- Chapter 9, "TL1 Commands" provides details of TL1 commands supported by the the Cisco ONS 15216 EDFA2/EDFA2-A.
- Chapter 10, "Troubleshooting" provides basic fault information and diagnosis (troubleshooting) procedures for the 2.1.0, 2.2.1, 2.3.0, and 2.4.0 product releases of the Cisco ONS 15216 EDFA2/EDFA2-A.

Document Conventions

This publication uses the following conventions:

boldface	Commands and keywords in body text.
italic	Command input that is supplied by the user.
[ ]	Keywords or arguments that appear within square brackets are optional.
{ x | x | x }	A choice of keywords (represented by x) appears in braces separated by vertical bars. The user must select one.
Ctrl	The control key. For example, where Ctrl + D is written, hold down the Control key while pressing the D key.
`screen font`	Examples of information displayed on the screen.
`boldface screen font`	Examples of information that the user must enter.
< >	Command parameters that must be replaced by module-specific codes.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the document.

⚠

Caution   Means *reader be careful*. In this situation, the user might do something that could result in equipment damage or loss of data.

⚠

Warning   **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to the translated safety warnings that accompanied this device.

Note: SAVE THESE INSTRUCTIONS

Note: This documentation is to be used in conjunction with the specific product installation guide that shipped with the product. Please refer to the Installation Guide, Configuration Guide, or other enclosed additional documentation for further details.

Where to Find Safety and Warning Information

For safety and warning information, refer to the *Cisco Optical Transport Products Safety and Compliance Information* document that accompanied the product. This publication describes the international agency compliance and safety information for the Cisco ONS 15xxx systems. It also includes translations of the safety warnings that appear in the ONS 15xxx system documentation.

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Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/univercd/home/home.htm

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http://www.cisco.com

You can access international Cisco websites at this URL:

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You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:

  http://www.cisco.com/en/US/partner/ordering/index.shtml

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Cisco Optical Networking Product Documentation CD-ROM

Optical networking-related documentation, including Cisco ONS 15xxx product documentation, is available in a CD-ROM package that ships with your product. The Optical Networking Product Documentation CD-ROM is updated periodically and may be more current than printed documentation.

Documentation Feedback

You can send comments about technical documentation to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
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170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, Cisco Technical Support provides 24-hour-a-day, award-winning technical assistance. The Cisco Technical Support Website on Cisco.com features extensive online support resources. In addition, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not hold a valid Cisco service contract, contact your reseller.

Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year at this URL:

http://www.cisco.com/techsupport

Access to all tools on the Cisco Technical Support Website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool automatically provides recommended solutions. If your issue is not resolved using the recommended resources, your service request will be assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553 2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is "down," or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

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Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:

  http://cisco.com/univercd/cc/td/doc/pcat/

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

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- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

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- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

  http://www.cisco.com/go/iqmagazine

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/ipj

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html

1

Applications

This manual describes how to install and operate the Cisco Optical Network System (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. It features bandwidth-on-demand and wavelength protection switching that extend dense wavelength division multiplexing (DWDM) links by hundreds of kilometers. With the ONS 15216 EDFA2, optical signals from a span in a DWDM network can be added or dropped without negatively affecting (degrading) other optical signals on the same span.

This manual pertains to both the ONS 15216 EDFA2 and the ONS 15216 EDFA2-A hardware. The label "ONS 15216 EDFA2" is used when describing features related to both products. All information is applicable to both the ONS 15216 EDFA2 and ONS 15216 EDFA2-A unless otherwise specified.

1.1 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 the ONS 15216 EDFA2's 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 (composite) input power of all wavelengths is between 4 dBm and –27 dBm, any number of wavelengths can be amplified.

1.2 Wavelength Protection Switching

The ONS 15216 EDFA2 uses wavelength protection switching to restore wavelengths that are lost in the event of a fiber cut or other loss of signal. 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 counter-clockwise wavelengths, only one transits the span linking locations D and C. If a fiber cut occurred on this span, the affected wavelength could be restored by rerouting it (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, not the entire fiber.

Figure 1-1   Wavelength Protection Switching
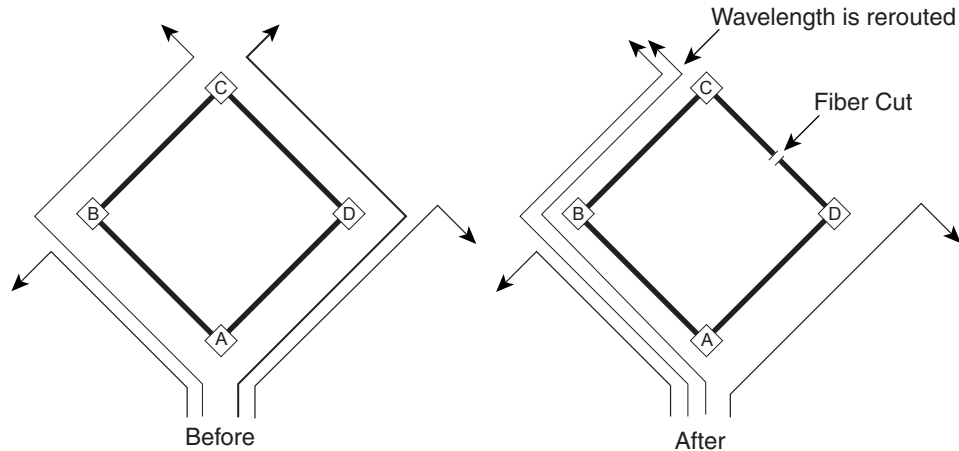
After a protection switch occurs, the number of wavelengths on each fiber changes. In the example, the number of clockwise wavelengths increases to three, while the number of counter-clockwise wavelengths decreases to one.

1.3 Key Features

The ONS 15216 EDFA2 has the following key features:

- Adjustable constant gain of 13 to 22 dB
- Gain flattening
- Transient suppression
- Low noise figure
- Automatic laser shutdown
- Simple Network Management Protocol (SNMP) MIBs
- Transaction Language 1 (TL1)

1.3.1 Constant Gain

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 dB, no matter how many wavelengths are being amplified.

Constant gain 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 Temperature Compensated mode by default, but since there may be applications where other operating modes may be required, the ONS 15216 EDFA2 can be set to operate in any one the following pump control modes:

- Constant Gain Temperature Compensated mode
- Constant Output Power mode

- Constant Pump Current mode
- Constant Pump Power mode

1.3.2 Gain Flattening

Figure 1-2 illustrates the effect of the gain flattening filter in the ONS 15216 EDFA2. Fiber (a) in the figure shows a set of channels with equal powers being input to a cascaded network of amplifiers that produce vastly different power levels and optical signal-to-noise ratios (OSNR) at the output. In contrast, fiber (b) shows how the EDFAs effectively reduce this effect by introducing a gain flattening filter within each amplifier.

Figure 1-2   Gain Flattening Filter
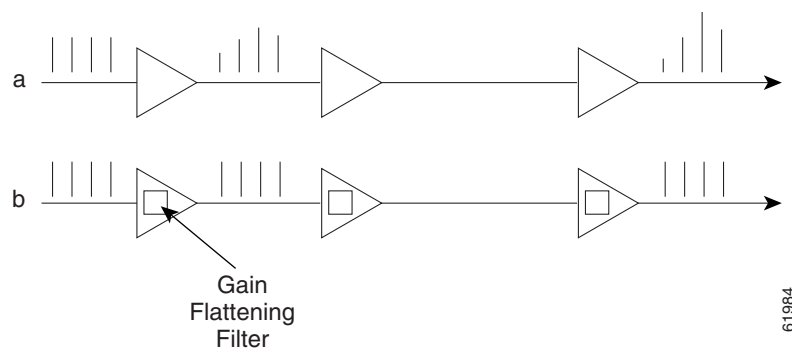
1.3.3 Transient Suppression

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.

1.3.4 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.

1.3.5 Automatic Laser Shutdown

If automatic laser shutdown is enabled, when the input power (signal) goes below the loss of signal value, the laser pumps are shut down until the input signal is restored. This option prevents ASE (typically –3.5 dBm) from being present at the output during the loss of signal.

1.3.6 SNMP MIBs

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

1.3.7 TL1

The ONS 15216 EDFA2 has a TL1 interface available to the network operator and craftsperson.

2

Technical Specifications

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

2.1 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)[1]	–27 dBm to 4 dBm (total all channels)
	See the "2.1.1 Maximum Input Power" section on page 2-2 and the "2.1.2 Channel Loading" section on page 2-2 for more information.
	Note 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, see the "3.3.1 Safety Requirements" section on page 3-3.
Mode of operation	Unidirectional (two common fibers: one transmit, one receive)
Maximum output power	17 ± 0.6 dBm
Signal gain per channel	13 dB to 22 dB
Channel gain deviation from setpoint	± 1.25 dB
Gain flattened	ONS 15216 EDFA2-A: < 1.5 dB (peak to valley)
	ONS 15216 EDFA2: < 2 dB (peak to valley)
Maximum noise figure	ONS 15216 EDFA2-A: < 6 dB at 22 dB gain. See Table 2-2.
	ONS 15216 EDFA2: < 7 dB at 22 dB gain
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.

1. In Constant Output Power mode, the input power should not be less than -15 dBm to ensure that constant output power is maintained. It is also recommended that the minimum output power setting in this mode be no less than 13 dBm.

Table 2-2   Noise Figure Specification - ONS 15216 EDFA2-A Only

Gain (dB)	Noise Figure (dB)
22	6.0
21	6.0
22	6.0
19	6.0
18	6.0
17	6.3
16	6.7
15	7.2
14	7.8
13	8.4

2.1.1 Maximum Input Power

The ONS 15216 EDFA2 operates at a gain setting between 13 and 22 dB. Each gain setting has a maximum input power. The maximum input power is defined as 17 dBm (the maximum output power) minus the gain setting. For example, at a gain setting of 22 dB, the maximum input power is –5 dBm. At a gain setting of 13 dB, the maximum input power is 4 dBm. Prolonged operation beyond the maximum input power can shorten the life of the ONS 15216 EDFA2.

External optical attenuators are required to reduce the total input power to less than or equal to 4 dBm.

2.1.2 Channel Loading

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 and the gain is set to 22 dB, 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 2-3   Maximum Channel Power

Composite Input Power (dBm)	4	3	2	1	0	−1	−2	−3	−4	−5
Corresponding Max. Gain (dB)	13	14	15	16	17	18	19	20	21	22
Number of Channels at Full Loading	Maximum per Channel Input Power at Maximum Gain Setting (dBm)									
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
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

Table 2-3   Maximum Channel Power (continued)

Composite Input Power (dBm)	4	3	2	1	0	–1	–2	–3	–4	–5
Corresponding Max. Gain (dB)	13	14	15	16	17	18	19	20	21	22
Number of Channels at Full Loading	Maximum per Channel Input Power at Maximum Gain Setting (dBm)									
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

2.2 Electrical Specifications

The ONS 15216 EDFA2 uses a power supply that meets the electrical specifications listed in Table 2-4.

Table 2-4   ONS 15216 EDFA2 Electrical Specifications

Requirement	Specification
Input voltage	–48 VDC
Maximum power consumption	< 30W (end of life) 0-50°C
Minimum supply voltage	–40 VDC
Minimum turn-on supply voltage	–43 VDC
Maximum supply voltage	–57 VDC or under
Maximum current	0.75A (0.63A at –48V)

2.3 Mechanical Specifications

Table 2-5 lists the ONS 15216 EDFA2 mechanical specifications.

Table 2-5   ONS 15216 EDFA2 Mechanical Specifications

Requirement	Specification
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 185°F (–40 to 85°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.

Table 2-5   ONS 15216 EDFA2 Mechanical Specifications (continued)

Requirement	Specification
Connector types	SC/UPC Bulkhead connectors
Mean time between failures (MTBF)	12.7 years as per calculation procedure outlined in TR-NWT-000332, Issue 4, Method 1

2.4 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 holes on the ONS 15216 EDFA2-A (studs on the ONS 15216 EDFA2) on rear, and two threaded grounding holes on each 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 EIA/TIA-232 serial interface connection

displays a mechanical outline of the external features and dimensions of the ONS 15216 EDFA2.

Figure 2-1   ONS 15216 EDFA2 Dimensions
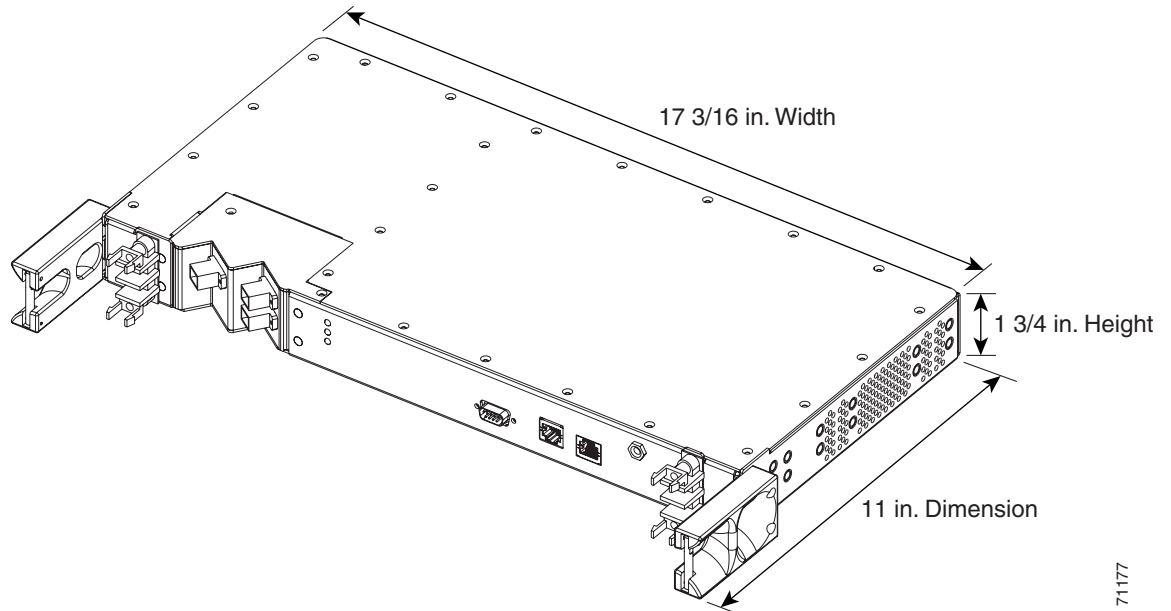
2.5 Front Panel

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
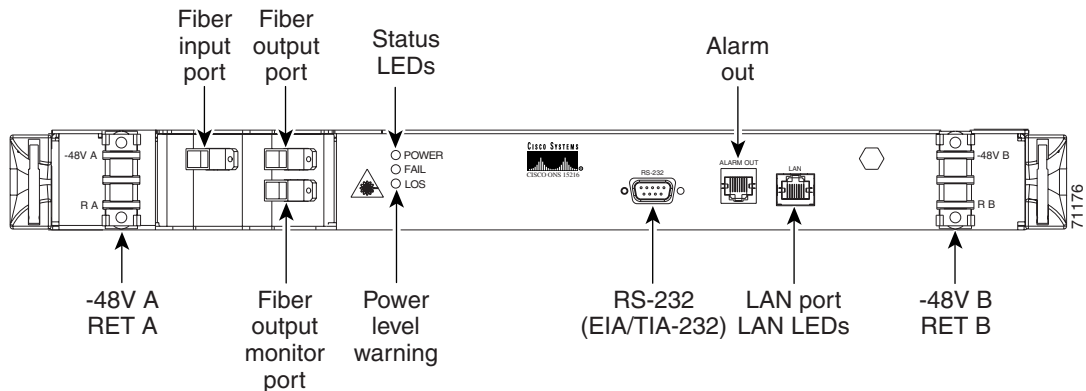
Table 2-6 describes the ONS 15216 EDFA2 front panel features.

Table 2-6   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 "3.4.1 Alarm Out Relay Interface (RJ-45)" section on page 3-5 for additional information.)
Serial port connection (EIA/TIA-232)	Serial port for local or remote (modem) data communication connection. (See Chapter 3, "Installation" 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 "3.4.2 Alarm LEDs" section on page 3-6.)
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 chassis ground to attach ground lug or wires using #10-32 screws to the ONS 15216 EDFA2-A (#8-32 nut to the ONS 15216 EDFA2)
LAN	RJ-45 connector used for 10BASE-T Ethernet connection. For more information, see the "3.4.5 LAN Interface (Ethernet)" section on page 3-14.

C H A P T E R 3

Installation

This chapter contains the installation procedures for the Cisco ONS 15216 EDFA2. The chapter is divided into the following sections:

- Power (–48V A, RET A, –48V B, RET B, and chassis ground)
- Optical (fiber input and output ports)
- Communications (Alarm Out, LEDs, RS-232 (EIA/TIA-232), and LAN)

3.1 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.
- Using standard fiber handling and cleaning procedures is critical when installing optical networking equipment.
- Eye safety precautions should be employed when handling fiber optic patchcords.

3.2 Placement and Power Connection

3.2.1 General Rack Considerations

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. 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. Do not block ventilation holes beyond what is allowed with supplied mounting brackets.
- Mechanical Loading—Mounting of the equipment in the rack should be such that it avoids 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.

- Reliable Earthing—Reliable grounding 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.).

Warning **The ONS 15216 EDFA2 is intended for installation in a restricted access area. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock, key, or other means of security. A restricted access area is controlled by the authority responsible for the location.**

3.2.2 Rack Installation and Power Supply Connection 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. 1.5A fusing is required (user-provided).

  b. Use 18 AWG stranded wire (and wire lugs as appropriate).

Step 3 Connect power cable from the office fuse panel to the power bus A terminals on the ONS 15216 EDFA2. See Figure 2-2 on page 2-6.

Step 4 Repeat Step 3 for power bus B.

Step 5 Connect the facility ground to the ONS 15216 EDFA2 side panel ground using #10-32 x 3/8-inch fasteners with lock washers and ground lugs, or connect to the rear panel ground using ring lugs for #8 studs.

Step 6 Insert 1.5A fuses into the fuse panel (user-provided).

Step 7 While the ONS 15216 EDFA2 is booting, the following LED behavior should be observed:

  a. The POWER (green), FAIL (red), and LOS (yellow) LEDs all turn on.

  b. The POWER LED flashes for approximately 1 second, the FAIL LED flashes for approximately 1 second, and the LOS LED flashes for approximately 1 second.

  c. The POWER, FAIL, and LOS LEDs all turn on.

  d. The alarm relays click, indicating that boot process has completed. This occurs because the software sets the relays to their default state and then determines the relay settings based on alarm conditions.

e. The POWER (green) LED remains on if the Power Bus mode is duplex and both power supplies are connected to valid power sources or if the Power Bus mode is simplex and the Power A terminal is connected to a valid power source. Note that the POWER LED could flash for a few seconds while the software determines the validity of the power sources. A continuously flashing POWER LED indicates a Power Bus alarm.

f. The FAIL (red) LED state depends on alarm conditions. The LOS (yellow) LED state depends on the condition of the optical input signal.

3.3 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 (MONITOR OUT)
  - 1% tap of output or 20 dB below output signal

3.3.1 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 performing adjustments or procedures other than those specified herein may result in hazardous radiation exposure.**

Warning **Class 1M laser radiation when open. 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 approximately –3.5 dBm of optical output power.**

The TL1, SNMP, and command-line interface (CLI) commands can be used to increase the level of laser energy. Necessary precautions must be taken to avoid exposure to laser energy when using these commands.

3.3.2 Optical Connection Procedure

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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. Refer to the Cisco document "Cleaning Procedure for Fiber Optic Connectors" for more information.

Step 2   Connect the first patchcord between the ONS 15216 EDFA2 OUTPUT connector and the FACILITY LINE connection.

The measured optical output power should be 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
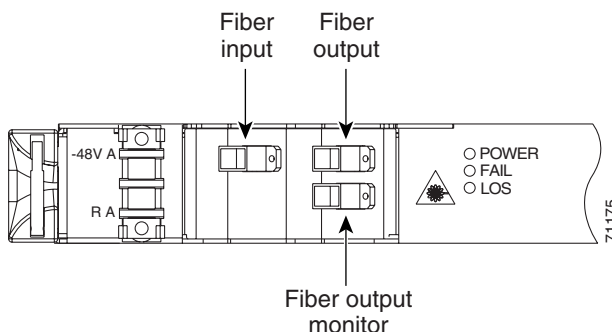
3.3.3 Optical Amplification Operation Verification Procedure

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

Step 1   Connect an optical power meter to the MONITOR OUT port.

Step 2   Measure and record the output power. The MONITOR 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 3-1.

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 3-1   Gain Range

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

Note   Unless overridden by the user, the gain per channel is by default set to 22 dB 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 "4.7 Set Gain" section on page 4-5.

3.4 Communications

The ONS 15216 EDFA2 can communicate in the following ways:

- Alarm Out relay contacts (RJ-45)
- Alarm LEDs
- Serial interface (EIA/TIA-232)
- Serial interface connected to a modem
- LAN interface (RJ-45)

3.4.1 Alarm Out Relay Interface (RJ-45)

The ONS 15216 EDFA2 Alarm Out (RJ-45) port reports alarm status for the following:

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

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

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

Table 3-2 provides the ONS 15216 EDFA2 RJ-45 alarm out pinout and alarm definitions.

Table 3-2   Alarm Pinout and Definitions (RJ-45)

Relay	Pinout	Description
0	1 (0+)	Loss of electrical power
	2 (0–)	

Table 3-2   Alarm Pinout and Definitions (RJ-45) (continued)

Relay	Pinout	Description
1	3 (1+)	Laser pump temperature or bias is out of range; input power is out of tolerance for gain settings (Major)
	4 (1–)	
2	5 (2+)	Loss of optical input signal or input signal is below threshold (Minor)
	6 (2–)	
3	7 (3+)	Loss of electrical power or out of range for Bus A or Bus B while in duplex mode
	8 (3–)	

3.4.1.1 Alarm Relay Connection Procedure

To set up alarm contacts, follow these steps:

Step 1   Connect the RJ-45 to the stub-end cable using a #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 for information concerning alarm contacts. Refer to for information on the ONS 15216 EDFA2 alarm LEDs.

3.4.2 Alarm LEDs

The ONS 15216 EDFA2 has five LEDs:

- POWER
- FAIL
- LOS
- Ethernet socket (2)

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

3.4.2.1 POWER LED (Green)

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

- **On:** –48 VDC power is within tolerance. (Power Bus A and B are powered normally.)
- **Off:** No –48 VDC 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 "3.4.1 Alarm Out Relay Interface (RJ-45)" section on page 3-5.)

3.4.2.2 FAIL LED (Red)

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

• **On:** The laser pump bias, laser pump temperature, output power, gain, or case temperature is out of tolerance. (A major internal failure has occurred.)

• **Off:** The laser pump bias or laser pump temperature is in the specified range (or no –48 VDC power is present).

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.

3.4.2.3 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 (or no –48 VDC power 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.

3.4.2.4 Ethernet Socket LEDs

Two LEDs are located at the top left and right 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 or flashing, there is Ethernet traffic.

3.4.3 Serial Interface (EIA/TIA-232) Communication

This section describes communication with the ONS 15216 EDFA2 using a serial connection.

3.4.3.1 Required Equipment

Establishing a serial communications link with a ONS 15216 EDFA2 requires the equipment listed in Table 3-3.

Table 3-3   Equipment Checklist

Hardware	Comments
Laptop or computer running a Terminal application.	User-provided. HyperTerminal can be found in the Microsoft Windows Accessories menu.
EIA/TIA-232 cable with DB-9F/DB-9M connectors wired as shown in Figure 3-8 on page 3-14.	Provides EIA/TIA-232 link to ONS 15216 EDFA2.

3.4.3.2 Serial Connection Procedure

To set up an EIA/TIA-232 link to the ONS 15216 EDFA2, use the following procedure. (The procedure uses HyperTerminal and a connection via the COM1 port.)

Step 1 Connect the DB-9F end of the EIA/TIA-232 data cable (straight cable, user provided) to the laptop COM port.

Step 2 Connect the DB-9M end of the EIA/TIA-232 data cable to the RS-232 (EIA/TIA-232) serial port connection on the front 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 on page 3-9. 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
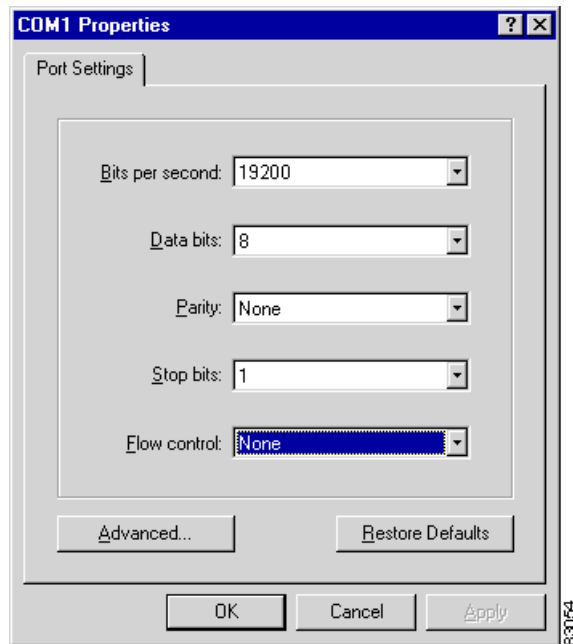
Step 7   In the HyperTerminal main window, click **File > Properties.**

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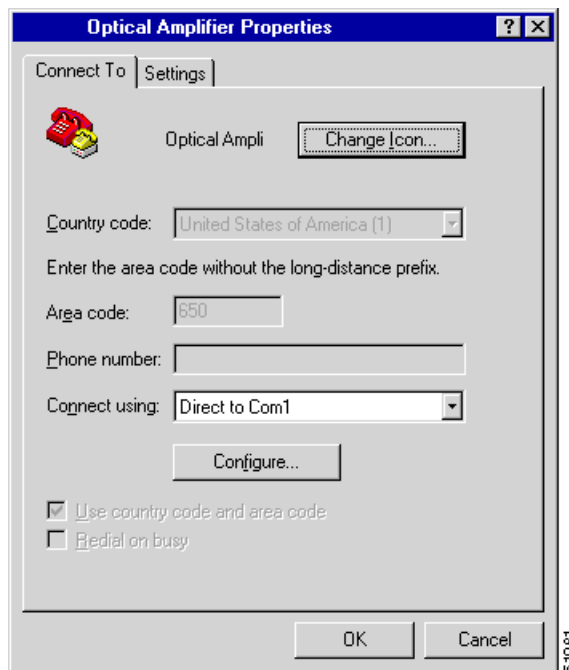
Step 9   Ensure that Direct to Com1 is selected in the Connect using field.

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

Figure 3-5   *Optical Amplifier Properties Dialog Box (Settings Tab)*
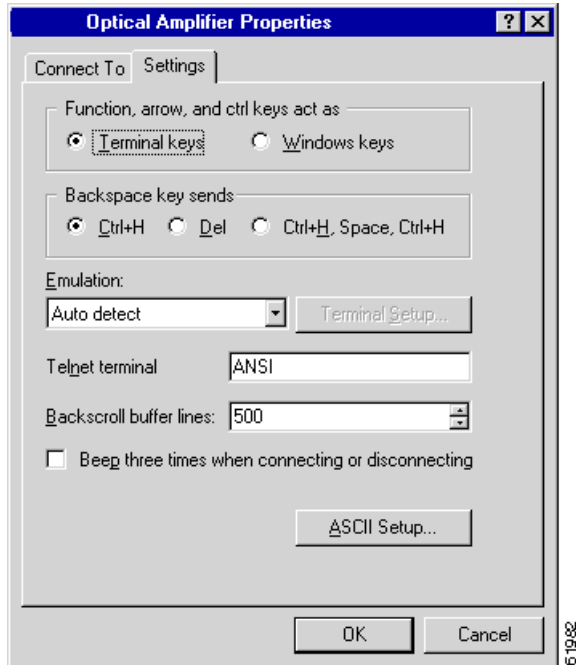
Step 11   Configure the ASCII Setup window as shown in Figure 3-6. Click **OK** when done.

Figure 3-6   *HyperTerminal ASCII Setup Dialog Box*
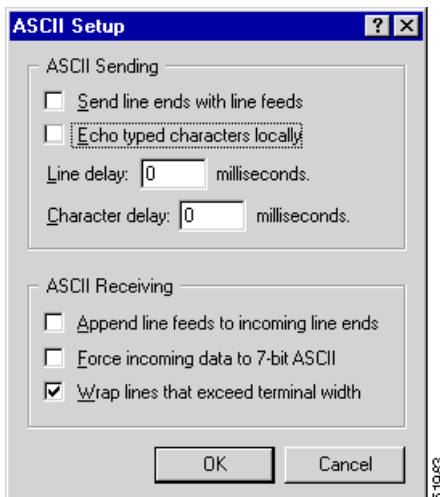
Step 12   Click **OK** to return to the main HyperTerminal window.

The ONS 15216 EDFA2 login screen appears. The appearance depends on the shell the ONS 15216 EDFA2 is set to (TL1 is the default shell). See the "4.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal" section on page 4-1 for the login procedure in ASH shell and the "8.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal" section on page 8-1 for the login procedure in TL1 shell.

3.4.4 Serial Interface Remote Communication via Modem

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
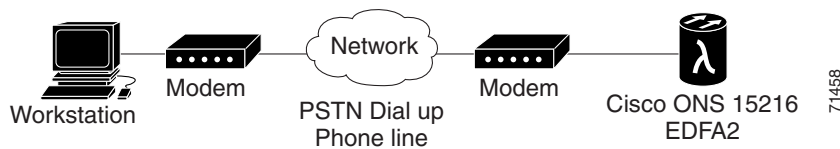
3.4.4.1 Remote Communication Component Requirements

Table 3-4 lists the components required to communicate remotely with a ONS 15216 EDFA2. Table 3-4 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 3-4   Communication Component List

Component	Notes
Remote Site	
1 ONS 15216 EDFA2	
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	

Table 3-4   Communication Component List (continued)

Component	Notes
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	

3.4.4.2 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.

3.4.4.3 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 3-5.

Table 3-5   Modem 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
6	U	Carrier detect normal
7	U	Load NVRAM defaults
8	D	Smart mode

3.4.4.4 Modem 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 3-6 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 3-6   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
&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

3.4.4.5 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.

3.4.4.6 PC Connection via Modem

The ONS 15216 EDFA2 and modem are connected through the RS-232 (EIA/TIA-232) port using a DB-9 connector. The modem, PC, and ONS 15216 EDFA2 should be physically set up 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 for RS-232 (EIA/TIA-232) Port*
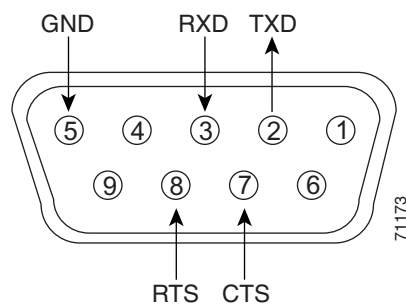
Using the terminal program from the PC, enter the **ATDT** command with the appropriate telephone number to call the remote ONS 15216 EDFA2 modem. After the modems synchronize, log into the ONS 15216 EDFA2 using the correct user name and password. Refer to Chapter 5, "SNMP MIB Configuration," Chapter 6, "ASH Commands," and Chapter 9, "TL1 Commands," for additional information on commands.

3.4.5 LAN Interface (Ethernet)

You can connect to the ONS 15216 EDFA2 to an Ethernet LAN for remote access.

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 with ASH and SNMP" or Chapter 8, "Provisioning with TL1."

Telnet is an application that allows remote management using IP over the Ethernet LAN. The following types of commands can be issued through a Telnet session:

- SNMP MIB commands (Chapter 5, "SNMP MIB Configuration")

- ASH CLI commands (Chapter 6, "ASH Commands")

- TL1 commands (Chapter 9, "TL1 Commands")

3.4.5.1 LAN Connection Procedure

Use the following procedure to configure the module to accept SNMP, CLI, and TL1 commands via its RJ-45 LAN port:

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. See the "4.2 Set IP Address" section on page 4-3.

Step 2   Connect ONS 15216 EDFA2 to the network via the module LAN port.

Use a straight-through Cat5 Ethernet cable with RJ-45 connectors to connect to a LAN, or use a cross-over cable if connecting directly to a PC.

Step 3   At a terminal or workstation, open the Telnet application.

Note   To send CLI and TL1 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's IP address.

If you do not specify a port number, the ONS 15216 EDFA2 responds in the shell that the ONS 15216 EDFA2 is set to (TL1 is the default shell). Specify port number 8023 to access through the ASH shell or port number 3083 to access through the TL1 shell.

The ONS 15216 EDFA2 login screen appears. See the "4.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal" section on page 4-1 for the login procedure in ASH shell and the "8.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal" section on page 8-1 for the login procedure in TL1 shell.

CHAPTER

4

Provisioning with ASH and SNMP

This chapter discusses the provisioning procedures for the Cisco ONS 15216 EDFA2 using SNMP and a proprietary command line interface named the ASH shell. See Chapter 8, "Provisioning with TL1" for provisioning information using TL1 commands in the TL1 shell.

The provisioning procedure for the ONS 15216 EDFA2 in the ASH shell is as follows:

1. 4.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal, page 4-1
2. 4.2 Set IP Address, page 4-3
3. 4.3 Log In via LAN Port Using Telnet (Optional), page 4-3
4. 4.4 Set Date and Time, page 4-4
5. 4.5 Set Power Bus Mode (Simplex or Duplex), page 4-4
6. 4.6 Verify Amplifier Operational Status, page 4-4
7. 4.7 Set Gain, page 4-5
8. 4.8 Set Alarm Thresholds, page 4-5
9. 4.9 Set Password, page 4-10
10. 4.10 Add Users, page 4-11
11. 4.11 Save Changes, page 4-11
12. 4.12 Log Off, page 4-12
13. 4.13 Back Up System Configuration, page 4-12
14. 4.14 Restore System Configuration, page 4-13

The following sections describe these steps in detail.

4.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal

You must log in through the RS-232 (EIA/TIA-232) port and set the ONS 15216 EDFA2 IP address before access can be available via the LAN port. (See the "4.3 Log In via LAN Port Using Telnet (Optional)" section on page 4-3.)

Step 1 Connect to the RS-232 (EIA/TIA-232) port on the front panel. See the "3.4.3.2 Serial Connection Procedure" section on page 3-8 for line connection and HyperTerminal setup instructions.

Step 2 Open HyperTerminal. (HyperTerminal can be found in the Microsoft Windows Accessories menu.)

Step 3 If you see the login window shown in Example 4-1 on page 4-2, skip to Step 4.

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4-1

By default the ONS 15216 EDFA2 is in TL1 shell, so this step may be required to proceed in ASH shell. When in TL1 shell, the screen opens to a simple prompt (>). To change to ASH shell, log in using the procedure in the "8.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal" section on page 8-1, and then enter the following command at the sid/tid name prompt:

sidtidname:ONS15216 EDFA2> **ED-NE-GEN:::123:::CLI=ASH;**

Then enter the following command at the hostname prompt:

sidtidname:ONS15216 EDFA2> **INIT-SYS::ALL:1234::1;**

The ONS 15216 EDFA2 should log you off and then bring up the ASH shell login window.

Step 4   Check that the ONS 15216 EDFA2 login window appears as shown in Example 4-1.

Example 4-1   ASH Shell Login Window

```
-- LOGIN ------------------------------------------------------------



                            Username:  {                   }
                            Password:  {                   }

                                    [Login]
```

Step 5   Enter both a user name and password.

The default user name and password is CISCO15 with no password (press **Enter**).

> ✎
> **Note**   For security reasons, it is recommended that you change the password from its default value. See the "4.9 Set Password" section on page 4-10 or the "8.9 Set Password" section on page 8-11.

Step 6   Press **Enter** when [Login] becomes highlighted. Example 4-2 displays the login response.

Example 4-2   ASH Shell Login Response

```
Welcome to ONS15216 EDFA2 Console (v2.4.0)
************************* Warning ********************************
This system is restricted to authorized users for business purposes.

Unauthorized access is a violation of the law. This service may be
monitored for administrative and security reasons.

By proceeding you consent to this monitoring.
*****************************************************************

ash:hostname:ONS15216 EDFA2>
```

An EIA/TIA-232 link to the ONS 15216 EDFA2 is established. The user can now provision the ONS 15216 EDFA2.

4.2 Set IP Address

Before connecting the ONS 15216 EDFA2 to a LAN, it is mandatory to set the ONS 15216 EDFA2 IP address through a local serial communication interface using the RS-232 (EIA/TIA-232) port on the front of the module.

Step 1 If you do not know the ONS 15216 EDFA2's 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 Host Name

```
ash:hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaSromIpMgmtGroup

cerent15216EdfaSromIpMgmtEnetAddress 0.0.0.0
cerent15216EdfaSromIpMgmtEnetSubNetMask 0.0.0.0
cerent15216EdfaSromIpMgmtDefaultRouterAddress 0.0.0.0
cerent15216EdfaSromIpMgmtHostName ""
```

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 host name (community ID).

Step 3 The changes must be saved prior to terminating the session. See "4.11 Save Changes" section on page 4-11.

Step 4 The system must be rebooted to make the IP address active. Use the **processor reset** command. (See "6.3.6 processor reset Command" section on page 6-12.)

4.3 Log In via LAN Port Using Telnet (Optional)

Provisioning of the ONS 15216 EDFA2 can be accomplished entirely through the RS-232 (EIA/TIA-232) port using CLI commands. After an IP address is assigned, it may be 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 LAN port (see "3.4.5 LAN Interface (Ethernet)" section on page 3-14), the user can configure the module to accept SNMP and CLI commands via Telnet using the following procedure:

Step 1 Connect to the LAN port on the front panel. See "3.4.5.1 LAN Connection Procedure" section on page 3-15.

Step 2 **Click the Microsoft Windows Start menu and select Run**.

Step 3 In the text field, type the following:

```
telnet <ONS 15216 EDFA2 IP address> 8023
```

Specifying port 8023 ensures login through the ASH shell. If no port is specified, the ONS 15216 EDFA2 responds in the shell that the ONS 15216 EDFA2 is set to. (TL1 is the default shell.)

Step 4 Log in again using Step 4 through Step 6 in "4.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal" section on page 4-1.

You are now connected to the ONS 15216 EDFA2 via Telnet.

4.4 Set Date and Time

Use the **snmp attribute set local cerent15216EdfaRtcDateAndTimeLocalString** command to set the date, time, and time zone. Entries must follow this format: "yyyy-m-d,h:m:s.s +h:m". Following the space, the time zone is set as +/– hours from Greenwich Mean Time (GMT) (also designated as universal coordinated time (UTC)) followed by a colon and minutes ahead for daylight savings. For example, Pacific Daylight Time would be –8:60 and Greenwich Mean Time would be +0:0. See Example 4-4.

Example 4-4   Setting the Date and Time

```
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaRtcDateAndTimeLocalString
"2002-6-30,14:8:30.0 -8:60"
```

4.5 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 4-5.

Example 4-5   Setting the Power Bus Mode

```
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaPowerBusMode simplex
```

4.6 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 4-6 displays the output of this command.

Example 4-6   Verifying the Amplifier Operations Status

```
ash:hostname:ONS15216 EDFA2> snmp table display local cerent15216EdfaOverallStatusGroup

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaOverallStatusGroup ::=
{
    cerent15216EdfaInPoweruW =   279;
    cerent15216EdfaInPowerdBm =   -1555;
    cerent15216EdfaOutPowermW =   476;
    cerent15216EdfaOutPowerdBm =  678;
    cerent15216EdfaConstGainOverallGainMeasured =   219;
    cerent15216EdfaVariableGainPreAttenuationMeasured =  10;
};
```

The input power (signal) should be consistent with the input power measured during the optical connection procedure. See the "3.3.2 Optical Connection Procedure" section on page 3-4 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 2-3 on page 2-3.

4.7 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 (signal) level, the network application, and the required receiver specifications necessary for error-free operation. Gain range is provided in Table 3-1 on page 3-5.

To set the amplifier gain, enter the **snmp attribute set local cerent15216EdfaConstGainOverallGain** *gainvalue* command, where *gainvalue* is the desired gain multiplied by ten. For example, if the desired gain is 20 dB, the *gainvalue* would be set to 200. Example 4-7 shows the command used to set the gain.

Example 4-7   Setting the Gain

```
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaConstGainOverallGain
200
```

Note   Prior to changing or implementing gain changes, consult with the Cisco TAC to ensure proper network operation.

4.8 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 on page 4-6.)

Figure 4-1 ONS 15216 EDFA2 Front Panel
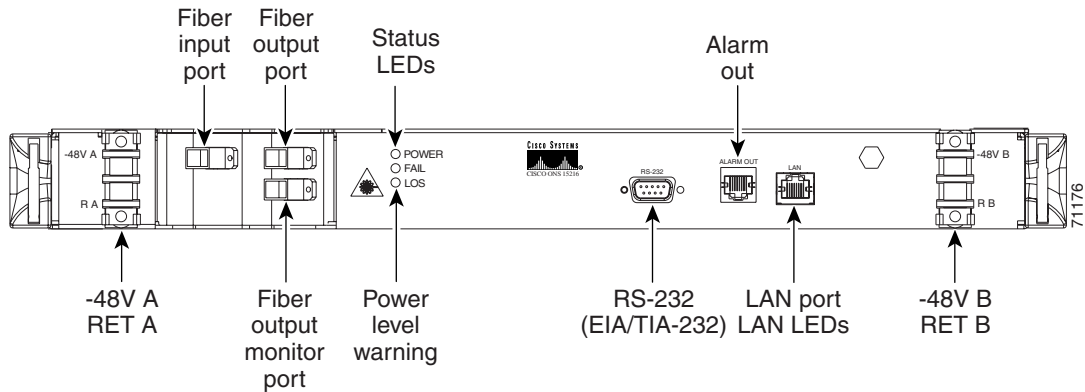
Alarms are reported for the following conditions:

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

Alarms can be connected to a network operations center (NOC) network management system (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 5, "SNMP MIB Configuration" or Chapter 6, "ASH Commands."

To display the alarm thresholds, use the **snmp table display local cerent15216EdfaCfgGroup** command (Example 4-8). This command returns the current alarm threshold default values.

Example 4-8 Displaying the Alarm Thresholds

```
ash:hostname: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 =  410;
    cerent15216EdfaPowerBusDCVoltageMax =  560;
    cerent15216EdfaALSMode =  enabled;
};
```

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 on page 4-7.

Table 4-1   Alarm Threshold Attribute Definitions

Attribute	Variable Definition	Syntax	Maximum Access	Description
cerent15216Edfa CfgSaved	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.
cerent15216Edfa LpoutSetpoint	Loss of output power setpoint	Integer (0 to 1000, 0 default)	Read-only	Can be disregarded when operating amplifier in Constant Gain Temperature Compensated mode (manufacturer default) and Constant Pump Current mode. Setpoint object is only valid when amplifier is used in Constant Output Power and Idle modes.
cerent15216Edfa LpoutDeviation	Loss of output power deviation	Integer (0 to 1000, 200 default)	Read-write	Can be disregarded when operating amplifier in manufacturer default Constant Gain Temperature Compensated mode. Deviation object is only valid when amplifier is used in Constant Output Power and Idle modes.
cerent15216Edfa LpoutHysteresis	Loss of output power hysteresis	Integer (0 to 1000, 100 default)	Read-write	Can be disregarded when operating amplifier in manufacturer default Constant Gain Temperature Compensated mode. Hysteresis object is only valid when amplifier is used in Constant Output Power and Idle modes.
cerent15216Edfa LOSThreshold	Loss of signal (input power) threshold	Integer (–3100 to –1500, –3000 default)	Read-write	Alarm 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 the Cisco TAC 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 in 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
cerent15216Edfa LOSHysteresis	Loss of signal (input power) hysteresis	Integer (0 to 1000, 100 default)	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 the Cisco TAC to determine the correct value for your application. As a guideline, Cisco recommends setting the value 1 dB above the LOS Threshold value. With this setting, the module will clear the alarm if it detects a signal level of 1 dB above the current LOS Threshold value. Valid entries are between 0 and 1000 and are in dB times 100. For example, if the hysteresis required is 1 dB, the power alarm hysteresis is 100.
cerent15216Edfa CtmpMin	Minimum case temperature	Integer (–10 to 10, –5 default)	Read-write	Alarm notifies operations personnel 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. Consult with the Cisco TAC to determine the correct value for your application. As a guideline, Cisco recommends that minimum case temperature be set at 1°C. Valid entries are between –10 and 10°C.
cerent15216Edfa CtmpMinHysteresis	Minimum case temperature hysteresis	Integer (0 to 10, 1 default)	Read-write	Used to set the amount that the case temperature of the module must rise above the minimum case temperature alarm level before the alarm is cleared. Set the hysteresis at a value that is appropriate for the application so that the alarm condition clears when the input is stable. Consult with the Cisco TAC to determine the correct value for your application. As a guideline, Cisco recommends that the hysteresis value be set at 1°C. Valid entries are between 0 and 10°C. Setting this value to 0 disables this option.

Table 4-1   Alarm Threshold Attribute Definitions (continued)

Attribute	Variable Definition	Syntax	Maximum Access	Description
cerent15216Edfa CtmpMax	Maximum case temperature	Integer (20 to 70, 70 default)	Read-write	Alarm 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 the Cisco TAC to determine the correct value for your application. As a guideline, Cisco recommends that maximum case temperature value be set at 50°C. Valid entries are between 20 and 70°C.
cerent15216Edfa CtmpMaxHysteresis	Maximum case temperature hysteresis	Integer (0 to 10, 1 default)	Read-write	Used to set the amount that the case temperature of module must drop below the maximum case temperature alarm level before the alarm is cleared. Set the hysteresis at a value that is appropriate for the application so that the alarm condition clears when the input is stable. Consult with the Cisco TAC to determine the correct 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.

Table 4-1   Alarm Threshold Attribute Definitions (continued)

Attribute	Variable Definition	Syntax	Maximum Access	Description
cerent15216Edfa PowerBusDCVolt ageMin	Power bus minimum voltage	Integer (350 to 700, 420 default)	Read-write	Minimum allowable power bus DC voltage. The default minimum power bus voltage is set at –42 VDC. Valid entries are between 350 and 700 and are in negative volts times 10. For example, if the voltage required is –40 VDC, the power bus setting is 400. The power bus threshold has a 1.5V tolerance and a 1.0V hysteresis. There is a potential ±1.5V inaccuracy in the ONS 15216 EDFA2 voltage measurement. If the minimum threshold is configured at 420 (-42 VDC), the may raise anywhere between -42 to -40.5V and will not clear until the voltage measures above -43 VDC.
cerent15216Edfa PowerBusDCVolt ageMax	Power bus maximum voltage	Integer (350 to 700, 570 default)	Read-write	Maximum allowable power bus DC voltage. The default maximum power bus voltage is set at –57 VDC. Valid entries are between 350 and 700 and are in negative volts times 10. For example, if the voltage required is –57 VDC, the power bus setting is 570. The power bus threshold has a 1.5V tolerance and a 1.0V hysteresis. There is a potential ±1.5V inaccuracy in the ONS 15216 EDFA2 voltage measurement. If the maximum threshold is configured at 570 (-57 VDC), the alarm may raise anywhere between -57 to -58.5V and will not clear until the voltage measures below -56 VDC.

4.9 Set Password

To restrict access to the ONS 15216 EDFA2, use the **user passwd set** command to change the default user password. The password must be a string of up to 10 characters, where at least 2 are non-alphabetic characters and at least 1 is a special character. With the exception of the administrator access level (read_write_admin), users can only modify their own passwords. For additional information on user levels, refer to . displays the command.

Example 4-9   Changing Current User's Password

```
ash:hostname:ONS15216 EDFA2> user passwd set
Password =
****
```

```
New Password =
******
Confirm 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.

4.10 Add Users

Use the **user entry create** command to add new users to the ONS 15216 EDFA2. The syntax is to enter
the command followed by the user name and then the access level (read, read_write, read_write_admin)
as shown in Example 4-10. The ONS 15216 EDFA2 responds with a request for the password.

Passwords must be an ASCII string of up to 10 characters, where at least 2 are non-alphabetic characters with
at least one special character. Special characters are +, #, and %.

Example 4-10   Adding a New User

```
ash:hostname:ONS15216 EDFA2> user entry create janedoe read_write
New Password =
*********
Confirm New Password =
*********
```

4.11 Save Changes

To ensure that the 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 4-11).

Example 4-11   Saving Changes

```
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaOpSaveConfig perform
```

Most SNMP configuration attributes require the above save command before terminating the session
(does not apply to TL1 shell). The exceptions to this save requirement (the attributes that are
automatically saved) are shown below:

- cerent15216EdfaPowerBusMode
- cerent15216EdfaPowerBusDCVoltageMin
- cerent15216EdfaPowerBusDCVoltageMax
- cerent15216EdfaALSMode
- cerent15216EdfaPumpCfgControlMode and the corresponding pump control value
- cerent15216EdfaConstGainOverallGain
- cerent15216EdfaVariableGainPreAttenuation
- SromIpMgmtGroup attributes:
  - cerent15216EdfaSromIpMgmtEnetAddress

- cerent15216EdfaSromIpMgmtEnetSubNetMask
        - cerent15216EdfaSromIpMgmtDefaultRouterAddress
        - cerent15216EdfaSromIpMgmtHostName
    - BootTable attributes:
        - cerent15216EdfaBootModuleIndex
        - cerent15216EdfaBootEntryIndex
        - cerent15216EdfaBootType
        - cerent15216EdfaBootIpAddress
        - cerent15216EdfaBootFileName

4.12 Log Off

At the end of a session, the user must log off of the ONS 15216 EDFA2. To log off, use the **logoff** command. This is shown in Example 4-12.

Example 4-12   Logging Off

```
ash:hostname:ONS15216 EDFA2> logoff
```

4.13 Back Up System Configuration

The configuration information for the ONS 15216 EDFA2 can be saved in a file for later use or to configure other ONS 15216 EDFA2 units. This file contains manufacturing information about the unit that is being backed up (such as part number and serial number), setup information for the unit (such as IP address and host name), all configuration information (such as alarm thresholds and pump mode), and the user database.

The backup file is saved with cyclic redundancy code (CRC) to ensure data integrity, and the user names, passwords, and other system settings are encrypted for security. The file header, which identifies the node name, IP address, and software version, is text readable. Only the configuration information and user database are copied back to the ONS 15216 EDFA2 during a restore.

Step 1   Back up the system configuration to a file on the FFS.

```
ash:hostname:ONS15216 EDFA2> backup system filename
```

The system responds with progress information:

```
Trying to Backup the system configuration to file filename...
Backup SNMP Data...
DONE!...
Backup NON-SNMP Config...
DONE!...
Backup USER/PASSWD Accts...
DONE!...
CRC = 6cce1bd9
Backup DONE!
```

Step 2   If desired, use FTP to copy the file to a remote server. See "7.1.2 Example of FTP to a Remote Server" section on page 7-2.

4.14 Restore System Configuration

The configuration information for the ONS 15216 EDFA2 can be restored form a file. During this process, all configuration information (such as alarm thresholds and pump mode) and the user database from the file are replaced in the ONS 15216 EDFA2 memory and FFS.

Before the restore begins, a cyclic redundancy code (CRC) check is performed to ensure data integrity.

Step 1   If desired, use FTP to copy a system configuration file from a remote server to the ONS 15216 EDFA2 FFS. See "7.1.1 Example of FTP from a Remote Server" section on page 7-1.

Step 2   Restore the system configuration from the file on the FFS.

```
ash:hostname:ONS15216 EDFA2> restore system filename
```

The system responds with progress information:

```
Restoring the system configuration from file filename...
CRC Check OK
Restore SNMP Configuration...
...............
DONE!...
Restore NON SNMP Configuration...
user inactivity modify read_write_admin 15
user inactivity modify read_write      30
user inactivity modify read            60
shell type modify  ash
tl1 sid modify foo
manufacturer keep_alive modify -idle 1 -interval 75 -retries 9
snmp attribute set local cerent15216EdfaSromIpMgmtHostName "newhostname"
DONE!...

Restore USER INFO...
DONE!...
Restore DONE!
```

Step 3   Reboot the ONS 15216 EDFA2.

```
ash:hostname:ONS15216 EDFA2> processor reset
```

After the processor reboots, user names and passwords from the new user database must be used for access.

5

SNMP MIB Configuration

This chapter explains how to read and understand SNMP MIB as it relates to the Cisco 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 with ASH and SNMP."

5.1 SNMP Overview

Simple Network Management Protocol (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 a NMS.

The ONS 15216 EDFA2 SNMP implementation uses proprietary and 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.

5.1.1 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.

5.1.2 ONS 15216 EDFA2 SNMP Elements

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

- SNMP agent
- SNMP MIB
- SNMP manager

The SNMP elements are shown in Figure 5-1.

Figure 5-1   SNMP Elements
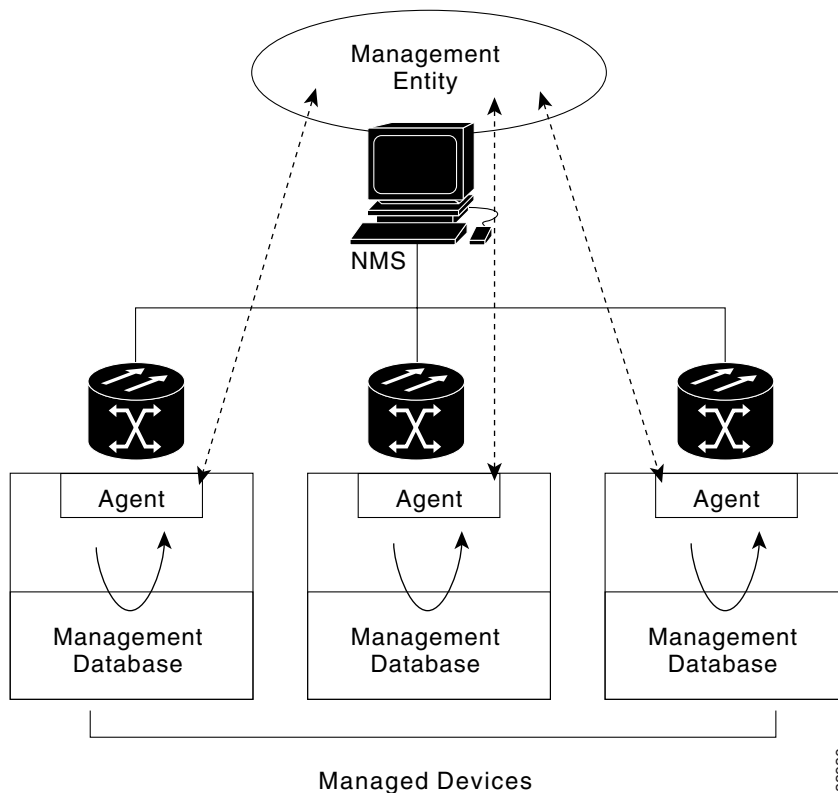
5.1.2.1 SNMP Agent

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 shows the relationship between the SNMP agent and the MIB.

Figure 5-2   SNMP Agent and MIB
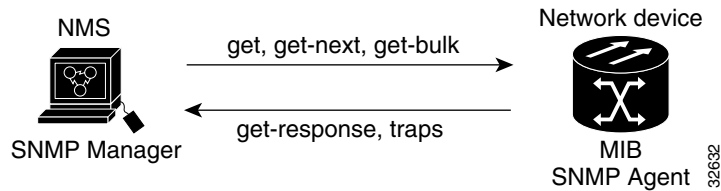
5.1.2.2 SNMP MIBs

The SNMP MIBs are files written in ASN.1 syntax. The MIBs specify what ONS 15216 EDFA2 information needs to be controlled and monitored. The MIBs are pre-installed on the SNMP agent and are accessible via the CLI. Table 5-1 lists the proprietary MIBs for the ONS 15216 EDFA2.

Table 5-1   SNMP MIB Files

File Name	MIB Name	Description
CERENT-15216-EDFA -MIB.mib	CERENT-15216-EDFA -MIB	The definitions of objects for managing and monitoring the ONS 15216 EDFA2.
CERENT-GLOBAL-RE GISTRY.mib	CERENT-GLOBAL-RE GISTRY	The global registrations for all other Cisco OTBU MIB modules.

The ONS 15216 EDFA2 also supports the RFC MIBS listed in Table 5-2. Note that some attributes and tables from these MIBS are not applicable or not implemented in the ONS 15216 EDFA2.

Table 5-2   Supported RFC SNMP MIB Files

File Name	MIB Name	Description
rfc1213.mib	RFC1213-MIB	The system MIB.
rfc1659.mib	RS-232-MIB	The MIB module for RS-232-like hardware devices.
rfc1907.mib	SNMPv2-MIB	The MIB module for SNMPv2 entities.
rfc2011.mib	IP-MIB	The MIB module for managing IP and ICMP implementations, but excluding their management of IP routes.
rfc2012.mib	TCP-MIB	The MIB module for managing TCP implementations.
rfc2013.mib	UDP-MIB	The MIB module for managing UDP implementations.
rfc2233.mib	IF-MIB	The MIB module to describe generic objects for network interface sub-layers. This MIB is an updated version of MIB-II's ifTable, and incorporates the extensions defined in RFC 1229.
rfc2737.mib	ENTITY-MIB	The MIB module for representing multiple logical entities supported by a single SNMP agent.

The CERENT-15216-EDFA-MIB.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, uses the SNMP MIBs to communicate with the SNMP agent.

5.1.2.3 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.

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 an 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.

5.1.3 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.

A 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 5-3 describes SNMP operation types.

Table 5-3   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.

5.1.4 Command Syntax Using the SNMP Agent

Although Cisco has its own separate SNMP manager (Cisco Transport Manager [CTM]), management of the ONS 15216 EDFA2 is also possible using the built-in SNMP manager via the command line in the ASH shell, as described in the "6.6 SNMP Commands" section on page 6-14. The example commands and command syntax described in this manual are based on using the built-in ONS 15216 EDFA2 SNMP manager through the ASH shell CLI.

Commands can be issued via Telnet over a LAN or directly through the RS-232 (EIA/TIA-232) port on the module. (See Chapter 3, "Installation" for more information.) After setting up a connection to the module and entering a password and user name, the following prompt appears:

```
ash:hostname:ONS15216 EDFA2>
```

To communicate with the module using SNMP, the command must begin with "snmp". To view a list of possible SNMP operations, enter "snmp" followed by a space and press the **Tab** key. (See Example 5-1.)

Example 5-1   snmp Command Followed by the Tab Key

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

Continue to enter operations from the list until the complete command is created. (See Example 5-2.)

Example 5-2   snmp table display Command

```
ash:hostname:ONS15216 EDFA2> snmp table display local cerent
        cerent15216EdfaCommunityEntry
        cerent15216EdfaCommTrapEntry
        cerent15216EdfaViewEntry
        cerent15216EdfaAgentControlGroup
        cerent15216EdfaActionOpGroup
        cerent15216EdfaLogEventControl
        cerent15216EdfaLogEventEntry
        cerent15216EdfaBootEntry
        cerent15216EdfaBootImageEntry
        cerent15216EdfaRtcDateAndTime
        cerent15216EdfaSromIpMgmtGroup
        cerent15216EdfaCfgGroup
        cerent15216EdfaOverallControl
        cerent15216EdfaPumpCfgEntry
        cerent15216EdfaOverallStatusGroup
        cerent15216EdfaPumpStatusEntry
        cerent15216EdfaAlarmEntry
        cerent15216EdfaVersionGroup
        cerent15216EdfaFfsFileEntryGroup
        cerent15216EdfaFfsOpGroup
        ...
```

5.2 Enabling SNMP Remote Management Community Strings

SNMP communities are groupings of workstations and servers (or gateways) that can manage the ONS 15216 EDFA2. NMSs 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:

- 5.2.1 Creating a View, page 5-6
- 5.2.2 Creating a Community Entry, page 5-8

The ONS 15216 EDFA2 has the two default community strings listed in Table 5-4.

Table 5-4   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.

5.2.1 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 the Cisco TAC before modifying these settings.

5.2.1.1 Set View Entry

Command Types   **snmp row set local cerent15216EdfaViewEntry**

Syntax Description   **snmp row set local cerent15216EdfaViewEntry** *view_index_# subtree*

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. *view_index_#* 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

```
ash:hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaViewEntry 1 cerent

cerent15216EdfaViewMask '0'H
cerent15216EdfaViewType included
cerent15216EdfaViewStatus
        active
        notInService
        notReady
        createAndGo
        createAndWait
        destroy
cerent15216EdfaViewStatus createAndGo

ash:hostname:ONS15216 EDFA2> snmp row display local cerent15216EdfaViewEntry 1 sample
CLASS cerent15216Edfa-AGENT-MIB.cerent15216EdfaViewEntry ::=
{
    cerent15216EdfaViewIndex =  1;
    cerent15216EdfaViewSubtree =  { sample };
    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 5-5 describes the command and MIB view prompts.

Table 5-5   Creating a View

Data Prompt	Command	Description
cerent15216EdfaViewIndex	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.
cerent15216EdfaViewSubTree	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.
cerent15216EdfaViewMask	'0'H	A bit mask that identifies objects in the subtree.
cerent15216EdfaViewType	included	A flag that specifies the status of the view. Valid entries are included and excluded.
cerent15216EdfaViewStatus	createAndGo	If the entry currently exists, use active. (CreateAndGo cannot be used if any entry exists.)

5.2.2 Creating a Community Entry

SNMP communities are groupings of workstations and servers (or gateways) that can manage the ONS 15216 EDFA2. NMSs 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 the Cisco TAC before modifying these settings.

5.2.2.1 Set CommunityEntry

Command Types   **snmp row set local cerent15216EdfaCommunityEntry**

Syntax Description   **snmp row set local cerent15216EdfaCommunityEntry** *community_index_#*

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 5-6 on page 5-9 for information concerning data for each prompt.

Example 5-4   cerent15216EdfaCommunityEntry Set Command

```
ash:hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaCommunityEntry 3

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 5-6 displays the definitions for the community entry values.

Table 5-6   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 Example 5-4 on page 5-8, it is "3".
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 Table 5-7 on page 5-10 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.

Note   To create a community entry that is restricted to a single IP address, set the community attribute cerent15216EdfaCommNetMask to 255.255.255.255.

5.2.2.2 Display CommunityEntry

Command Types   **snmp row display local cerent15216EdfaCommunityEntry**

Syntax Description   **snmp row display local cerent15216EdfaCommunityEntry** *community_index_#*

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

```
ash: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 5-7 displays the decimal values for the following SNMP operations.

Table 5-7   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.

5.3 Setting Up for CTM Access

Use the following procedure to configure a new ONS 15216 EDFA2 for Cisco Transport Manager (CTM) access:

Step 1   Log into the serial port. Use 19,000 bps, 8 bits, no parity, 1 stop, and no flow control over a male-to-female straight 9-pin cable.

Amp01:ONS15216 EDFA2> **ACT-USER::CISCO15:123::;**

Step 2   Set the default user password to admin15##:

Amp01:ONS15216 EDFA2> **ED-PID::CISCO15:124::,admin15##;**

Step 3   Enter the IP address and node name configuration information:

Amp01:ONS15216 EDFA2> **ED-NE-GEN:::125:::NAME=   ,IPADDR=   ,IPMASK=   ,DEFRTR=   ;**

Step 4   Set the date and time:

Amp01:ONS15216 EDFA2> **ED-DAT:::126::2003-06-18,08-49-00;**

Step 5   Activate the new IP address by rebooting:

Amp01:ONS15216 EDFA2> **INIT-SYS::ALL:127::1;**

Step 6   Telnet to the ASH shell by typing the following:

telnet <ONS 15216 EDFA2 IP address> 8023

Step 7   Login using the user name CISCO15 and the password admin15##.

Step 8   Enter the community information:

```
ash:hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaCommunityEntry 2 (Do not
use Entry 1 which is the RO public community)
cerent15216EdfaCommIndex = 2    (if the CommunityEntry is 2)
cerent15216EdfaCommName = "private"    (must match the CTM community string entry)
cerent15216EdfaCommViewIndex = 1
cerent15216EdfaCommPrivileges = 255
cerent15216EdfaCommSrcIPAddr = 0.0.0.0    (for more security, enter CTM A's IP address)
cerent15216EdfaCommNetMask = 255.255.255.255
cerent15216EdfaCommStatus = 4
(active(1),notInService(2),notReady(3),createAndGo(4),createAndWait(5),destroy(6))

ash:hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaCommunityEntry 3

cerent15216EdfaCommIndex = 3    (if the CommunityEntry is 3)
cerent15216EdfaCommName = "private"    (must match the CTM community string entry)
cerent15216EdfaCommViewIndex = 1
cerent15216EdfaCommPrivileges = 255
cerent15216EdfaCommSrcIPAddr = 0.0.0.0    (for more security, enter CTM B's IP address)
cerent15216EdfaCommNetMask = 255.255.255.255
cerent15216EdfaCommStatus = 4
(active(1),notInService(2),notReady(3),createAndGo(4),createAndWait(5),destroy(6))
```

Step 9   Verify the community information:

```
ash:hostname:ONS15216 EDFA2> snmp table display local cerent15216EdfaCommunityEntry
```

Step 10   Enter the trap destination information. The Trap Community must match the SNMP Community string used in CTM:

```
ash:hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaCommTrapEntry 1

cerent15216EdfaCommTrapCommunity "private"
cerent15216EdfaCommTrapDestIPAddress <CTM A's IP address>
cerent15216EdfaCommTrapDestUDPPort 162
cerent15216EdfaCommTrapViewIndex 1
cerent15216EdfaCommTrapVersion v2
cerent15216EdfaCommTrapStatus 4

ash:hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaCommTrapEntry 2

cerent15216EdfaCommTrapCommunity "private"
cerent15216EdfaCommTrapDestIPAddress <CTM B's IP address>
cerent15216EdfaCommTrapDestUDPPort 162
cerent15216EdfaCommTrapViewIndex 1
cerent15216EdfaCommTrapVersion v2
cerent15216EdfaCommTrapStatus 4
```

Step 11   Verify the trap destination information:

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

Step 12   Enable traps:

```
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaAgentTrapEnable 1
```

Step 13   Verify that traps are enabled:

```
ash:hostname:ONS15216 EDFA2> snmp attribute get local cerent15216EdfaAgentTrapEnable
```

Step 14   Set network element (NE) ID:

```
ash:hostname:ONS15216 EDFA2> snmp attribute set local sysName <NE ID>
```

Step 15 Save the new settings:

ash:*hostname*:ONS15216 EDFA2> **snmp attribute set local cerent15216EdfaOpSaveConfig perform**

Step 16 Log off:

ash:*hostname*:ONS15216 EDFA2> **logoff**

5.4 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:

5.4.1 ActionOpGroup

The cerent15216EdfaActionOpGroup table is used to perform operations on the agent. Table 5-8 lists the table variables.

Table 5-8   cerent15216EdfaActionOpGroup Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa ActionOpStatus	idle(1), pending(2), inProgress(3), aborted(4)	Read-only	The status of the current operation.
cerent15216Edfa ActionOpResult	Integer (-2147483647 to 2147483647)	Read-only	This value saves the error result (if any) of the last operation. 0 indicates success.
cerent15216Edfa ActionOpReset	idle(1), perform(2), abort(3)	Read-write	This object resets the Management Module (not the Optical Module) when the "perform" value is written to it. The reset is delayed by approximately 2 seconds to allow SNMP response to be sent to the manager before the reset is performed.
cerent15216Edfa ActionOpSaveConfig	Display String (1 to 20 characters)	Read-write	To save the configuration of the SNMP agent on the Management Module, write the destination file name to this object. The most recent version of the destination file is saved as <name>.bak. **Note:** The agent automatically reads the configuration from 'snmp.cfg' at startup. Saving to other file names does not change this.

5.4.2 AgentControlGroup

The cerent15216EdfaControlGroup table is used to control the agent. Table 5-9 lists the table variables.

Table 5-9   cerent15216EdfaControlGroup Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa AgentTrapEnable	enabled(1), disabled(2)	Read-write	Allows the generation of traps from the agent.
cerent15216Edfa AgentNotificationNumber	Integer (0 to 2147483647)	Read-only	The number of traps dispatched since the reboot.

5.4.3 AlarmEntry

The cerent15216EdfaAlarmEntry table is used to display and control alarms. The associated table command provides a summary of all alarms. Table 5-10 describes the table variables.

Table 5-10   cerent15216EdfaAlarmEntry Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa AlarmIndex	Integer (1 to 2048)	Not Accessible	A unique value to identify this entry.
cerent15216Edfa AlarmID	unknownAlarm(1), lcrnt1(2), lcrnt2(3), ltmp1(4), ltmp2(5), lpout(6), lpin(7), gain(8), ctmp(9), powerBusA(10), powerBusB(11), dbBackup(12), dbRestore(13), swDownload(14)	Read-only	The alarm this entry refers to.
cerent15216Edfa AlarmPriority	noAlarm(1), info(2), minor(3), major(4), critical(5)	Read-only	The reporting priority of this alarm.
cerent15216Edfa AlarmState	active(1), disabled(2), cleared(3)	Read-only	The reporting state of this alarm.
cerent15216Edfa AlarmEnableStatus	enabled(1), disabled(2)	Read-write	If the alarm is enabled/disabled.
cerent15216Edfa AlarmDateAndTime	Cerent15216EdfaDateAndTimeString	Read-only	The local date and time when the alarm entered its current state.
cerent15216Edfa AlarmCfgPriority	noAlarm(1), info(2), minor(3), major(4), critical(5)	Read-write	The configured priority of this alarm.

5.4.4 BootEntry

The cerent15216EdfaBootEntry table is used to determine the boot source image for the bootable modules. The table contains up to four entries, and the module tries these sources in turn until an image is successfully loaded. Table 5-11 lists the table variables.

Table 5-11   cerent15216EdfaBootEntry Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa BootModuleIndex	Integer (1 to 63)	Not accessible	The index of this module within the chassis.
cerent15216Edfa BootEntryIndex	Integer (1 to 4)	Not accessible	The index of this boot entry for this module.
cerent15216Edfa BootType	tftp(1), flash(2), bootp(3), shell(4), noLoad(5)	Read-write	The boot record type.

Table 5-11   cerent15216EdfaBootEntry Variable Descriptions (continued)

Variable	Syntax	Maximum Access	Description
cerent15216Edfa BootIpAddress	IpAddress	Read-write	IP address for boot server when using TFTP or bootp. It is 0.0.0.0 otherwise.
cerent15216Edfa BootFileName	Display String (1 to 33 characters)	Read-write	The file to be loaded. This may include a path component. For example if BootType is TFTP, this object represents the location of the file relative to the TFTP server's root directory and may have a form like images/image1.

5.4.5 BootImageEntry

The cerent15216EdfaBootImageEntry table contains the boot and running software image name and revision information for each bootable module. Table 5-12 lists the table variables.

Table 5-12   cerent15216EdfaBootImageEntry Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa BootImageModul eIndex	Integer (1 to 63)	Not accessible	The index of this module within the chassis.
cerent15216Edfa BootImageType	bootLoader(1), runTime(2)	Not accessible	The type of this image.
cerent15216Edfa BootImageName	Display String (0 to 10 characters)	Read-only	The name of the image.
cerent15216Edfa BootImageFileN ame	Display String (1 to 33 characters)	Read-only	The file name of the image with no path component.
cerent15216Edfa BootImageRevM ajor	Integer (0 to 255)	Read-only	The major revision number of the image.
cerent15216Edfa BootImageRevM inor	Integer (0 to 255)	Read-only	The minor revision number of the image.
cerent15216Edfa BootImageRevIn terim	Integer (0 to 255)	Read-only	The interim revision number of the image.

5.4.6 CfgGroup

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 5-13 for variable definitions. For more information on alarm thresholds, see the "4.8 Set Alarm Thresholds" section on page 4-5.

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

Table 5-13   cerent15216EdfaCfgGroup Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa CfgSaved	Truth Value (true default)	Read-only	Indicates whether the current configuration has been saved. The object cerent15216EdfaOpSaveConfig can be used to save the current configuration.
cerent15216Edfa LpoutSetpoint	Integer (0 to 1000, 0 default)	Read-only	Laser pump output power setpoint for the Lpout alarm, in units of 0.1 mW. This is set automatically when the pump mode for pump 2 is set to cerent15216EdfaPumpCfgConstPumpPower or cerent15216EdfaPumpCfgConstOutPower.
cerent15216Edfa LpoutDeviation	Integer (0 to 1000, 200 default)	Read-write	Amount by which the output power must deviate from the setpoint to set the Lpout alarm, in units of 0.01 dB. For example, a value of 200 is actually 2.00 dB.
cerent15216Edfa LpoutHysteresis	Integer (0 to 1000, 100 default)	Read-write	Amount the output power must move towards the setpoint before the Lpout alarm is cleared, in units of 0.01 dB. For example, a value of 100 is actually 1.00 dB.
cerent15216Edfa LOSThreshold	Integer (–3100 to –1500, –3000 default)	Read-write	Loss of signal threshold, in units of 0.01 dBm. For example, a value of -3000 is actually -30.0 dBm.
cerent15216Edfa LOSHysteresis	Integer (0 to 1000, 100 default)	Read-write	Amount above cerent15216EdfaLOSThreshold the input signal must rise before the Lpin alarm is cleared, in units of 0.01 dB. For example, a value of 100 is actually 1.0 dB.
cerent15216Edfa CtmpMin	Integer (–10 to 10, –5 default)	Read-write	Minimum allowable case temperature in degrees Celsius.
cerent15216Edfa CtmpMinHysteresis	Integer (0 to 10, 1 default)	Read-write	Amount above cerent15216EdfaCtmpMin that the case temperature must rise before the Ctmp alarm is cleared, in degrees Celsius.
cerent15216Edfa CtmpMax	Integer (20 to 70, 70 default))	Read-write	Maximum allowable case temperature in degrees Celsius.
cerent15216Edfa CtmpMaxHysteresis	Integer (0 to 10, 1 default)	Read-write	Amount below cerent15216EdfaCtmpMax that the case temperature must drop before the Ctmp alarm is cleared, in degrees Celsius.
cerent15216Edfa CLEI	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 not changed by the user.
cerent15216Edfa PowerBusMode	**simplex(1), duplex(2)**	Read-write	Simplex for one power source (Bus A) or duplex for redundant power source (Bus A and Bus B) Power Bus mode.

Table 5-13   cerent15216EdfaCfgGroup Variable Descriptions (continued)

Variable	Syntax	Maximum Access	Description
cerent15216Edfa PowerBusDCVolt ageMin	Integer (350 to 700, 420 default)	Read-write	Minimum allowable power bus DC voltage, in units of -0.1V. For example, a value of 420 is actually -42.0V. The power bus threshold has a 1.5V tolerance and a 1.0V hysteresis. If the minimum threshold is configured at 420 (-42 VDC), the alarm may raise anywhere between -42 to -40.5V and will not clear until the voltage goes above -43 VDC.
cerent15216Edfa PowerBusDCVolt ageMax	Integer (350 to 700, 570 default)	Read-write	Maximum allowable power bus DC voltage, in units of -0.1V. For example, a value of 570 is actually -57.0V. The power bus threshold has a 1.5V tolerance and a 1.0V hysteresis. If the maximum threshold is configured at 570 (-57 VDC), the alarm may raise anywhere between -57 to -58.5V and will not clear until the voltage goes below -56V.
cerent15216Edfa ALSMode	enabled(1), disabled(2)	Read-write	Automatic Laser Shutdown. If enabled, then when LOS is detected, the amplifier is shut down to 0 mW output power, and when LOS is cleared, the amplifier mode is restored to the before shutdown state.

5.4.7 FfsFileEntry

The cerent15216EdfaFfsFileEntry table contains status information about the files within the file system. Table 5-14 lists the table variables.

Table 5-14   cerent15216EdfaFfsFileEntry Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa FfsFileName	Display String (1 to 20 characters)	Not Accessible	The name of this file.
cerent15216Edfa FfsFileType	directory(1), sequenced(2), record(3), unknown(4)	Read-only	The type of this file. "sequenced" is a normal text file.
cerent15216Edfa FfsFileStatus	deleted(65528), ok(65532), renameSource(65534), unInitialised(65535)	Read-only	The status of this file.
cerent15216Edfa FfsFileLength	Integer	Read-only	The length of this file (-1 for cerent15216EdfaFfsFileType = record).
cerent15216Edfa FfsFileAttributes	Unsigned32	Read-only	The attributes field for this file.

5.4.8 FfsOpGroup

The cerent15216EdfaFfsOpGroup table contains information on performing operations on the Flash File System. Table 5-15 lists the table variables.

Table 5-15   cerent15216EdfaFfsOpGroup Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa FfsOpAction	idle(1), perform(2), abort(3)	Read-write	Start or abort a file operation.
cerent15216Edfa FfsOpOperation	cerent15216EdfaFfsNoOperation(1), cerent15216EdfaFfsTftpGet(2), cerent15216EdfaFfsTftpPut(3), cerent15216EdfaFfsTftpGetRecord(4), cerent15216EdfaFfsTftpPutRecord(5), cerent15216EdfaFfsCopy(6), cerent15216EdfaFfsRename(7), cerent15216EdfaFfsCompress(8), cerent15216EdfaFfsDelete(9)	Read-write	Indicates the current (or last) action performed on the flash file system. Note that cerent15216EdfaFfsTftpGet and cerent15216EdfaFfsTftpPut transfer normal text or image files.
cerent15216Edfa FfsOpStatus	idle(1), pending(2), inProgress(3), aborted(4)	Read-only	The status of the operation.
cerent15216Edfa FfsOpStage	idle(1), flashDirOpen(2), flashDirClose(3), srcFileOpen(4), dstFileOpen(5), srcFileClose(6), dstFileClose(7), readData(8), writeData(9), rename(10), delete(11), findFile(12), compress(13), nextRecord(14)	Read-only	Indicates the current (or last) stage of the action performed on the flash file system.
cerent15216Edfa FfsOpCopyProgr ess	Integer	Read-only	This provides an indication of the progress of the copy operation. For normal files this shows bytes copied.
cerent15216Edfa FfsOpResult	Integer	Read-only	Indicates the result of the last operation. Success is indicated by a value of 0.
cerent15216Edfa FfsOpRequestId	Integer	Read-write	The request identifier for this operation. This is provided to allow managers to match actions and results.
cerent15216Edfa FfsOpSrcName	Display String (0 to 127 characters)	Read-write	Source file name for the operation. Note that Flash File System names are limited to 20 bytes - the longer name supports long path names for TFTP operations from servers.

Table 5-15   cerent15216EdfaFfsOpGroup Variable Descriptions (continued)

Variable	Syntax	Maximum Access	Description
cerent15216Edfa FfsOpDstName	Display String (0 to 127 characters)	Read-write	Destination file name for the operation. Note that Flash File System names are limited to 20 bytes - the longer name supports long path names for TFTP operations from servers.
cerent15216Edfa FfsOpTftpSrvAd dr	IpAddress	Read-write	TFTP file server IP address.

5.4.9 LogEventControl

The cerent15216EdfaLogEventControl table controls the event log. Table 5-16 lists the table variables.

Table 5-16   cerent15216EdfaLogEventControl Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa LogEventClear	idle(1), perform(2), abort(3)	Read-write	Use this attribute to clear all logged events from the cerent15216EdfaLogEventTable.

5.4.10 LogEventEntry

The cerent15216EdfaLogEventEntry table contains the log information for each event. Table 5-17 lists the table variables.

Table 5-17   cerent15216EdfaLogEventEntry Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa LogEventIndex	Integer (1 to 2048)	Not Accessible	A unique value to identify this logged event.
cerent15216Edfa LogEventID	Autonomous Type	Read-only	he logged event this entry refers to.
cerent15216Edfa LogEventPriority	noAlarm(1), info(2), minor(3), major(4), critical(5)	Read-only	The priority of this logged event.
cerent15216Edfa LogEventType	active(1), cleared(2), trap(3)	Read-only	The type of logged event.

Table 5-17   cerent15216EdfaLogEventEntry Variable Descriptions (continued)

Variable	Syntax	Maximum Access	Description
cerent15216Edfa LogEventSlot	Integer (-1 to 15)	Read-only	Index of the slot reporting the logged event. -1 implies no slot.
cerent15216Edfa LogEventPort	Integer (0 to 15)	Read-only	Index of the port reporting the logged event. 0 implies no port.
cerent15216Edfa LogEventTime	TimeStamp	Read-only	The value of sysUpTime when the logged event happened.
cerent15216Edfa LogEventDateAn dTime	Cerent15216Edfa DateAndTimeStr ing	Read-only	The local date and time when the logged event happened. If the node does not support a run-time clock the string is blank.
cerent15216Edfa LogEventForms DateAndTime	Cerent15216Edfa DateAndTimeFor msString	Read-only	The local date and time when the logged event happened. If the node does not support a run-time clock the string is blank.

5.4.11 OpGroup

The cerent15216EdfaOpGroup table is used to display or set operation actions, such as saving configuration or loading new software. The individual variables in Table 5-18 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 5-18   cerent15216EdfaOpGroup Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa OpStatus	idle(1), pending(2), inProgress(3), aborted(4)	Read-only	The status of the current operation.
cerent15216Edfa OpResult	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. For DB backup and restore the following results are possible: 0: Success. 1: Restore or backup operation cannot obtain the db semaphore. This error should never occur because the cerent15216EdfaOpGroup MIB implementation does not allow more than one operation to be in progress at a time. 2: This will occur if there is a problem with opening cerent15216EdfaOpDbFileName. This could be because the file system is full, the file does not exist in the case of a restore, or the file already exists on the file system in the case of a backup. 3: This occurs if the backup procedure cannot obtain a configuration value. 4: This occurs during a restore if the CRC in file specified by cerent15216EdfaOpDbFileName is not correct. For example, a corrupted backup file. 5: This occurs during a restore if there is a parsing error. This could occur if the backup file was created by a version of software that is not compatible with the current software version. -1: Unknown internal failure.
cerent15216Edfa OpRequestId	Integer	Read-write	The request identifier for this operation. This is provided to allow managers to match results with actions.
cerent15216Edfa OpSaveConfig	idle(1), perform(2), abort(3)	Read-write	To save the configuration of the management and optical modules, write "perform" to this object.

Table 5-18   cerent15216EdfaOpGroup Variable Descriptions (continued)

Variable	Syntax	Maximum Access	Description
cerent15216Edfa OpCutover	idle(1), perform(2), abort(3)	Read-write	When "perform" is written to this object, a cutover occurs where the cerent15216EdfaAlternateVersion software image will be loaded after a Management Module reset. The cutover operation is achieved automatically by swapping cerent15216EdfaBootEntry 1 & 2, then performing a Management Module reset. That is, the pre-reset cerent15216EdfaAlternateVersion becomes the post-reset cerent15216EdfaCurrentVersion and vice-versa.
cerent15216Edfa OpLoad	idle(1), perform(2), abort(3)	Read-write	When "perform" is written to this object, a new software image is downloaded via TFTP. Before setting this attribute, the source of the new software image should be specified by setting cerent15216EdfaOpSrcFileName and cerent15216EdfaOpTftpSrvAddr.
cerent15216Edfa OpSrcFileName	Display String (0 to 127 characters)	Read-write	Source file name for the Load operation. This must include the path of the file relative to the TFTP server's root directory, e.g. images/image1.
cerent15216Edfa OpTftpSrvAddr	IpAddress	Read-write	TFTP file server address for the Load operation.
cerent15216Edfa OpReset	idle(1), perform(2), abort(3)	Read-write	When "perform" is written to this object, a software reset is performed. The reset is delayed by approximately 10 seconds to allow SNMP response to be sent to the manager before the reset is performed.
cerent15216Edfa OpDbFileName	Display String (0 to 20 characters)	Read-write	Database file name for the Db Backup and Db Restore operations.
cerent15216Edfa OpDbBackup	idle(1), perform(2), abort(3)	Read-write	When "perform" is written to this object, the amplifier identification data and configuration are written to the specified Db backup file. Before setting this attribute, the Db backup file name must specified by setting cerent15216EdfaDbFileName.
cerent15216Edfa OpDbRestore	idle(1), perform(2), abort(3)	Read-write	When "perform" is written to this object, the amplifier select configuration is restored from the specified DB backup file. Before setting this attribute, the Db backup file name must specified by setting cerent15216EdfaDbFileName

5.4.12 OverallControl

The cerent15216EdfaOverallControl table allows the user to display and configure overall gain and pre-attenuation. Table 5-19 describes cerent15216EdfaOverallControl variables.

Table 5-19   cerent15216EdfaOverallControl Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa ConstGainOveral lGain	Integer (130 to 220)	Read-write	The target overall gain that is used when the control mode in the PumpCfgEntry table is set to constGainTempComp, in units of 0.1 dB. For example, a value of 130 is actually 13.0 dB. This variable is irrelevant in constOutputPower, constCurrent, and constPower modes.
cerent15216Edfa VariableGainPre Attenuation	Integer (10 to 100)	Read-write	The target pre-attenuation that is used when the control mode in the PumpCfgEntry table is set to constOutputPower, constCurrent, or constPower, in units of 0.1 dB. For example a value of 10 is actually 1.0 dB. This variable is irrelevant in constGainTempComp mode.

5.4.13 OverallStatusGroup

The cerent15216EdfaOverallStatusGroup table allows users to display the input and output of the ONS 15216 EDFA2 amplifier. Table 5-20 describes cerent15216EdfaOverallStatusGroup table variables.

Table 5-20   cerent15216EdfaOverallStatusGroup Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216EdfaInPoweruW	Integer (0 to 99999)	Read-only	EDFA input power in units of 0.1 microW. For example, a value of 1353 is actually 135.3 microW.
cerent15216EdfaInPowerdBm	Integer (–999999 to 999999)	Read-only	EDFA input power in units of 0.01 dBm. For example, a value of -869 is actually -8.69 dBm.
cerent15216EdfaOutPowermW	Integer (0 to 999999)	Read-only	EDFA output power in units of 0.01 mW. For example, a value of 2148 is actually 21.48 mW.
cerent15216EdfaOutPowerdBm	Integer (–99999 to 99999)	Read-only	EDFA output power in units of 0.01 dBm. For example, a value of 1832 is actually 18.32 dBm.

Table 5-20   cerent15216EdfaOverallStatusGroup Variable Descriptions (continued)

Variable	Syntax	Maximum Access	Description
cerent15216EdfaConstGainOverallGainMeasured	Integer (0 to 230)	Read-only	The measured overall gain that is used when the control mode in the PumpCfg table is set to constGainTempComp, in units of 0.1 dB. For example, a value of 219 is actually 21.9 dB.
cerent15216EdfaVariableGainPreAttenuationMeasured	Integer (0 to 110)	Read-only	The measured pre-attenuation that is used when the control mode in the PumpCfg table is *not* set to constGainTempComp, in units of 0.1 dB. For example, a value of 10 is actually 1.0 dB.

Note The values in mW and microW units are measured values. The dBm units are converted from mW or microW to dBm, so theses values could be slightly different. If you take the cerent15216EdfaInPoweruW, convert it to dBm (10log(cerent15216EdfaInPoweruW)) and compare the value to the attribute cerent15216EdfaInPowerdBm, you will see a small difference. The difference is because of rounding error. The value cerent15216EdfaInPoweruW that is displayed on the screen has been rounded, but the value used in the calculation has more significant digits.

5.4.14 PumpCfgEntry

The cerent15216EdfaPumpCfgEntry table is used to set or get laser pump control mode configuration. The associated table command displays a settings summary or allows you to set pumps. See Table 5-21 for variable definitions. The factory default pump control mode for the ONS 15216 EDFA2 is Constant Gain Temperature Compensated. Cisco recommends that users contact the Cisco TAC prior to changing this mode of operation.

Table 5-21   cerent15216EdfaPumpCfgEntry Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216EdfaPumpCfgPumpNum	Integer (1 or 2)	Not Accessible	Laser pump number (1 or 2).
cerent15216EdfaPumpCfgControlMode	constGainTempComp(2), constOutputPower(3), constCurrent(4), constPower(5), idle(6)	Read-write	Laser pump control mode. When the mode is set directly to constCurrent, constPower, or constOutputPower, the respective current value of ConstPumpCurrent, ConstPumpPower, or ConstOutPower is used as the constant parameter for the new mode. **Note:** Pump 1 cannot be set to constOutputPower mode.
cerent15216EdfaPumpCfgConstPumpCurrent	Integer (0 to 300)	Read-write	Constant pump current (mA). The current that is used when the pump control mode is changed to constCurrent.
cerent15216EdfaPumpCfgConstPumpPower	Integer (0 to 100)	Read-write	Constant pump power (mW). The power that is used when the control mode is changed to constPumpPower.
cerent15216EdfaPumpCfgConstOutPower	Integer (0 to 650)	Read-write	Constant output power. The power that is used when the control mode is changed to constOutputPower. In units of 0.1 mW. For example, a value of 551 is actually 55.1 mW.

5.4.14.1 Changing the Pump Control Mode

For Constant Gain Temperature Compensated, Constant Pump Current, Constant Pump Power, or idle modes, the system automatically sets the second pump to the same mode when either pump is set.

Constant Output Power mode is only valid for pump 2. If pump 2 is set to Constant Output Power Mode, pump 1 is automatically set to Constant Pump Power mode with an internally calculated value.

Warning   **The pump control modes Constant Pump Current, Constant Pump Power, and Constant Output Power are to be used with very high precautions. They are service affecting and can reduce the life cycle of the lasers if used in extreme conditions. The factory default setting and recommended mode of operation is Constant Gain Temperature Compensated mode. Cisco recommends that users contact the Cisco TAC before changing from this mode of operation.**

To set the ONS 15216 EDFA2 to Constant Pump Current mode, use the following steps:

Step 1   Set the pump value using **cerent15216EdfaPumpCfgConstPumpCurrent** attribute.

    a.   Select pump 1.

    b.   Set the value.

Step 2   Repeat Step 1 for pump 2.

Step 3   Set the pump mode of operation using **cerent15216EdfaPumpCfgControlMode** attribute.

   a.   Select pump 1 or 2.

   b.   Set the mode.

Example 5-6 shows how to set the ONS 15216 EDFA2 to Constant Pump Current mode and then set it back to Constant Gain Temperature Compensated mode. (Setting pump 1 or 2 to Constant Gain Temperature Compensated mode sets both pumps to that mode.)

Example 5-6   Setting Mode to Constant Pump Current and then Back to Constant Gain Temperature Compensated

```
ash:hostname:ONS15216 EDFA2> snmp attribute set local
cerent15216EdfaPumpCfgConstPumpCurrent 1 200
ash:hostname:ONS15216 EDFA2> snmp attribute set local
cerent15216EdfaPumpCfgConstPumpCurrent 2 200
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaPumpCfgControlMode 1
        constGainTempComp
        constOutputPower
        constCurrent
        constPower
        idle
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaPumpCfgControlMode 1
constCurrent
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaPumpCfgControlMode 1
constGainTempComp
```

5.4.14.2 Changing the Pump Control Value

To change the control value for Constant Gain Temperature Compensated mode, the user must set a new value of cerent15216EdfaConstGainOverallGain.

Constant Output Power mode is only valid for pump 2. To change the control value for pump 2, the user must set the new value of cerent15216EdfaPumpCfgConstOutPower for pump 2. When Constant Output Power mode is set for pump 2, pump 1 is automatically set to Constant Pump Power mode with a value that is internally calculated.

To change the control value for Constant Pump Current mode, the user must set new values of cerent15216EdfaPumpCfgConstPumpCurrent for both pumps.

To change the control value for Constant Pump Power mode, the user must set new values of cerent15216EdfaPumpCfgConstPumpPower for both pumps.

For example, to change the value for Constant Pump Current mode, use the following steps:

Step 1   Set the pump value using **cerent15216EdfaPumpCfgConstPumpCurrent** attribute.

   a.   Select pump 1.

   b.   Set the value.

Step 2   Repeat Step 1 for pump 2.

Step 3   If desired, set the pump mode of operation using **cerent15216EdfaPumpCfgControlMode** attribute.

   a.   Select pump 1 or 2.

b. Set the mode.

Example 5-7 shows how to set the value for Constant Pump Current mode to be 200 mA and then set the mode to Constant Pump Current mode again for the settings to take effect.

Example 5-7   Changing Value for Constant Pump Current Mode

```
ash:hostname:ONS15216 EDFA2> snmp attribute set local
cerent15216EdfaPumpCfgConstPumpCurrent 1 200
ash:hostname:ONS15216 EDFA2> snmp attribute set local
cerent15216EdfaPumpCfgConstPumpCurrent 2 200
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaPumpCfgControlMode 1
constCurrent
```

5.4.15 PumpStatusEntry

The cerent15216EdfaPumpStatusEntry table is used to display optical amplification module data. Table 5-22 displays information regarding the cerent15216EdfaPumpStatusEntry table variables.

Table 5-22   cerent15216EdfaPumpStatusEntry Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216EdfaPumpStatus PumpNum	Integer (1 or 2)	Not Accessible	Laser pump number
cerent15216EdfaPumpStatus LaserChipTemp	Integer (–9999 to 9999)	Read-only	Laser chip temperature in units of 0.1°C. For example, a value of 260 is actually 26.0°C.
cerent15216EdfaPumpStatus LaserChipTempSetpoint	Integer (0 to 999)	Read-only	Laser chip temperature setpoint in units of 0.1°C. For example, a value of 260 is actually 26.0°C.
cerent15216EdfaPumpStatus LaserTECCurrent	Integer (0 to 99999)	Read-only	Laser TEC current (mA).
cerent15216EdfaPumpStatus LaserPower	Integer (0 to 99999)	Read-only	Laser power in units of 0.01 mW. For example, a value of 3230 is actually 32.30 mW.
cerent15216EdfaPumpStatus LaserCurrent	Integer (0 to 999999)	Read-only	Laser current in units of 0.01 mA. For example, a value of 4024 is actually 40.24 mA.
cerent15216EdfaPumpStatus AmbientTemp	Integer (–9999 to 9999)	Read-only	Ambient temperature in units of 0.01°C. For example, a value of 2454 is actually 24.54°C.
cerent15216EdfaPumpStatus DCVoltage	Integer (0 to 9999)	Read-only	Pump DC voltage in units of 0.1V. For example, a value of 52 is actually 5.2V.
cerent15216EdfaPumpStatus InPoweruW	Integer (0 to 99999)	Read-only	Optical input power to the pump, in units of 0.1 microW. For example, a value of 1764 is actually 176.4 microW.

Table 5-22   cerent15216EdfaPumpStatusEntry Variable Descriptions (continued)

Variable	Syntax	Maximum Access	Description
cerent15216EdfaPumpStatus InPowerdBm	Integer (–999999 to 999999)	Read-only	Optical input power to the pump, in units of 0.01 dBm. For example, a value of -753 is actually -7.53 dBm.
cerent15216EdfaPumpStatus OutPowermW	Integer (0 to 999999)	Read-only	Optical output power of the pump, in units of 0.01 mW. For example, a value of 3497 is actually 34.97 mW.
cerent15216EdfaPumpStatus OutPowerdBm	Integer (–99999 to 99999)	Read-only	Optical output power of the pump, in units of 0.01 dBm. For example, a value of 1542 is actually 15.42 dBm.
cerent15216EdfaPumpStatus Gain[1]	Integer (–9999 to 9999)	Read-only	The gain across the pump, in units of 0.1 dBm. For example, a value of 229 is actually 22.9 dBm.
cerent15216EdfaPumpStatus ControlMode	constGainTemp Comp(2), constOutputPow er(3), constCurrent(4), constPower(5), idle(6)	Read-only	Laser pump control mode.
cerent15216EdfaPumpStatus ControlValue	Integer (0 to 3000)	Read-only	Laser pump control value. The units depend on control mode: • constGainTempComp: 0.1 dB • ConstOutPower: 0.1 mW • constCurrent: 0.1 mA • constPower: 0.1 mW For example, if the pump control mode is constGainTempComp, then a value of 229 is actually 22.9 dB.

1. In Constant Gain Temperature Compensated mode, 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. The cerent15216EdfaPumpStatusGain is the value of the gain of the amplification module only, it does not take into account the VOA (variable optical attenuator) attenuation. If you try to calculate the gain using the values of the PumpStatusOutPowerdBm – PumpStatusInPowerdBm you will not get the exact PumpStatusGain value. A more complex calculation is required to get the gain value. It needs to take ASE (amplified spontaneous emission) into account. This variable will be more dominant when the input power to the amplifier is low.

5.4.16 RtcDateAndTime

The cerent15216EdfaRtcDateAndTime table allows the user to set the date and time. When setting the local time of day, set the time zone first, set the DST offset second, and set the local time last. Entries must follow this format: "yyyy-m-d,h:m:s.s +h:m". Following the space, the time zone is set as +/- hours from Greenwich Mean Time (GMT) (also designated as universal coordinated time (UTC)) followed by a colon and minutes ahead for daylight savings. For example, Pacific Daylight Time would be -8:60 and Greenwich Mean Time would be +0:0.

Table 5-23 describes the variables.

Table 5-23   cerent15216EdfaRtcDateAndTime Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa RtcDateAndTime Local	DateAndTime	Read-write	The current local time. Setting this value changes the time according to the cerent15216EdfaRtcDateAndTimeTimezone and cerent15216EdfaRtcDateAndTimeSaving values. In the format '07d3051e0c111a002d0800'H.
cerent15216Edfa RtcDateAndTime GMT	DateAndTime	Read-only	The current GMT time in the format '07d3051e0c111a002d0800'H.
cerent15216Edfa RtcDateAndTime LocalString	Cerent15216E dfaDateAndTi meString	Read-write	The current local time in the format "2003-5-30,12:17:26.0 -8.0".
cerent15216Edfa RtcDateAndTime GMTString	Cerent15216E dfaDateAndTi meString	Read-only	The current GMT time in the format "2003-5-30,20:17:26.0 +0.0".
cerent15216Edfa RtcDateAndTime Timezone	Integer (-23 to 23)	Read-write	The time zone in hours from GMT, in the format "-8".
cerent15216Edfa RtcDateAndTime Saving	Integer (-60 to 60)	Read-write	The current daylight saving offset in minutes, in the format "0".
cerent15216Edfa RtcDateAndTime FormsString	Cerent15216E dfaDateAndTi meFormsString	Read-write	The current local time, in the format "05/30/2003 12:17:26".

5.4.17 SromIpMgmtGroup

The cerent15216EdfaSromIpMgmtgroup table provides the IP setup information. Table 5-24 describes the variables.

Table 5-24   cerent15216EdfaSromIpMgmtGroup Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216EdfaSromIpMgmtEnetAd dress	IpAddress	Read-write	The IP address used by the system's Ethernet management port. If set to 0.0.0.0, then no IP traffic is supported over the Ethernet interface.
cerent15216EdfaSromIpMgmtEnetSu bNetMask	IpAddress	Read-write	The IP subnetwork mask for the Ethernet management port.

Table 5-24   cerent15216EdfaSromIpMgmtGroup Variable Descriptions (continued)

Variable	Syntax	Maximum Access	Description
cerent15216EdfaSromIpMgmtDefault RouterAddress	IpAddress	Read-write	The IP address of the default router used by the system. The router's address must be on the Ethernet IP subnetwork.
cerent15216EdfaSromIpMgmtHostNa me	Display String (0 to 15 characters)	Read-write	The system's host name.
cerent15216EdfaSromIpMgmtMacAd dress	MacAddress	Read-only	The system's MAC address.

5.4.18 VersionGroup

The cerent15216EdfaVersionGroup table allows users to display the currently loaded image and the image to be loaded after cutover. Table 5-25 describes cerent15216EdfaVersionGroup table variables.

Table 5-25   cerent15216EdfaVersionGroup Variable Descriptions

Variable	Syntax	Maximum Access	Description
cerent15216Edfa CurrentVersion	Display String (0 to 255 characters)	Read-only	The version of the currently loaded image.
cerent15216Edfa AlternateVersion	Display String (0 to 255 characters)	Read-only	The version of the image to be loaded after a cutover is performed.
cerent15216Edfa HardwareVersion	Display String (0 to 255 characters)	Read-only	The hardware version of the unit.
cerent15216Edfa HardwarePartNu mber	Display String (0 to 255 characters)	Read-only	The hardware part number of the unit.

5.5 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. See Table 5-28 on page 5-45 and Table 5-29 on page 5-46 for the alarms and events that initiate traps.

5.5.1 Display Trap Command

Command Types   **snmp table display local cerent15216EdfaCommTrapEntry**

Syntax Description   **snmp table display local cerent15216EdfaCommTrapEntry #**

Displays the communities for traps.

Example 5-8   cerent15216EdfaCommTrapEntry Display Command

```
ash:hostname:ONS15216 EDFA2> snmp table display local cerent15216EdfaCommTrapEntry 1

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

5.5.2 Set Trap Command

Command Types   **snmp row set local cerent15216EdfaCommTrapEntry**

Syntax Description   **snmp row set local cerent15216EdfaCommTrapEntry #**

The command followed by a community number permits the user to set the parameters for the SNMP trap. Example 5-9 displays the prompts that appear after entering the 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 5-9   cerent15216EdfaCommTrapEntry Set Command

```
ash:hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaCommTrapEntry 1

cerent15216EdfaCommTrapCommunity "private"
cerent15216EdfaCommTrapDestIPAddress 172.22.87.50
cerent15216EdfaCommTrapDestUDPPort 162
cerent15216EdfaCommTrapViewIndex 1
cerent15216EdfaCommTrapVersion v2
cerent15216EdfaCommTrapStatus 4
```

5.5.3 Set Agent Trap Enable

Command Types   **snmp attribute set local cerent15216EdfaAgentTrapEnable**

Syntax Description   **snmp attribute set local cerent15216EdfaAgentTrapEnable** *control*

Enables or disables SNMP traps depending on whether the parameter *control* is "enabled" or "disabled".

5.5.4 Get Agent Trap Enable

Command Types   **snmp attribute get local cerent15216EdfaAgentTrapEnable**

Syntax Description   **snmp attribute get local cerent15216EdfaAgentTrapEnable**

Gets the SNMP enable trap status. The system responds with either "enabled" or "disabled".

5.6 Retrieving Information

The following SNMP commands access ONS 15216 EDFA2 information.

5.6.1 IP Address

Command Types   **snmp table display local cerent15216EdfaSromIpMgmtGroup**

Syntax Description   **snmp table display local cerent15216EdfaSromIpMgmtGroup**

Displays the ONS 15216 EDFA2 IP address.

The following SNMP command displays the ONS 15216 EDFA2's IP address and other networking information:

- **snmp row display local cerent15216EdfaSromIpMgmtGroup command** (Example 5-10)

Example 5-10   cerent15216EdfaSromIpMgmtGroup Display Command

```
ash: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 5-26 describes the other attributes displayed by these commands.

Table 5-26   cerent15216EdfaSromIpMgmtGroup Command Attributes

Attribute	Description
cerent15216EdfaSromIpMgmt EnetAddress	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.
cerent15216EdfaSromIpMgmt DefaultRouterAddress	The default router (gateway) address for the network.
cerent15216EdfaSromIpMgmt EnetSubNetMask	The IP subnet mask for the Ethernet management port.
cerent15216EdfaSromIpMgmt HostName	The host name of the system.

5.6.2 Date and Time

Command Types   **snmp attribute get local cerent15216EdfaRtcDateAndTime**

Syntax Description   **snmp attribute get local cerent15216EdfaRtcDateAndTime**

Displays the date and time for the ONS 15216 EDFA2.

The following SNMP command displays the date and time for the ONS 15216 EDFA2 and other time data:

- **snmp row display local cerent15216EdfaRtcDateAndTime command**

The following SNMP command sets the date and time for the ONS 15216 EDFA2 and other time data:

- **snmp attribute set local cerent15216EdfaRtcDateAndTimeLocalString command**

When setting the local time of day, set the time zone first, set the DST offset second, and set the local time last. Entries must follow this format: "yyyy-m-d,h:m:s.s +h:m". Following the space, the time zone is set as +/– hours from Greenwich Mean Time (GMT) (also designated as universal coordinated time (UTC)) followed by a colon and minutes ahead for daylight savings. For example, Pacific Daylight Time would be –8:60 and Greenwich Mean Time would be +0:0.

Example 5-11 displays the ONS 15216 EDFA2 command for displaying the date and time.

Example 5-11   cerent15216EdfaRtcDateAndTime Display Command

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

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaRtcDateAndTime ::=
{
    cerent15216EdfaRtcDateAndTimeLocal =  '07d20716070a2a042d083c'H;
    cerent15216EdfaRtcDateAndTimeGMT =  '07d207160e0a2a042b0000'H;
    cerent15216EdfaRtcDateAndTimeLocalString =  "2002-7-22,7:10:42.4 -8:60";
```

```
        cerent15216EdfaRtcDateAndTimeGMTString =  "2002-7-22,14:10:42.4 +0:0";
        cerent15216EdfaRtcDateAndTimeTimezone =  -8;
        cerent15216EdfaRtcDateAndTimeSaving =  60;
        cerent15216EdfaRtcDateAndTimeFormsString =  "07/22/2002 07:10:42";
    };
```

Table 5-27 describes the attributes displayed by these commands.

Table 5-27   cerent15216EdfaRtcDateAndTime Command Attributes

Attribute	Description
cerent15216EdfaRtcDateAndTimeLocal	The current local time.
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.

5.6.3 Power Gain

Command Types   **snmp attribute get local cerentEdfa15216EdfaConstGainOverallGain**

Syntax Description   **snmp attribute get local cerentEdfa15216EdfaConstGainOverallGain #**

Displays the overall power gain when the ONS 15216 EDFA2 is in Constant Gain Temperature Compensated mode.

The following commands access overall power gain when in the Constant Gain Temperature Compensated 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 5-12 on page 5-34).

Example 5-12   cerent15216EdfaOverallControl Display Command

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

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaOverallControl ::=
{
    cerent15216EdfaConstGainOverallGain =  220;
    cerent15216EdfaVariableGainPreAttenuation =  10;
};
```

For information about all of the parameters in the cerent15216EdfaOverallStatusGroup, refer to Table 5-20 on page 5-23.

5.6.4 Case Temperature

5.6.4.1 Case Temperature Value

Command Types   **snmp attribute get local cerent15216EdfaPumpStatusAmbientTemp**

Syntax Description   **snmp attribute get local cerent15216EdfaPumpStatusAmbientTemp** *pump#*

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

The following command displays the temperature value (where *pump#* is the pump number) and other pump status data:

- **snmp row display local cerent15216EdfaPumpStatusAmbientTemp** *pump#* command

The cerent15216EdfaPumpStatusAmbientTemp attribute of the cerent15216EdfaPumpStatusEntry display command shows the case temperature (Example 5-13).

Example 5-13   cerent15216EdfaPumpStatusEntry Display Command

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

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaPumpStatusEntry ::=
{
    cerent15216EdfaPumpStatusPumpNum =  1;
    cerent15216EdfaPumpStatusLaserChipTemp =  260;
    cerent15216EdfaPumpStatusLaserChipTempSetpoint =  260;
    cerent15216EdfaPumpStatusLaserTECCurrent =  20;
    cerent15216EdfaPumpStatusLaserPower =  8503;
    cerent15216EdfaPumpStatusLaserCurrent =  17010;
    cerent15216EdfaPumpStatusAmbientTemp =  2272;
    cerent15216EdfaPumpStatusDCVoltage =  52;
    cerent15216EdfaPumpStatusInPoweruW =  250;
    cerent15216EdfaPumpStatusInPowerdBm =  -600;
    cerent15216EdfaPumpStatusOutPowermW =  5000;
    cerent15216EdfaPumpStatusOutPowerdBm =  1700;
    cerent15216EdfaPumpStatusGain =  220;
    cerent15216EdfaPumpStatusControlMode=  constGainTempComp;
    cerent15216EdfaPumpStatusControlValue =  220;
};
```

Refer to Table 5-22 on page 5-27 for information about all of the parameters in the cerent15216EdfaPumpStatusEntry table.

5.6.4.2 Case Temperature Alarm Threshold

5.6.4.2.1 CtmpMin

Command Types   **snmp attribute get local cerent15216EdfaCtmpMin**

Syntax Description   **snmp attribute get local cerent15216EdfaCtmpMin**

This command displays minimum case temperature alarm threshold.

5.6.4.2.2 CtmpMax

snmp attribute get local cerent15216EdfaCtmpMax

Syntax Description   **snmp attribute get local cerent15216EdfaCtmpMax**

This command displays maximum case temperature alarm threshold.

The following command displays case temperature alarm threshold and other temperature data:

- **snmp row display local cerent15216EdfaCfgGroup** command

This command is shown in .

Example 5-14   cerent15216EdfaCfgGroup Display Command

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

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaCfgGroup ::=
{
    cerent15216EdfaCfgSaved =  true;
    cerent15216EdfaLpoutSetpoint =  0;
    cerent15216EdfaLpoutDeviation =  200;
    cerent15216EdfaLpoutHysteresis =  100;
    cerent15216EdfaLOSThreshold =  -3102;
    cerent15216EdfaLOSHysteresis =  100;
    cerent15216EdfaCtmpMin =  -5;
    cerent15216EdfaCtmpMinHysteresis =  1;
    cerent15216EdfaCtmpMax =  65;
    cerent15216EdfaCtmpMaxHysteresis =  1;
    cerent15216EdfaCLEI =  "WMM4180BRA";
    cerent15216EdfaPowerBusMode =  duplex;
    cerent15216EdfaPowerBusDCVoltageMin =  420;
    cerent15216EdfaPowerBusDCVoltageMax =  700;
};
```

Refer to for information about all of the parameters in cerent15216EdfaOverallStatusGroup.

5.6.4.3 Case Temperature Alarm Hysteresis

5.6.4.3.1 CtmpMaxHysteresis

Command Types   **snmp attribute get local cerent15216EdfaCtmpMaxHysteresis**

Syntax Description   **snmp attribute get local cerent15216EdfaCtmpMaxHysteresis**

Displays maximum case temperature alarm hysteresis.

The cerent15216EdfaCtmpMaxHysteresis attribute in the cerent15216EdfaCfgGroup display command shows the maximum case hysteresis temperature alarm threshold (Example 5-14 on page 5-36). Refer to Table 5-13 on page 5-16 for information about all of the parameters in cerent15216EdfaCfgGroup.

5.6.4.3.2 CtmpMinHysteresis

Command Types   **snmp attribute get local cerent15216EdfaCtmpMinHysteresis**

Syntax Description   **snmp attribute get local cerent15216EdfaCtmpMinHysteresis**

Displays the minimum case hysteresis temperature alarm threshold.

The following command displays case temperature alarm hysteresis and other data:

- **snmp row display local cerent15216EdfaCfgGroup** command

The cerent15216EdfaCfgGroup command is shown in Example 5-14 on page 5-36. For information about all of the parameters in the cerent15216EdfaCfgGroup table, see Table 5-13 on page 5-16.

5.6.5 Power Bus

5.6.5.1 Power Bus Mode

Command Types   **snmp attribute get local cerent15216EdfaPowerBusMode**

Syntax Description   **snmp attribute get local cerent15216EdfaPowerBusMode**

Displays the power bus mode (simplex or duplex).

The following command displays power bus voltage and other data:

- **snmp row display local cerent15216EdfaCfgGroup** command

5.6.5.2 Power Bus Alarm Threshold

5.6.5.2.1 PowerBusDCVoltageMax

Command Types	**snmp attribute get local cerent15216EdfaPowerBusDCVoltageMax**

Syntax Description	**snmp attribute get local cerent15216EdfaPowerBusDCVoltageMax**

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

The following command displays power bus voltage and other data:

- **snmp row display local cerent15216EdfaCfgGroup** command

5.6.5.2.2 PowerBusDCVoltageMin

Command Types	**snmp attribute get local cerent15216EdfaPowerBusDCVoltageMin**

Syntax Description	**snmp attribute get local cerent15216EdfaPowerBusDCVoltageMin**

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

The following command displays power bus voltage and other data:

- **snmp row display local cerent15216EdfaCfgGroup** command

5.6.6 Input Power (Signal)

5.6.6.1 Input Power (Signal) Value

5.6.6.1.1 InPoweruW

Command Types	**snmp attribute get local cerent15216EdfaInPoweruW**

Syntax Description	**snmp attribute get local cerent15216EdfaInPoweruW**

Displays input power value in microwatts.

The following command displays the ONS 15216 EDFA2 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 .

5.6.6.1.2 InPowerdBm

Command Types   **snmp attribute get local cerent15216EdfaInPowerdBm**

Syntax Description   **snmp attribute get local cerent15216EdfaInPowerdBm**

Displays the input power value in dBm. The dBm units are converted from µW to dBm, so theses values could be slightly different due to rounding error.

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

- **snmp row display local cerent15216EdfaOverallStatusGroup** command

For information about all of the parameters in the cerent15216EdfaOverallStatusGroup table, refer to Table 5-20 on page 5-23.

5.6.6.2 Loss of Signal (Input Power) Alarm Threshold

Command Types   **snmp attribute get local cerent15216EdfaLOSThreshold**

Syntax Description   **snmp attribute get local cerent15216EdfaLOSThreshold**

Displays the loss of signal (input power) alarm threshold.

The following command displays 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 5-14 on page 5-36).

For information about all of the parameters in the cerent15216EdfaCfgGroup table, refer to Table 5-13 on page 5-16.

5.6.6.3 Loss of Signal (Input Power) Alarm Hysteresis

Command Types   **snmp attribute get local cerent15216EdfaLOSHysteresis**

Syntax Description   **snmp attribute get local cerent15216EdfaLOSHysteresis**

Displays the loss of signal (input power) alarm hysteresis value.

The following command displays the loss of input power hysteresis value and other laser power and temperature data:

- **snmp row display local cerent15216EdfaCfgGroup** command

The cerent15216EdfaLOSHysterisis attribute in the cerent15216EdfaCfgGroup display command shows the loss of input power alarm threshold (Example 5-14 on page 5-36). For information about all of the parameters in the cerent15216EdfaCfgGroup table, refer to Table 5-13 on page 5-16.

5.6.7 Output Power

5.6.7.1 Output Power Value

5.6.7.1.1 OutPowermW

Command Types	**snmp attribute get local cerent15216EdfaOutPowermW**

Syntax Description	**snmp attribute get local cerent15216EdfaOutPowermW**
	Displays output power value in milliwatts.
	The **snmp row display local cerent15216EdfaOverallStatusGroup command** displays the ONS 15216 EDFA2 output power value and additional pump status. For information about all of the parameters in the cerent15216EdfaOverallStatusGroup table, refer to Table 5-20 on page 5-23.

5.6.7.1.2 OutPowerdBm

Command Types	**snmp attribute get local cerent15216EdfaOutPowerdBm**

Syntax Description	**snmp attribute get local cerent15216EdfaOutPowerdBm**
	Displays output power value in dBm. This command displays loss of output power value and additional pump status data. The dBm units are converted from mW to dBm, so theses values could be slightly different due to rounding error.
	For information about all of the parameters in the cerent15216EdfaOverallStatusGroup table, refer to Table 5-20 on page 5-23.

5.6.7.2 Loss of Output Power Alarm Setpoint

5.6.7.2.1 LpoutSetpoint

Command Types	**snmp attribute get local cerent15216EdfaLpoutSetpoint**

Syntax Description	**snmp attribute get local cerent15216EdfaLpoutSetpoint**
	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 the Cisco TAC to determine threshold value for your application. As a guideline, Cisco recommends that loss of output power alarm threshold value be set at 1 dB below the current output power level of the amplifier.

When the ONS 15216 EDFA2 is set to Constant Gain Temperature Compensated mode (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 5-14 on page 5-36). This command returns the current alarm threshold default values.

5.6.7.2.2 LpoutDeviation

Command Types   **snmp attribute get local cerent15216EdfaLpoutDeviation**

Syntax Description   **snmp attribute get local cerent15216EdfaLpoutDeviation**

This attribute is not required when operating in factory default Constant Gain Temperature Compensated mode. Setting of the loss of output power alarm deviation is only necessary when the amplifier is used in Constant Output Power mode.

This attribute is used to set the amount by which the output power must vary from the threshold set point 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 the Cisco TAC 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 dB. The module triggers an alarm if it detects a signal level of 2 dB below the current output power alarm level threshold value set for the amplifier.

When the ONS 15216 EDFA2 is set to Constant Gain Temperature Compensated mode (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 5-14 on page 5-36. 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 mode, type **snmp attribute set local cerent15216EdfaLpoutDeviation** at the command prompt followed by a number (as shown in Example 5-15 on page 5-41). Valid entries are between 0 and 1000 and are in dB times 100. For example, if the loss of output power deviation required were 0.2 dB, 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 5-15   cerent15216EdfaLpoutDeviation Set Command

```
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaLpoutDeviation 200
```

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

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaCfgGroup ::=
{
    cerent15216EdfaCfgSaved =  false;
    cerent15216EdfaLpoutSetpoint =  0;
    cerent15216EdfaLpoutDeviation =  200;
    cerent15216EdfaLpoutHysteresis =  100;
    cerent15216EdfaLOSThreshold =  -2694;
    cerent15216EdfaLOSHysteresis =  100;
    cerent15216EdfaCtmpMin =  -5;
    cerent15216EdfaCtmpMinHysteresis =  1;
    cerent15216EdfaCtmpMax =  65;
    cerent15216EdfaCtmpMaxHysteresis =  1;
    cerent15216EdfaCLEI =  "WMAW27VLAA";
    cerent15216EdfaPowerBusMode =  duplex;
    cerent15216EdfaPowerBusDCVoltageMin =  420;
    cerent15216EdfaPowerBusDCVoltageMax =  700;
};
```

Changes must be saved before terminating the session. See the "4.11 Save Changes" section on page 4-11.

5.6.7.3 Loss of Output Power Alarm Hysteresis

Command Types   **snmp attribute get local cerent15216EdfaLpoutHysteresis**

Syntax Description   **snmp attribute get local cerent15216EdfaLpoutHysteresis**

This attribute is not required when operating in factory default Constant Gain Temperature Compensated 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 the Cisco TAC 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 dB. The module clears the alarm if it detects a signal level of 0.2 dB above the current output power alarm level threshold value set for the amplifier.

When ONS 15216 EDFA2 is set to Constant Gain Temperature Compensated mode (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 5-14 on page 5-36. This command returns the current alarm threshold default values.

To set the loss of output power alarm hysteresis when ONS 15216 EDFA2 is configured for operation in either Constant Output Power mode or Constant Pump Power 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 dB times 100. For example, if the loss of output power hysteresis required were 0.2 dB, 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 "4.11 Save Changes" section on page 4-11.

5.6.8 Database Backup and Restore

The configuration information for the ONS 15216 EDFA2 can be saved in a file for later use or to configure other ONS 15216 EDFA2 units. This file contains manufacturing information about the unit that is being backed up (such as part number and serial number), setup information for the unit (such as IP address and host name), all configuration information (such as alarm thresholds and pump mode), and the user database.

The backup file is saved with cyclic redundancy code (CRC) to ensure data integrity, and the user names, passwords, and other system settings are encrypted for security. Only the configuration information and user database are copied back to the ONS 15216 EDFA2 during a restore.

5.6.8.1 Database Backup Procedure

Step 1 Back up the system configuration to a file (in this case, dbbkup) on the FFS:

  a. Set cerent15216EdfaOpDbFileName = "dbbkup".

  b. Set cerent15216EdfaOpRequestId = 1.

  c. Set cerent15216EdfaOpDbBackup = 2.

  d. Wait until cerent15216EdfaOpStatus goes from inprogress to idle.

  e. Verify that cerent15216EdfaOpResult is 0.

Step 2 Verify that the backup file is on the FFS by getting the table cerent15216EdfaFfsFileEntry and checking for the file named "dbbkup".

Step 3 Copy the backup file to your TFTP server:

  a. Set cerent15216EdfaFfsOpRequestId = 2.

  b. Set cerent15216EdfaFfsOpSrcName = "dbbkup".

  c. Set cerent15216EdfaFfsOpDstName = "dbbkup".

  d. Set cerent15216EdfaFfsOpTftpSrvAddr = a.b.c.d (your TFTP server address).

  e. Set cerent15216EdfaFfsOpOperation = 3 (put).

  f. Set cerent15216EdfaFfsOpAction = 2 (perform).

Step 4 Wait for the TFTP put to complete and check that cerent15216EdfaFfsOpResult = 0 and that cerent15216EdfaFfsOpCopyProgress contains the number of bytes in the file "dbbkup".

Step 5 Copy file from your TFTP server to the FFS:

  a. Set cerent15216EdfaFfsOpRequestId = 2.

  b. Set cerent15216EdfaFfsOpSrcName = "dbbkup".

  c. Set cerent15216EdfaFfsOpDstName = "dbbkup".

  d. Set cerent15216EdfaFfsOpTftpSrvAddr = a.b.c.d (your TFTP server address).

  e. Set cerent15216EdfaFfsOpOperation = 2 (get).

> **f.** Set cerent15216EdfaFfsOpAction = 2 (perform).

Step 6 Verify that the file "dbbkup" is on the FFS by getting the table cerent15216EdfaFfsFileEntry.

5.6.8.2 Database Restore Procedure

The configuration information for the ONS 15216 EDFA2 can be restored form a file. During this process, all configuration information (such as alarm thresholds and pump mode) and the user database from the file are replaced in the ONS 15216 EDFA2 memory and FFS.

Before the restore begins, a cyclic redundancy code (CRC) check is performed to ensure data integrity.

Step 1 Restore from the backup database from a file (in this case, dbbkup) on the FFS:

> **a.** Set cerent15216EdfaOpDbFileName = "dbbkup".
>
> **b.** Set cerent15216EdfaOpRequestId = 1.
>
> **c.** Set cerent15216EdfaOpDbRestore = 2.
>
> **d.** Wait until cerent15216EdfaOpStatus goes from inprogress to idle.
>
> **e.** Verify that cerent15216EdfaOpResult is 0.

Step 2 Save the changes by setting cerentEdfa15216OpSaveConfig = 2.

Step 3 Reboot the ONS 15216 EDFA2 by setting cerentEdfa15216OpReset = 2.

After the processor reboots, user names and passwords from the new user database must be used for access.

5.6.9 Alarm Entry

Command Types **snmp table display local cerent15216EdfaAlarmEntry**

Syntax Description **snmp table display local cerent15216EdfaAlarmEntry**

Accesses the alarm status. Example 5-16 shows the **cerent15216EdfaAlarmEntry display** command.

Example 5-16   cerent15216EdfaAlarmEntry Display Command

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

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaAlarmEntry ::=
{
    cerent15216EdfaAlarmIndex =  1;
    cerent15216EdfaAlarmID =  lcrnt1;
    cerent15216EdfaAlarmPriority =  minor;
    cerent15216EdfaAlarmState =  cleared;
    cerent15216EdfaAlarmEnable =  enabled;
    cerent15216EdfaAlarmDateAndTime =  "2002-10-16,13:49:42.8 -8:60";
    cerent15216EdfaAlarmCfgPriority =  minor;
};
```

```
CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaAlarmEntry ::=
{
    cerent15216EdfaAlarmIndex =  2;
    cerent15216EdfaAlarmID =  lcrnt2;
    cerent15216EdfaAlarmPriority =  minor;
    cerent15216EdfaAlarmState =  cleared;
    cerent15216EdfaAlarmEnable =  enabled;
    cerent15216EdfaAlarmDateAndTime =  "2002-10-16,13:31:55.4 -8:60";
    cerent15216EdfaAlarmCfgPriority =  minor;
};

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaAlarmEntry ::=
{
    cerent15216EdfaAlarmIndex =  3;
    cerent15216EdfaAlarmID =  ltmp1;
...
```

For information about all of the parameters in the cerent15216EdfaAlarmEntry table, refer to Table 5-10 on page 5-14.

5.7 Summary of SNMP Alarms and Events

Alarm priorities can be configured (cerent15216EdfaAlarmCfgPriority), so the default values are provided in the tables below. Table 5-28 summarizes the ONS 15216 EDFA2 SNMP alarms.

Table 5-28   SNMP Alarms

Alarm Index	Alarm ID	Description	Default Priority
1	lcrnt1	Excessive pump current for pump 1. Drive current greater than 95% of end of life value. Current must drop to 90% of end of life value for alarm to clear.	Minor
2	lcrnt2	Excessive pump current for pump 2. Drive current greater than 95% of end of life value. Current must drop to 90% of end of life value for alarm to clear.	Minor
3	ltmp1	Pump 1 laser temperature out of range. Chip temperature deviating more than 10 degrees C from the manufacturer-defined setpoint.	Minor
4	ltmp2	Pump 2 laser temp. out of range. Chip temperature deviating more than 10 degrees C from the manufacturer-defined setpoint.	Minor
5	lpout	Loss of output power. EDFA output power is deviating more than the value of cerent15216EdfaLpoutDeviation from the value of cerent15216EdfaLpoutSetpoint. This alarm is only valid for constOutputPower mode.	Major
6	lpin	Loss of input power (signal). EDFA input power is below the value of cerent15216EdfaLOSThreshold.	Major

Table 5-28   SNMP Alarms (continued)

Alarm Index	Alarm ID	Description	Default Priority
7	gain	Gain out of range. Gain has deviated more than 1.25 dB from the setpoint in constGainTempComp mode. This alarm is also triggered if the input power goes outside the manufacturer-defined range by more than 0.15 dB.	Major
8	ctmp	The case temperature out of the threshold range.	Minor
9	powerBusA	The Power Bus A voltage is out of the threshold range. The power bus threshold has a 1.5V tolerance and a 1.0V hysteresis. There is a ±1.5V inaccuracy in the ONS 15216 EDFA2 voltage measurement.	Minor/Critical[1]
10	powerBusB	The Power Bus B voltage is out of the threshold range. The power bus threshold has a 1.5V tolerance and a 1.0V hysteresis. There is a ±1.5V inaccuracy in the ONS 15216 EDFA2 voltage measurement.	Minor/Critical[1]
11	dbBackup	A database backup is in progress.	Minor
12	dbRestore	A database restore is in progress.	Minor
13	swDownload	A TFTP software download is in progress.	Minor

1.   If the power system is in simplex mode, a power bus alarm is Critical by default. If the power system is in duplex mode, a single power bus alarm is Minor by default, and if an alarm is raised on both power buses, the second alarm is Critical.

Table 5-29 summarizes the ONS 15216 EDFA2 SNMP event traps.

Table 5-29   SNMP Events

Notification	Notification Trigger	Default Priority	Condition
cerent15216Edfa OpStarted and cerent15216Edfa OpFinished	cerent15216EdfaOpSaveConfig cerent15216EdfaOpCutover cerent15216EdfaOpLoad cerent15216EdfaOpReset cerent15216EdfaOpDbBackup cerent15216EdfaOpDbRestore	NSA NSA NSA NSA NSA NSA	Notification is generated when an operation from the affected attributes list starts and when it completes or terminates.

Table 5-29   SNMP Events (continued)

Notification	Notification Trigger	Default Priority	Condition
cerent15216Edfa FfsOpStarted and cerent15216Edfa FfsOpFinished	cerent15216EdfaFfsTftpPut cerent15216EdfaFileTftpGet cerent15216EdfaFfsCopy cerent15216EdfaFfsRename cerent15216EdfaFfsDelete cerent15216EdfaFfsCompress	NSA NSA NSA NSA NSA NSA	Notification is generated when an operation from the affected attributes list starts and when it completes or terminates.
cerent15216Edfa AlarmActivated and cerent15216Edfa AlarmCleared	lcrnt1 lcrnt2 ltmp1 ltmp2 lpout lpin gain ctmp powerBusA powerBusB dbBackup dbRestore swDownload	Minor Minor Minor Minor Major Major Major Minor Minor/Critical Minor/Critical Minor Minor Minor	Notification is generated when the fault condition is detected and when it is cleared.

6

ASH Commands

ASH commands are available in the ASH shell command line interface. ASH commands consist of proprietary commands and command-line SNMP instructions. This chapter is a reference of ASH commands that are used in advanced setup and troubleshooting. For provisioning the Cisco ONS 15216 EDFA2 using ASH commands, see Chapter 4, "Provisioning with ASH and SNMP."

All commands discussed in this chapter are available to the default CISCO15 user and any other user with read_write_admin (RWA) access privileges. Users with read_write (RW) and read (R) access levels have access to a subset of the commands, as shown in Table 6-1.

6.1 Summary of Security Permissions for ASH Commands

Table 6-1   ASH Commands Security Permissions (Access Levels)

Command	Description	User Access Levels		
		R	RW	RWA
clear	Clears the shell screen. See the "6.3.1 clear Command" section on page 6-10.	Yes	Yes	Yes
backup system	Backs up configuration information to file. See the "6.9.1 backup system Command" section on page 6-30.	No	No	Yes
debug memory display	Displays memory.	Yes	Yes	Yes
error log display	Displays current error log.	No	Yes	Yes
exit	Exits the shell. See the "6.3.2 exit Command" section on page 6-10.	Yes	Yes	Yes
ffs bams display	Displays flash file system BAMS.	No	Yes	Yes
ffs block compress	Compresses flash file system block into spare.	No	Yes	Yes
ffs block display	Displays flash file system blocks.	No	Yes	Yes
ffs file copy	Copies flash file.	No	Yes	Yes
ffs file delete	Delete flash file.	No	Yes	Yes
ffs file display	Displays contents of flash file.	No	Yes	Yes

Table 6-1   ASH Commands Security Permissions (Access Levels) (continued)

Command	Description	User Access Levels		
		R	RW	RWA
ffs file list	Displays the files in flash memory. See the "6.5.1 ffs file list Command" section on page 6-14.	No	Yes	Yes
ffs file rename	Renames flash file.	No	Yes	Yes
ffs format	Formats flash file system.	No	Yes	Yes
ffs status display	Displays current flash file system status.	No	Yes	Yes
ffs tftp get	Copies TFTP file to flash file system.	No	Yes	Yes
ffs tftp put	Copies flash file to TFTP file system.	No	Yes	Yes
ffs tftp record get	Copies record-based TFTP file to flash file.	No	Yes	Yes
ffs tftp record put	Copies record-based flash file to TFTP file.	No	Yes	Yes
flash block display	Displays flash memory.	No	No	Yes
flash boot erase	Erases flash boot sector.	No	No	Yes
flash boot program tftp	Programs flash from TFTP file.	No	No	Yes
flash chip block display	Displays chip block flash memory.	No	No	Yes
flash chip display	Displays flash chip information.	No	No	Yes
gain attenuation display	Displays target attenuation.	Yes	Yes	Yes
gain gain display	Displays gain setting. See the "6.2.7 gain gain display Command" section on page 6-9.	Yes	Yes	Yes
help	Gives help about commands. See the "6.3.3 help Command" section on page 6-11.	Yes	Yes	Yes
history	Displays the history list. See the "6.3.4 history Command" section on page 6-11.	Yes	Yes	Yes
login	Allows the user to log into shell. See the "6.3.5 login and logoff Commands" section on page 6-11.	Yes	Yes	Yes
logoff	Allows the user to log off of the shell. See the 6.3.5 login and logoff Commands, page 6-11.	Yes	Yes	Yes
manufacturer clei display	Displays CLEI code.	Yes	Yes	Yes
manufacturer mode enable	Enables access to manufacturer commands.	No	No	Yes
manufacturer restore defaults all	Restores all settings to manufacturer defaults. See the "6.10.2 manufacturer restore defaults all Command" section on page 6-31.	No	No	Yes
manufacturer restore defaults passwords	Restores manufacturer password defaults. See the "6.10.1 manufacturer restore defaults passwords Command" section on page 6-30.	No	No	Yes

Table 6-1   ASH Commands Security Permissions (Access Levels) (continued)

Command	Description	R	RW	RWA
		User Access Levels		
network host ftp	FTPs to remote host. See the "7.1 FTP Command Line" section on page 7-1	No	Yes	Yes
network host ping	Pings remote host.	No	Yes	Yes
network host telnet	Telnets to remote host	No	Yes	Yes
pdm busmode display	Displays the bus mode (simplex or duplex). See the "6.2.5 pdm busmode display Command" section on page 6-9	Yes	Yes	Yes
pdm cfg threshold bus display	Displays bus threshold configuration.	Yes	Yes	Yes
processor reset	Resets the CPU. See the "6.3.6 processor reset Command" section on page 6-12.	No	Yes	Yes
restore system	Restores configuration from backup file. See the "6.9.2 restore system Command" section on page 6-30.	No	No	Yes
shell lines set	Sets the number of shell lines. See the "6.4.1 shell lines set Command" section on page 6-12.	Yes	Yes	Yes
shell more disable	Disables more. See the "6.4.2 shell more enable and disable Commands" section on page 6-12.	Yes	Yes	Yes
shell more enable	Enables more. See the "6.4.2 shell more enable and disable Commands" section on page 6-12.	Yes	Yes	Yes
shell rows set	Sets the number of shell rows.	Yes	Yes	Yes
shell status display	Displays the shell status. See the "6.4.3 shell status display Command" section on page 6-13.	Yes	Yes	Yes
shell type display	Displays the default shell type.	Yes	Yes	Yes
shell type modify	Modifies the default shell type. See the "6.4.4 shell type modify Command" section on page 6-13.	No	No	Yes
snmp attribute get	Gets an attribute. See the "6.6.1 snmp attribute get Command" section on page 6-15.	No	Yes	Yes
snmp attribute list	Lists an attribute. See the "6.6.2 snmp attribute list Command" section on page 6-15.	No	Yes	Yes
snmp attribute oid get	get an attribute	No	Yes	Yes
snmp attribute oid set	set an attribute	No	Yes	Yes

Table 6-1   ASH Commands Security Permissions (Access Levels) (continued)

Command	Description	User Access Levels		
		R	RW	RWA
snmp attribute set	Sets an attribute. See the "6.6.3 snmp attribute set Command" section on page 6-16.	No	Yes	Yes
snmp host ip get	Gets the IP address from host name.	No	Yes	Yes
snmp host name get	Gets the host name from IP address.	No	Yes	Yes
snmp mib display	Displays a MIB. See the "6.6.4 snmp mib display Command" section on page 6-16.	No	Yes	Yes
snmp mib get	Gets a MIB. See the "6.6.5 snmp mib get Command" section on page 6-17.	No	Yes	Yes
snmp mib list	Lists a MIB. See the "6.6.6 snmp mib list Command" section on page 6-17.	No	Yes	Yes
snmp pdu send	Sends a SNMP protocol data unit (PDU).	No	Yes	Yes
snmp row display	Displays a row. See the "6.6.7 snmp row display Command" section on page 6-18.	No	Yes	Yes
snmp row get	Gets a row. See the "6.6.8 snmp row get Command" section on page 6-19.	No	Yes	Yes
snmp row line set	Dumps a row.	No	Yes	Yes
snmp row oid display	Displays a row.	No	Yes	Yes
snmp row oid get	Gets a row.	No	Yes	Yes
snmp row oid set	Dumps a row.	No	Yes	Yes
snmp row set	Sets a row. See the "6.6.9 snmp row set Command" section on page 6-19.	No	Yes	Yes
snmp session version v1	Sets default SNMP session version to v1.	No	Yes	Yes
snmp session version v2C	Sets default SNMP session version to v2C.	No	Yes	Yes
snmp subtree display	Displays a subtree. See the "6.6.10 snmp subtree display Command" section on page 6-20.	No	Yes	Yes
snmp subtree get	Gets a subtree. See the "6.6.11 snmp subtree get Command" section on page 6-20.	No	Yes	Yes
snmp subtree list	Lists a subtree. See the "6.6.12 snmp subtree list Command" section on page 6-21.	No	Yes	Yes

Table 6-1   ASH Commands Security Permissions (Access Levels) (continued)

Command	Description	User Access Levels		
		R	RW	RWA
snmp table display	Displays a table. See the "6.6.13 snmp table display Command" section on page 6-22. See also "5.5.1 Display Trap Command" section on page 5-30, the "5.6.1 IP Address" section on page 5-32, and the "5.6.9 Alarm Entry" section on page 5-44.	No	Yes	Yes
snmp table get	Gets a table. See the "6.6.14 snmp table get Command" section on page 6-23.	No	Yes	Yes
snmp table list	Lists a table. See the "6.6.15 snmp table list Command" section on page 6-23.	No	Yes	Yes
snmp trap send	Sends a SNMP trap.	No	Yes	Yes
snmp tree attribute list	Lists the attributes in the MIB. See the "6.6.16 snmp tree attribute list Command" section on page 6-24.	No	Yes	Yes
snmp tree mib list	Lists the MIBs in the MIB tree.	No	Yes	Yes
snmp tree oid display	Displays object identifier (OID) for a MIB tree object.	No	Yes	Yes
snmp tree syntax display	Displays the syntax of a MIB tree object.	No	Yes	Yes
snmp tree table provided list	Lists provided tables in the MIB tree.	No	Yes	Yes
srom cfg boot display	Displays the serial ROM boot content. See the "6.2.1 srom cfg boot display Command" section on page 6-7.	No	Yes	Yes
srom cfg boot modify	Modifies the serial ROM boot contents. See the "6.2.2 srom cfg boot modify Command" section on page 6-7.	No	Yes	Yes
srom cfg debug display	Displays one config (CFG) ROM byte.	No	No	Yes
srom cfg debug modify	Modifies one CFG ROM byte.	No	No	Yes
srom cfg display	Displays CFG ROM contents.	No	Yes	Yes
srom cfg ip display	Displays the serial ROM IP contents. See the "6.2.3 srom cfg ip display Command" section on page 6-8.	No	Yes	Yes
srom cfg ip modify	Modifies the serial ROM IP contents. See the "6.2.4 srom cfg ip modify Command" section on page 6-8	No	Yes	Yes
srom cfg modify	Modifies CFG ROM contents.	No	Yes	Yes
srom id display	Displays serial ROM contents.	No	Yes	Yes
tl1c	TL1s to host.	Yes	Yes	Yes

Table 6-1   ASH Commands Security Permissions (Access Levels) (continued)

Command	Description	User Access Levels		
		R	RW	RWA
user active list	Lists the active users. See the "6.7.7 user active list Command" section on page 6-28.	No	Yes	Yes
user active message send	Sends the message to all active users. See the "6.7.8 user active message send Command" section on page 6-28.	No	Yes	Yes
user entry create	Creates a new user. See the "6.7.1 user entry create Command" section on page 6-25.	No	No	Yes
user entry delete	Deletes the user. See the "6.7.3 user entry delete Command" section on page 6-26.	No	No	Yes
user entry edit	Edits an existing user entry. See the "6.7.2 user entry edit Command" section on page 6-25.	No	No	Yes
user file display	Displays the user names and information. See the "6.7.4 user file display and user name display Commands" section on page 6-26.	No	Yes	Yes
user inactivity display	Displays user inactivity times. See the "6.7.5 user inactivity modify and user inactivity display Commands" section on page 6-26.	Yes	Yes	Yes
user inactivity modify	Modifies user inactivity time. See the "6.7.5 user inactivity modify and user inactivity display Commands" section on page 6-26.	No	No	Yes
user name display	Displays the user name. See the "6.7.4 user file display and user name display Commands" section on page 6-26.	Yes	Yes	Yes
user passwd set	Sets the user password. See the "6.7.6 user passwd set Command" section on page 6-27.	Yes	Yes	Yes
user passwd set *username*	Sets another user's password. See the "6.7.6 user passwd set Command" section on page 6-27.	No	No	Yes
voa power input display	Displays VOA power input. See the "6.2.8 voa power input display Command" section on page 6-10.	Yes	Yes	Yes

6.2 Configuration Commands

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

6.2.1 srom cfg boot display Command

Command Types   **srom cfg boot display**

Syntax Description   `srom cfg boot display`
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

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

    Boot Count 2
       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
    CRC-32 8bd3cb56
```

6.2.2 srom cfg boot modify Command

Command Types   **srom cfg boot modify**

Syntax Description   `srom cfg boot modify`
Modifies the contents of the ROM boot. See Example 6-2.

Example 6-2   srom cfg boot modify Command

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

Boot Count = 2

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

Note   Boot type 1 = TFTP and boot type 2 = Flash.

6.2.3 srom cfg ip display Command

Command Types   **srom cfg ip display**

Syntax Description   srom cfg ip display
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

```
ash: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
```

6.2.4 srom cfg ip modify Command

Command Types   **srom cfg ip modify**

Syntax Description   srom cfg ip modify
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

```
ash: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
```

6.2.5 pdm busmode display Command

Command Types   **pdm busmode display**

Syntax Description   `pdm busmode display`
Displays power bus mode (simplex or duplex).

6.2.6 pdm cfg threshold bus display Command

Command Types   **pdm cfg threshold bus display**

Syntax Description   `pdm cfg threshold bus display`
Displays the minimum and maximum allowable power bus DC voltage.

Example 6-5   pdm cfg threshold bus display Command

```
ash:hostname:ONS15216 EDFA2> pdm cfg threshold bus display
BUS Threshold Low      = 40000(mV)
BUS Threshold High     = 57000(mV)
```

6.2.7 gain gain display Command

Command Types   **gain gain display**

Syntax Description   `gain gain display`
Displays the gain setting for the ONS 15216 EDFA2.

Example 6-6   gain gain display Command

```
ash:hostname:ONS15216 EDFA2> gain gain display
Target = 22000(mdB), Actual = 21985(mdB)
```

6.2.8 voa power input display Command

Command Types   **voa power input display**

Syntax Description   voa power input display
Displays variable optical attenuator (VOA) power input.

6.3 Administrative Commands

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

6.3.1 clear Command

Command Types   **clear**

Syntax Description   clear
Clears content from the terminal window. An empty screen with a cursor appears.

6.3.2 exit Command

Command Types   **exit**

Syntax Description   exit
Ends the session with the ONS 15216 EDFA2.

6.3.3 help Command

Command Types   **help**

Syntax Description   `help`
Displays a list of all CLI commands for current user security level.

6.3.4 history Command

Command Types   **history**

Syntax Description   `history`
Displays a list of commands issued by the user during that specific session. See Example 6-7.

Example 6-7   history Command

```
ash: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
```

6.3.5 login and logoff Commands

Command Types   **login** or **logoff**

Syntax Description   `login or logoff`
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 6-8.

Example 6-8   login Command

```
ash:hostname:ONS15216 EDFA2> login
```

```
Parameters
    user_name        (string[0..10])        name of user
```

6.3.6 processor reset Command

Command Types	**processor reset**

Syntax Description	`processor reset` Resets the processor on the ONS 15216 EDFA2. Although the performance of the amplifier is not affected, the user must log in again.

6.4 Shell Commands

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

6.4.1 shell lines set Command

Command Types	**shell lines set**

Syntax Description	`shell lines set #`*lines* Sets the number of lines that can be viewed on the screen without pressing Enter. 40 lines per screen is recommended (maximum is 999).

6.4.2 shell more enable and disable Commands

Command Types	**shell more enable or shell more disable**

Syntax Description	`shell more {enable	disable}` The s**hell 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.

6.4.3 shell status display Command

Command Types   **shell status display**

Syntax Description   `shell status display`
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 6-9.

Example 6-9   shell status display Command

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

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

6.4.4 shell type modify Command

Command Types   **shell type modify**

Syntax Description   `shell type modify {tl1 | ash}`
Sets the shell type to TL1 or ASH for the ONS 15216 EDFA2's RS-232 (EIA/TIA-232) port (accessed via HyperTerminal) and the default TCP/IP port on the ONS 15216 EDFA2's LAN port (accessed via Telnet). The default is TL1. This command requires a system reboot using the **processor reset** command for changes to take effect.

To return to the ASH shell from the TL1 shell, use the command **ED-NE-GEN.** (See Step 3 in the

6.5 Flash File System Commands

The flash file system (FFS) file commands allow the user to manage the number of files that are on the ONS 15216 EDFA2 Flash memory. Never erase the following files:

- Two current versions of software (15216EdfaSw_*x.x.x*)
- snmp.cfg
- passwd

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.

EDFA software image files are named using a special naming convention. Do not 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.

6.5.1 ffs file list Command

Command Types   ffs file list

Syntax Description   `ffs file list`
List the files on the ONS 15216 EDFA2 Flash memory. See Example 6-10.

Example 6-10   ffs file list Command

```
ash:hostname:ONS15216 EDFA2> ffs file list

--------name-------- type status   length  rename_bam attributes
  15216EdfaSw_2.3.0    1   fffc  xxxxxxx   ffffffff   ffffffff
           snmp.bak    1   fffc     1709   00140001   ffffffff
             passwd    2   fffc       -1   ffffffff   ffffffff
           snmp.cfg    1   fffc     1709   ffffffff   ffffffff
  15216EdfaSw_2.1.0    1   fffc  1681923   ffffffff   ffffffff
```

6.6 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:

- 6.6.1 snmp attribute get Command, page 6-15
- 6.6.2 snmp attribute list Command, page 6-15
- 6.6.3 snmp attribute set Command, page 6-16
- 6.6.4 snmp mib display Command, page 6-16
- 6.6.5 snmp mib get Command, page 6-17
- 6.6.6 snmp mib list Command, page 6-17
- 6.6.7 snmp row display Command, page 6-18
- 6.6.8 snmp row get Command, page 6-19
- 6.6.9 snmp row set Command, page 6-19
- 6.6.10 snmp subtree display Command, page 6-20
- 6.6.11 snmp subtree get Command, page 6-20
- 6.6.12 snmp subtree list Command, page 6-21
- 6.6.13 snmp table display Command, page 6-22
- 6.6.14 snmp table get Command, page 6-23
- 6.6.15 snmp table list Command, page 6-23
- 6.6.16 snmp tree attribute list Command, page 6-24

6.6.1 snmp attribute get Command

Command Types   **snmp attribute get**

Syntax Description   `snmp attribute get {`*IP_address* `| local}` *attribute_name index*
Accesses and displays a specific MIB attribute. See Example 6-11.

Example 6-11   snmp attribute get Command

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

attributes
    sysDescr                       "hostname, Hardware Rev B0, ONS15216 EDFA2, v2.1.9,
Serial No DIT05470008, MAC Addr 00059a383d11"
```

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 get Command List

```
ash: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
        ...
```

6.6.2 snmp attribute list Command

Command Types   **snmp attribute list**

Syntax Description   `snmp attribute list {`*IP_address* `| local}` *attribute_name*
Lists the value of an attribute for all table rows. See Example 6-13.

Example 6-13   snmp attribute list Command

```
ash: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;
```

6.6.3 snmp attribute set Command

Command Types   snmp attribute set

Syntax Description   snmp attribute set {*IP_address* | local} *attribute_name index new_value*
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 6-14.

Example 6-14   snmp attribute set Command

```
ash: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
        ...
```

6.6.4 snmp mib display Command

Command Types   snmp mib display

Syntax Description   `snmp mib display {IP_address | local} -all`
Displays all writable MIB attributes (or all accessible attributes if the -all option is used).

6.6.5 snmp mib get Command

Command Types   **snmp mib get**

Syntax Description   `snmp mib get {IP_address | local}`
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 6-15.

Example 6-15   snmp mib get Command

```
ash:hostname:ONS15216 EDFA2> snmp mib get local

attributes
    sysDescr        "mntuboot v0.0.0 ONS15216 EDFA2 v1.3.0, MAC Addr 0010b4000525"
    sysObjectID     cerent15216EdfaNode
    sysUpTime       24703705
    sysContact      ""
    sysName         "sysname"
    sysLocation     ""
    sysServices     0
    sysORLastChange 90

index
    sysORIndex      1
attributes
    sysORID         snmpBasicCompliance
    sysORDescr      ""
    sysORUpTime     24704075
```

6.6.6 snmp mib list Command

Command Types   **snmp mib list**

Syntax Description   `snmp mib list {IP_address | local}`
Displays the values of all attributes supported by the SNMP agent. Example 6-16.

Example 6-16   snmp mib list Command

```
ash:hostname:ONS15216 EDFA2> snmp mib list local

sysDescr.0 =  "hostname v3.0.0 ONS15216 EDFA2 v2.1.1, Serial No DIT0533000P, MAC
Addr 00059a383d10";
sysObjectID.0 =  { cerent15216EdfaNode };
sysUpTime.0 =  355920;
sysContact.0 =  "";
```

```
sysName.0 =  "sysname";
sysLocation.0 =  "";
sysServices.0 =  0;
sysORLastChange.0 =  135;
sysORID.1 =  { snmpBasicCompliance };
sysORID.2 =  { rs232Compliance };
sysORDescr.1 =  "";
sysORDescr.2 =  "";
sysORUpTime.1 =  355925;
sysORUpTime.2 =  355925;
ifNumber.0 =  3;
ifIndex.300 =  300;
ifIndex.302 =  302;
ifIndex.350 =  350;
ifDescr.300 =  "Intra-machine interface";
ifDescr.302 =  "Ethernet Interface";
ifDescr.350 =  "RS232 Interface";
ifType.300 =  softwareLoopback;
ifType.302 =  ethernetCsmacd;
ifType.350 =  rs232;
ifMtu.300 =  0;
ifMtu.302 =  1500;
ifMtu.350 =  0;
ifSpeed.300 =  0;
ifSpeed.302 =  10000000;
ifSpeed.350 =  19171;
...
```

6.6.7 snmp row display Command

Command Types   **snmp row display**

Syntax Description   *snmp row display {IP_address | local} row_name index*
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 6-17.

Example 6-17   snmp row display Command

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

        cerent15216EdfaCfgGroup
        cerent15216EdfaPumpCfgEntry
        cerent15216EdfaAlarmControl
        cerent15216EdfaStatusGroup
        cerent15216EdfaPumpStatusEntry
        cerent15216EdfaAlarmEntry
        cerent15216EdfaOpGroup
ash: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;
                          cerent15216EdfaCLEI =  "CLEI";
                          cerent15216EdfaPowerBusMode =  duplex;
                          cerent15216EdfaPowerBusDCVoltageMin =  480;
                          cerent15216EdfaPowerBusDCVoltageMax =  570;
                          cerent15216EdfaALSMode =  enabled;
```

6.6.8 snmp row get Command

Command Types   **snmp row get**

Syntax Description   *snmp row get {IP_address | local} row_name index*
Accesses a row. Use this command to obtain information to use with other commands. See
Example 6-18.

Example 6-18   snmp row get Command

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

CfgSa Lpo Lpo Lpo  LOST LOS  C C Ct C         CLEI PowerBu Pow Pow þALSMode
 true   0 200 100 -3000 100 -5 1 65 1     þ"cisco" þduplex 420 570 disabled
```

6.6.9 snmp row set Command

Command Types   **snmp row set**

Syntax Description   *snmp row set {IP_address | local} row_name index*
Sets data within a row. Use the **snmp row display** command first to view the contents of data within a
row. See Example 6-19.

Example 6-19   snmp row set Command

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

cerent15216EdfaAlarmEnableStatus enabled
cerent15216EdfaAlarmCfgPriority minor
```

6.6.10 snmp subtree display Command

Command Types   **snmp subtree display**

Syntax Description   `snmp subtree display {IP_address | local} subtree`
Displays the attributes below a node in a SNMP tree. See Example 6-20.

Example 6-20   snmp subtree display Command

```
ash:hostname:ONS15216 EDFA2> snmp subtree display local cerent15216EdfaCommunityEntry

BEGIN-HOST "testhost" 0.0.0.0 "private"

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaCommunityEntry ::=
{
    cerent15216EdfaCommIndex =  1;
    cerent15216EdfaCommName =  "public";
    cerent15216EdfaCommViewIndex =  1;
    cerent15216EdfaCommPrivileges =  247;
    cerent15216EdfaCommSrcIPAddr =  0.0.0.0;
    cerent15216EdfaCommNetMask =  255.255.255.255;
    cerent15216EdfaCommStatus =  active;
};
CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaCommunityEntry ::=
{
    cerent15216EdfaCommIndex =  2;
    cerent15216EdfaCommName =  "private";
    cerent15216EdfaCommViewIndex =  1;
    cerent15216EdfaCommPrivileges =  255;
    cerent15216EdfaCommSrcIPAddr =  0.0.0.0;
    cerent15216EdfaCommNetMask =  255.255.255.255;
    cerent15216EdfaCommStatus =  active;
...
```

6.6.11 snmp subtree get Command

Command Types   **snmp subtree get**

Syntax Description   `snmp subtree get {IP_address | local} subtree`
Accesses a subtree. See Example 6-21.

Example 6-21   snmp subtree get Command

```
ash:hostname:ONS15216 EDFA2> snmp subtree get local sysDescr

index
    sysORIndex                    1
attributes
    sysORID                       snmpBasicCompliance
    sysORDescr                    ""
```

```
        sysORUpTime                    391985

index
    sysORIndex                 2
attributes
    sysORID                    rs232Compliance
    sysORDescr                 ""
    sysORUpTime                391990

        3

index
    ifIndex                    300
attributes
    ifDescr                    "Intra-machine interface"
    ifType                     softwareLoopback
    ifMtu                      0
...
```

6.6.12 snmp subtree list Command

Command Types   **snmp subtree list**

Syntax Description   `snmp subtree list {IP_address | local}`
 Lists the attributes below a node in a SNMP tree. See Example 6-22.

Example 6-22   snmp subtree list Command

```
ash: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
        ...

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

sysDescr.0 =  "hostname v3.0.0 ONS15216 EDFA2 v2.3.0, Serial No DIT0533000P, MAC
Addr 00059a383d10";
```

```
sysObjectID.0 =  { cerent15216EdfaNode };
sysUpTime.0 =  35913255;
sysContact.0 =  "";
sysName.0 =  "sysname";
sysLocation.0 =  "";
sysServices.0 =  0;
sysORLastChange.0 =  120;
sysORID.1 =  { snmpBasicCompliance };
...
```

6.6.13 snmp table display Command

Command Types   **snmp table display**

Syntax Description   *snmp table display {IP_address | local}*
Displays table data for the ONS 15216 EDFA2. 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 6-23   snmp table display Command

```
ash: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
...


ash:hostname:ONS15216 EDFA2> snmp table display local system

CLASS SNMPv2-MIB.system ::=
{
    sysDescr =  "hostname v3.0.0 ONS15216 EDFA2 v2.3.0, Serial No DIT0533000P, MA
C Addr 00059a383d10";
    sysObjectID =  { cerent15216EdfaNode };
    sysUpTime =  35942955;
    sysContact =  "";
    sysName =  "sysname";
    sysLocation =  "";
    sysServices =  0;
```

```
                  sysORLastChange =  120;
            };
```

6.6.14 snmp table get Command

Command Types   **snmp table get**

Syntax Description   *snmp table get {IP_address | local} table*
Accesses table data. See Example 6-24.

Example 6-24   snmp table get Command

```
ash:hostname:ONS15216 EDFA2> snmp table get local system

attributes
    sysDescr                       "hostname, Hardware Rev A1, ONS15216 EDFA2,
v2.3.0, Serial No DIT0533000P, MAC Addr 00059a383d10"
    sysObjectID                    cerent15216EdfaNode
    sysUpTime                      1330310
    sysContact                     "username"
    sysName                        "sysname"
    sysLocation                    "Lab"
    sysServices                    0
    sysORLastChange                125
```

6.6.15 snmp table list Command

Command Types   **snmp table list**

Syntax Description   *snmp table list {IP_address | local} table*
Lists all the data within a table. Example 6-25 below displays the command for the UDP (User Datagram Protocol) table. This command displays data by attribute.

Example 6-25   snmp table list Command

```
ash:hostname:ONS15216 EDFA2> snmp table list local udp

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

6.6.16 snmp tree attribute list Command

Command Types   snmp tree attribute list

Syntax Description   `snmp tree attribute list`
Lists all the attributes implemented by the SNMP agent. See Example 6-26.

Example 6-26   snmp tree attribute list Command

```
ash: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
...
```

6.7 User Commands

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

6.7.1 user entry create Command

Command Types **user entry create**

Syntax Description `user entry create` *name user_mode*
Creates a new user. The parameters required to create a new user are user name, access level, and password.

The user_mode (access privilege level) is set by entering either read, read_write, or read_write_admin. See Table 6-1 on page 6-1 for the command privileges of each user level. The password must be an ASCII string of up to 10 characters, where at least 2 are non-alphabetic characters with at least one special character. Special characters are +, #, and %. See Example 6-27.

Example 6-27   user entry create Command

```
ash:hostname:ONS15216 EDFA2> user entry create jdoe read_write
New Password =
**********
Confirm New Password =
**********
```

6.7.2 user entry edit Command

Command Types **user entry edit**

Syntax Description `user entry edit` *username*
Edit a user's parameters (name, password, and access level). This command uses the optional parameters shown at the beginning of Example 6-28. The **-user_mode** parameter changes the access level (read, read_write, or read_write_admin). If the password is not to be changed, hit the **Enter** key when the new password is requested and confirmed, as shown in Example 6-29. This keeps the password unchanged.

Example 6-28   user entry edit Command (Change Password)

```
ash:hostname:ONS15216 EDFA2> user entry edit
Options
   -new_user_name    (string[0..10])        new name of user
   -user_mode        (string[0..16])        mode of user
Parameters
    user_name        (string[0..10])        name of user

ash:hostname:ONS15216 EDFA2> user entry edit jsmith
New Password =
******
Confirm New Password =
******
```

Example 6-29   user entry edit Command (Change Access Level)

```
ash:hostname:ONS15216 EDFA2> user entry edit jsmith -user_mode read_write
```

```
New Password =

Confirm New Password =
```

6.7.3 user entry delete Command

Command Types   **user entry delete**

Syntax Description   user entry delete *username*
Delete users. See Example 6-30.

Example 6-30 user entry delete Command

ash:*hostname*:ONS15216 EDFA2> **user entry delete jdoe**

6.7.4 user file display and user name display Commands

Command Types   **user file display** or **user name display**

Syntax Description   *user file display or user name display*
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.

The access privilege level is set by entering either read, read_write, or read_write_admin. See Table 6-1 on page 6-1 for the command privileges of each user level. Inactivity is the length of time of user inactivity before the user is automatically logged off. See Example 6-31.

Example 6-31 user file display Command

ash:*hostname*:ONS15216 EDFA2> **user file display**

```
User      Mode             Inactivity
CISCO15   read_write_admin 15
janedoe   read_write       30
jdoe      read_write       30
johndoe   read             60
```

6.7.5 user inactivity modify and user inactivity display Commands

Command Types   **user inactivity modify** or **user inactivity display**

Syntax Description   *user inactivity modify levelvalue* or user inactivity display

Inactivity is the length of time of user inactivity before the user is automatically logged off. Type the **user inactivity modify** command to change the inactivity values. Type the **user inactivity display** command to display the current inactivity values.

The default inactivity values for the read, read_write, and read_write_admin user access levels are 60, 30, and 15 minutes, respectively. Possible values are 0 to 99 (in minutes). A value of 0 means no timeout. See Example 6-32 and Example 6-33.

Example 6-32   user inactivity modify Command

```
ash:hostname:ONS15216 EDFA2> user inactivity modify read 75
```

Example 6-33   user inactivity display Command

```
ash:hostname:ONS15216 EDFA2> user inactivity display

Mode            Inactivity
read_write_admin 15
read_write      30
read            75
```

6.7.6 user passwd set Command

To restrict access to the ONS 15216 EDFA2, use the **user passwd set** command to change the default user password. Example 6-34 displays the **user passwd set** syntax for a current user. Example 6-35 displays the **user passwd set** *username* command for changing another user's password.

The password must be an ASCII string of up to 10 characters, where at least 2 are non-alphabetic characters with at least one special character. Special characters are +, #, and %. With the exception of the read_write_admin level user, the user can only modify their own password.

Example 6-34   Changing Current User's Password

```
ash:hostname:ONS15216 EDFA2> user passwd set
Password =
*****
New Password =
*******
Confirm New Password =
*******
```

Example 6-35   Changing Another User's Password

```
ash:hostname:ONS15216 EDFA2> user passwd set jdoe
Password =
****
New Password =
******
Confirm 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**.

6.7.7 user active list Command

Command Types   user active list

Syntax Description   `user active list`
Displays a list of the active users. See Example 6-36.

Example 6-36   user active list Command

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

Users
CISCO15
```

6.7.8 user active message send Command

Command Types   user active message send

Syntax Description   `user active message send ["message"]`
Sends a message to all current users on the system. See Example 6-37.

Example 6-37   user active message send Command

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

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

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

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

6.8 Manufacturing Information Access Commands

6.8.1 snmp table display local entPhysicalEntry Command

Command Types   snmp table display local entPhysicalEntry

Syntax Description   `snmp table display local entPhysicalEntry`
Displays the entity information. See Example 6-38.

Example 6-38   snmp table display local entPhysicalEntry Command

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

CLASS ENTITY-MIB.entPhysicalEntry ::=
{
    entPhysicalIndex =  1;
    entPhysicalDescr =  "ONS15216 EDFA2";
    entPhysicalVendorType =  { cerent15216EdfaChassis };
    entPhysicalContainedIn =  0;
    entPhysicalClass =  chassis;
    entPhysicalParentRelPos =  -1;
    entPhysicalName =  "hostname";
    entPhysicalHardwareRev =  "A0";
    entPhysicalFirmwareRev =  "v2.3.15";
    entPhysicalSoftwareRev =  "v2.4.0";
    entPhysicalSerialNum =  "DIT0533000P";
    entPhysicalMfgName =  "Cisco Systems";
    entPhysicalModelName =  "216EDFA2-A";
    entPhysicalAlias =  "";
    entPhysicalAssetID =  "";
    entPhysicalIsFRU =  true;
};
```

6.8.2 snmp table display local cerent15216EdfaCommTrapEntry Command

Command Types   **snmp table display local cerent15216EdfaCommTrapEntry**

Syntax Description   snmp table display local cerent15216EdfaCommTrapEntry
Displays information about autonomous messages (SNMP traps) going to destination manager's location
(IP address).

Example 6-39   snmp table display local cerent15216EdfaCommTrapEntry Command

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

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

CLASS CERENT-15216-EDFA-MIB.cerent15216EdfaCommTrapEntry ::=
{
    cerent15216EdfaCommTrapIndex =  2;
    cerent15216EdfaCommTrapCommunity =  "private";
    cerent15216EdfaCommTrapDestIPAddress =  172.22.87.254;
    cerent15216EdfaCommTrapDestUDPPort =  162;
    cerent15216EdfaCommTrapViewIndex =  1;
    cerent15216EdfaCommTrapVersion =  v2;
    cerent15216EdfaCommTrapStatus =  active;
```

```
};
```

6.9 Restore Commands

6.9.1 backup system Command

Command Types   **backup system**

Syntax Description   `backup system` *filename*
Creates a backup file on the FFS with the configuration information of the ONS 15216 EDFA2. This file contains manufacturing information about the unit that is being backed up (such as part number and serial number), setup information for the unit (such as IP address and host name), all configuration information (such as alarm thresholds and pump mode), and the user database.

6.9.2 restore system Command

Command Types   **restore system**

Syntax Description   `restore system` *filename*
Restores the configuration information from a backup file on the FFS to the ONS 15216 EDFA2. During this process, all configuration information (such as alarm thresholds and pump mode) and the user database from the file are replaced in the ONS 15216 EDFA2 memory and FFS. Before the restore begins, a cyclic redundancy code (CRC) check is performed to ensure data integrity.

6.10 Manufacturer Mode

A **manufacturer mode enable** command is available. It 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.**

6.10.1 manufacturer restore defaults passwords Command

Command Types   **manufacturer restore defaults passwords**

Syntax Description   `manufacturer restore defaults passwords`
Restores the manufacturing factory default passwords to the ONS 15216 EDFA2.

Note   If the password for the CISCO15 user is lost and there are not other users with read_write_admin access level in the system, the password for CISCO15 can be reset by following the procedure in "10.2.9 Lost Password" section on page 10-12.

6.10.2 manufacturer restore defaults all Command

Command Types   **manufacturer restore defaults all**

Syntax Description   `manufacturer restore defaults all`
Restores the manufacturing factory settings to the ONS 15216 EDFA2 and resets the unit. The files on the flash file system (FFS), the date and time, and the values of manufacturing calibration are not affected. When this command is entered the unit resets itself.

Warning   **This command resets the IP address, resets the hostname, deletes the user directory, reverts CISCO15 to the default password, and resets other parameters to restore the unit to its state as shipped from manufacturing.**

6.10.2 manufacturer restore defaults all Command

File Transfers

This chapter discusses how to get and send image and configuration files between an FTP or TFTP server and the ONS 15216 EDFA2.

7.1 FTP Command Line

To start an FTP session, use the following command:

```
ash:hostname:ONS15216 EDFA2> network host ftp 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.

7.1.1 Example of FTP from a Remote Server

The following procedure shows how to FTP an image file from a remote server to the FFS of the ONS 15216 EDFA2.

Step 1 Start FTP on the remote server.

Step 2 At the hostname prompt, enter the following command to log in to the FTP site.

```
ash:hostname:ONS15216 EDFA2> network host ftp FTP_server_IP_address
```

The ONS 15216 EDFA2 should respond as follows:

```
connecting to FTP_server_IP_address
connected to FTP_server_IP_address
```

Once the login process is completed, the ftp prompt should be available.

Step 3 At the ftp prompt, enter the command as shown below to complete the FTP logon.

```
ftp> login FTP_username
```

Step 4 When prompted, enter the FTP user password as shown.

```
Password: *****
```

The ONS 15216 EDFA2 should respond as follows:

```
230 User FTP_username logged in.
```

Step 5 At the ftp prompt, change directories to where the remote file is located using the following command:

```
ftp> cd /Directory_of_FTP_site
```

Step 6 At the ftp prompt, enter the following command:

```
ftp> type i
```

The ONS 15216 EDFA2 should respond as follows:

```
type set to BINARY
```

Step 7 At the ftp prompt, get the file from the remote server using the following command:

```
ftp> get 15216EdfaSw_2.x.x
```

When the command is entered, the file transfer begins. When the file transfer is complete, the following information should be displayed:

```
Bytes received: 1963195
Transfer complete.
```

Step 8 At the ftp prompt, enter the following command:

```
ftp> quit
```

The FTP session is terminated and the following response should be displayed:

```
Ftp session terminated.
```

The ONS 15216 EDFA2 then returns to the hostname prompt.

Step 9 At the hostname prompt, check that the file was transferred and is complete using the following command:

```
ash:hostname:ONS15216 EDFA2> ffs file list
```

7.1.2 Example of FTP to a Remote Server

The following procedure shows how to FTP a database backup file from the FFS of the ONS 15216 EDFA2 to a remote server.

Step 1 Start FTP on the remote server.

Step 2 At the hostname prompt, enter the following command to log in to the FTP site.

```
ash:hostname:ONS15216 EDFA2> network host ftp FTP_server_IP_address
```

The ONS 15216 EDFA2 should respond as follows:

```
connecting to FTP_server_IP_address
connected to FTP_server_IP_address
```

Once the login process is completed, the ftp prompt should be available.

Step 3 At the ftp prompt, enter the command as shown below to complete the FTP logon.

```
ftp> login FTP_username
```

Step 4 When prompted, enter the FTP user password as shown.

```
Password: *****
```

The ONS 15216 EDFA2 should respond as follows:

```
230 User FTP_username logged in.
```

Step 5   At the ftp prompt, change directories to where the file is to be placed using the following command:

```
ftp> cd /Directory_of_FTP_site
```

Step 6   At the ftp prompt, enter the following command:

```
ftp> type i
```

The ONS 15216 EDFA2 should respond as follows:

```
type set to BINARY
```

Step 7   At the ftp prompt, put the file on the remote server using the following command:

```
ftp> put bkupfilename.txt
```

When the command is entered, the file transfer begins. When the file transfer is complete, the following information should be displayed:

```
Bytes sent: 18547
Transfer complete.
```

Step 8   At the ftp prompt, enter the following command:

```
ftp> quit
```

The FTP session is terminated and the following response should be displayed:

```
Ftp session terminated.
```

The ONS 15216 EDFA2 then returns to the hostname prompt.

Step 9   On the remote server, check that the file is present and complete.

7.1.3 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 quit ftp 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_address  Open a connection to server at ip_address and port.
put local_file   Send 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.
```

7.2 TFTP File Transfer

TFTP can also be used to transfer files to and from an external server. See the sections below for examples of transferring a database backup file from and to and external server.

7.2.1 Example of TFTP from a Remote Server

To transfer a file from a TFTP server, see Example 7-2, which shows a database backup file transfer.

Example 7-2*   *TFTP Transfer of Database Backup File from TFTP Server

```
ash:hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaFfsOpGroup

cerent15216EdfaFfsOpAction perform
cerent15216EdfaFfsOpOperation cerent15216EdfaFfsTftpGet
cerent15216EdfaFfsOpRequestId 1
cerent15216EdfaFfsOpSrcName dbbkup
cerent15216EdfaFfsOpDstName dbbkup
cerent15216EdfaFfsOpTftpSrvAddr 10.75.0.32
```

7.2.2 Example of TFTP to a Remote Server

To transfer a file to a TFTP server, see Example 7-2, which shows a database backup file transfer.

Example 7-3*   *TFTP Transfer of Database Backup File to TFTP Server

```
ash:hostname:ONS15216 EDFA2> snmp row set local cerent15216EdfaFfsOpGroup

cerent15216EdfaFfsOpAction perform
cerent15216EdfaFfsOpOperation cerent15216EdfaFfsTftpPut
cerent15216EdfaFfsOpRequestId 1
cerent15216EdfaFfsOpSrcName dbbkup
cerent15216EdfaFfsOpDstName dbbkup
cerent15216EdfaFfsOpTftpSrvAddr 10.75.0.32
```

<CHAPTER>

C H A P T E R **8**

Provisioning with TL1

This chapter discusses the provisioning procedures for the Cisco ONS 15216 EDFA2 using TL1 commands in the TL1 shell. See Chapter 4, "Provisioning with ASH and SNMP" for provisioning information using command-line SNMP and proprietary commands in the ASH shell.

The provisioning procedure for the ONS 15216 EDFA2 in the TL1 shell is as follows:

1. 8.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal, page 8-1
2. 8.2 Set IP Address, page 8-3
3. 8.3 Log In via LAN Port Using Telnet (Optional), page 8-3
4. 8.4 Set Date and Time, page 8-4
5. 8.5 Set Power Bus Mode (Simplex or Duplex), page 8-4
6. 8.6 Verify Amplifier Operational Status, page 8-4
7. 8.7 Set Gain, page 8-5
8. 8.8 Set Alarm Thresholds, page 8-5
9. 8.9 Set Password, page 8-11
10. 8.10 Add Users, page 8-12
11. 8.11 Log Off, page 8-12
12. 8.12 Back Up System Configuration, page 8-12
13. 8.13 Restore System Configuration, page 8-13

The following sections describe these steps in detail.

8.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal

Logging in through the RS-232 (EIA/TIA-232) port is required to set the ONS 15216 EDFA2 IP address before there can be access via the LAN port (see the "8.3 Log In via LAN Port Using Telnet (Optional)" section on page 8-3).

Step 1   Connect to the RS-232 (EIA/TIA-232) port on the ONS 15216 EDFA2. See the "3.4.5.1 LAN Connection Procedure" section on page 3-15 for line connection and HyperTerminal setup instructions.

Step 2   Open HyperTerminal. (HyperTerminal can be found in the Microsoft Windows Accessories menu.)

Step 3   If you see the login window shown in Example 8-1 on page 8-2, skip to Step 4.

If the ONS 15216 EDFA2 has been set to ASH shell, this step may is be required to proceed in TL1 shell. When in ASH shell, the screens opens to a multi-line login screen beginning with -- LOGIN--- and with the cursor positioned in the Username line. To change to the TL1 shell, log in using the procedure in the , and then enter the following command at the ASH hostname prompt:

```
ash:hostname:ONS15216 EDFA2> shell type modify tl1
```

Then enter the following command at the ASH hostname prompt:

```
ash:hostname:ONS15216 EDFA2> processor reset
```

The ONS 15216 EDFA2 should log you off and then bring up the TL1 shell login prompt.

Step 4   Check that the ONS 15216 EDFA2 login prompt appears as shown in Example 8-1.

Example 8-1   TL1 Shell Login Prompt

```
>
```

Step 5   Log in using the **ACT-USER** command (see the) with the following syntax:

```
ACT-USER:[<tid>]:<uid>:<ctag>::<pid>;
```

The *tid* is the same as the *sidtidname* in the command line prompt (use is optional), *uid* is the user name, *ctag* is an arbitrary number to associate with the command, and *pid* is the user password. The default *uid* is CISCO15 with no *pid* (nothing between the last colon and semicolon).

> ✎
>
> **Note**   For security reasons, Cisco recommends changing the password from its default value. See the .

Step 6   After the semicolon is entered, the ONS 15216 EDFA2 displays the login response, as shown in Example 8-2.

Example 8-2   TL1 Shell Login Response

```
> ACT-USER::CISCO15:100;

    sidtidname 2002-07-11 10:09:19
M  100 COMPLD
    /* ACT-USER */
;

Welcome to ONS15216 EDFA2 Console (v2.4.0)
************************* Warning ********************************
This system is restricted to authorized users for business purposes.

Unauthorized access is a violation of the law. This service may be
monitored for administrative and security reasons.

By proceeding you consent to this monitoring.
********************************************************************

sidtidname:ONS15216 EDFA2>
```

An EIA/TIA-232 link to the ONS 15216 EDFA2 is established. The user can now provision the ONS 15216 EDFA2.

8.2 Set IP Address

Before connecting the ONS 15216 EDFA2 to a LAN, it is mandatory to set the ONS 15216 EDFA2 IP address through a local serial communication interface using the RS-232 (EIA/TIA-232) port on the front of the module.

Step 1   If you do not know the ONS 15216 EDFA2's IP address, subnet mask, gateway address, or sid/tid name, contact your network administrator.

Step 2   At the command prompt, enter the **ED-NE-GEN** command (see the "9.6.12 ED-NE-GEN" section on page 9-21) according to the following syntax:

```
ED-NE-GEN:[<tid>]::<ctag>:::[NAME=<name>],[IPADDR=<ipaddr>],[IPMASK=<ipmask>],[DEFRTR=<defrtr>];
```

The *name* is the sid/tid name in the command line prompt. See Example 8-3.

Example 8-3   Setting IP Address, Subnet Mask, Gateway Address, and sid/tid Name Using TL1

```
sidtidname:ONS15216 EDFA2> ED-NE-GEN:::101:::NAME=Amp01,IPADDR=192.167.3.4,IPMASK=255.255.255.0,DEFRTR=192.167.3.20;
```

Step 3   The system must be rebooted to make the IP address active. Use the **INIT-SYS** command (see the "9.6.17 INIT-SYS" section on page 9-28), as follows:

```
sidtidname:ONS15216 EDFA2> INIT-SYS::ALL:102::1;
```

8.3 Log In via LAN Port Using Telnet (Optional)

Provisioning of the ONS 15216 EDFA2 can be accomplished entirely through the RS-232 (EIA/TIA-232) port, so this step is optional. After an IP address is assigned, it may be easier to provision the ONS 15216 EDFA2 using Telnet. A Telnet client is needed for TL1 commands over IP. After connecting the ONS 15216 EDFA2 to the network through its RJ-45 LAN port (see the "3.4.5 LAN Interface (Ethernet)" section on page 3-14), the user can configure the module to accept TL1 commands via Telnet using the following procedure:

Step 1   Connect to the LAN port on the ONS 15216 EDFA2. See the "3.4.5.1 LAN Connection Procedure" section on page 3-15.

Step 2   **Click the Microsoft Windows Start menu and select Run**.

Step 3   In the text field, type the following:

```
telnet <ONS 15216 EDFA2 IP address> 3083
```

Specifying port 3083 ensures login through the TL1 shell. If no port is specified, the ONS 15216 EDFA2 responds in the shell that the ONS 15216 EDFA2 is set to. (TL1 is the default shell.)

Step 4 Log in again using Step 4 through Step 6 in the "8.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal" section on page 8-1.

You are now connected to the ONS 15216 EDFA2 via Telnet.

8.4 Set Date and Time

Use the **ED-DAT** command (see the "9.6.9 ED-DAT" section on page 9-19) to set the date and time. A time zone cannot be set using TL1. The time setting is restricted to universal coordinated time (UTC) according to the following syntax:

```
ED-DAT:[<tid>]::<ctag>::<utcdate>,<utctime>;
```

The utcdate and utctime entries must follow this format: yyyy-mm-dd,hh-mm-ss. See Example 8-4.

Example 8-4   Setting the Date and Time Using TL1

sidtidname:ONS15216 EDFA2> **ED-DAT:::120::2002-04-18,02-24-55;**

8.5 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. The default mode is duplex. Use the **ED-EQPT** command (see the "9.6.11 ED-EQPT" section on page 9-21) to set the desired power bus mode according to the following syntax:

```
ED-ENV:[<tid>]:<aid>:<ctag>:::PWRBUSMODE=<pwrbusmode>;
```

The pwrbusmode value can be SIMPLEX or DUPLEX. See Example 8-5.

Example 8-5   Setting the Power Bus Mode Using TL1

sidtidname:ONS15216 EDFA2> **ED-ENV::ALL:121:::PWRBUSMODE=SIMPLEX;**

8.6 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 **RTRV-DWDM** command (see the "9.6.33 RTRV-DWDM" section on page 9-56) to verify amplifier operational status according to the following syntax:

```
RTRV-DWDM:[<tid>]:<aid>:<ctag>;
    <sid> <date> <time>
M  <ctag>  COMPLD
   "<aid>:INPWRMICROW=<inputpoweruw>,INPWRDBM=<inputpowerdbm>,OUTPWRMILLIW=<outputpowermw>
,OUTPWRDBM=<outputpowerdbm>,PUMP1CTRLMODE=<pump1ctrlmode>,PUMP1CTRLVALUE=<pump1ctrlvalue>,
PUMP2CTRLMODE=<pump2ctrlmode>,PUMP2CTRLVALUE=<pump2ctrlvalue>,OVERALLGAINMEASURED=<gainmea
sured>,CONFIGGAIN=<gain>,PREATTMEASURED=<preattmeasured>,ALS=<als>"
```

Example 8-6 displays sample output of this command.

Example 8-6   Verifying the Amplifier Operations Status Using TL1

sidtidname:ONS15216 EDFA2> **RTRV-DWDM::ALL:122;**

   sidtidname 2002-07-11 10:20:05
M 122 COMPLD
   "1:INPWRMICROW=264,INPWRDBM=-1578,OUTPWRMILLIW=172,OUTPWRDBM=237,PUMP1CTRLMODE=GAINTEMP
,PUMP1CTRLVALUE=169,PUMP2CTRLMODE=GAINTEMP,PUMP2CTRLVALUE=169,OVERALLGAIN=169,PREATT=60"
;

The input power should be consistent with the input power measured during the optical connection procedure. See the "3.3.2 Optical Connection Procedure" section on page 3-4 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 2-3 on page 2-3.

8.7 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 3-1 on page 3-5.

To set the amplifier gain, use the **ED-DWDM** command (see the "9.6.10 ED-DWDM" section on page 9-19), according to the following syntax:

ED-DWDM:[<tid>]:<aid>:<ctag>:::[OVERALLGAIN=<gain>];

The *gain* is the desired gain multiplied by ten. For example, if the desired gain is 20 dB, the *gain* value would be set to 200.

Example 8-7   Setting the Gain Using TL1

sidtidname:ONS15216 EDFA2> **ED-DWDM::ALL:123:::OVERALLGAIN=200;**

Note   Prior to changing or implementing gain changes, consult with the Cisco TAC to ensure proper network operation.

8.8 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 8-1 on page 8-6.)

Figure 8-1   ONS 15216 EDFA2 Front Panel
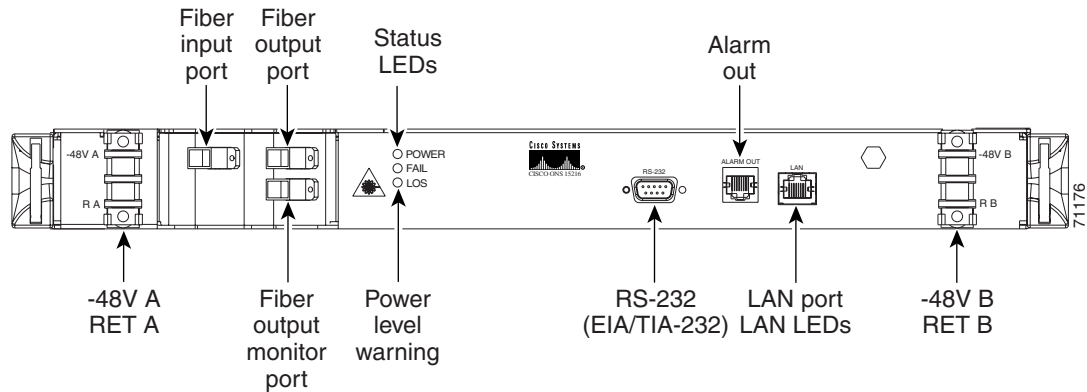
Alarms are reported for the following conditions:

- Degradation of electrical power source

- Laser pump overheating or excessive pump current

- Loss or degradation of optical input (signal)

- Loss of output power or gain out of range

- Case temperature out of range

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 9, "TL1 Commands."

To display the alarm thresholds, use the **RTRV-TH-DWDM** and **RTRV-TH-EQPT** commands (see the "9.6.39 RTRV-TH-DWDM" section on page 9-63 and the "9.6.40 RTRV-TH-EQPT" section on page 9-64) according to the following syntax:

```
RTRV-TH-DWDM:[<tid>]:<aid>:<ctag>::[<thresholdtype>][,][,];
   <sid> <date> <time>
M <ctag> COMPLD
   "<aid>,DWDM:<thresholdtype>,,,<thresholdvalue>"

RTRV-TH-EQPT:[<tid>]:<aid>:<ctag>::[<thresholdtype>][,][,];
   <sid> <date> <time>
M  <ctag> COMPLD
   "<aid>:<thresholdtype>,,,<thresholdvalue>"
```

Example 8-8 shows sample command outputs.

Example 8-8   Displaying the Alarm Thresholds Using TL1

```
sidtidname:ONS15216 EDFA2> RTRV-TH-DWDM::ALL:124;

   sidtidname 2002-07-11 11:15:19
M  124 COMPLD
   "1,DWDM:LOSTH,,,-3000"
   "1,DWDM:LOSHYST,,,5"
   "1,DWDM:LPOUTDEV,,,1000"
   "1,DWDM:LPOUTHYST,,,5"
   "1,DWDM:LPOUTSETPT,,,0"
;
sidtidname:ONS15216 EDFA2> RTRV-TH-EQPT::ALL:125;
```

```
        sidtidname 2002-07-11 11:16:10
M   125 COMPLD
    "EQPT:MAXCTMP,,,65"
    "EQPT:MAXCTMPHYST,,,5"
    "EQPT:MINCTMP,,,10"
    "EQPT:MINCTMPHYST,,,2"
    "PWR-A:PWRBUSMIN,,,420"
    "PWR-A:PWRBUSMAX,,,570"
    "PWR-B:PWRBUSMIN,,,420"
    "PWR-B:PWRBUSMAX,,,570"
;
```

To set the alarm thresholds, use the **SET-TH-DWDM** and **SET-TH-EQPT** commands (see the "9.6.46 SET-TH-DWDM" section on page 9-71 and the "9.6.47 SET-TH-EQPT" section on page 9-72). Alarm threshold attributes are described in Table 8-1.

Table 8-1   Alarm Threshold Attribute Definitions

Attribute	Variable Definition	Syntax	Maximum Access	Description
LOSTH	Loss of signal (input power) threshold	Integer (–3100 to –1500, –3000 default)	Read-write	Alarm 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 the Cisco TAC 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.
LOSHYST	Loss of signal (input power) hysteresis	Integer (0 to 1000, 100 default)	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 the Cisco TAC to determine the correct value for your application. As a guideline, Cisco recommends setting the value 1 dB above the LOS Threshold value. With this setting, the module will clear the alarm if it detects a signal level of 1 dB above the current LOS Threshold value. Valid entries are between 0 and 1000 and are in dB times 100. For example, if the hysteresis required is 1 dB, the power alarm hysteresis is 100.

Table 8-1   Alarm Threshold Attribute Definitions (continued)

Attribute	Variable Definition	Syntax	Maximum Access	Description
LPOUTDEV	Loss of output power deviation	Integer (0 to 1000, 200 default)	Read-write	Can be disregarded when operating amplifier in factory default Constant Gain Temperature Compensated mode. Deviation object is only valid when amplifier is used in Constant Output Power and Idle modes.
LPOUTHYST	Loss of output power hysteresis	Integer (0 to 1000, 100 default)	Read-write	Can be disregarded when operating amplifier in factory default Constant Gain Temperature Compensated mode. Hysteresis object is only valid when amplifier is used in Constant Output Power and Idle modes.
LPOUTSETPT	Loss of output power setpoint	Integer (0 to 1000, 0 default)	Read-only	Can be disregarded when operating amplifier in factory default Constant Gain Temperature Compensated mode. Setpoint object is only valid when amplifier is used in Constant Output Power and Idle modes.
MAXCTMP	Maximum case temperature	Integer (20 to 70, 70 default)	Read-write	Alarm 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 the Cisco TAC to determine the correct value for your application. As a guideline, Cisco recommends that maximum case temperature value be set at 50°C. Valid entries are between 20 and 70°C.
MAXCTMPHYST	Maximum case temperature hysteresis	Integer (0 to 10, 1 default)	Read-write	Used to set the amount that the case temperature of module must drop below the maximum case temperature alarm level before the alarm is cleared. Set the hysteresis at a value that is appropriate for the application so that the alarm condition clears when the input is stable. Consult with the Cisco TAC to determine the correct 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.

Table 8-1   Alarm Threshold Attribute Definitions (continued)

Attribute	Variable Definition	Syntax	Maximum Access	Description
MINCTMP	Minimum case temperature	Integer (–10 to 10, –5 default)	Read-write	Alarm notifies operations personnel 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. Consult with the Cisco TAC to determine the correct value for your application. As a guideline, Cisco recommends that minimum case temperature be set at 1°C. Valid entries are between –10 and 10°C.
MINCTMPHYST	Minimum case temperature hysteresis	Integer (0 to 10, 1 default)	Read-write	Used to set the amount that the case temperature of the module must rise above the minimum case temperature alarm level before the alarm is cleared. Set the hysteresis at a value that is appropriate for the application so that the alarm condition clears when the input is stable. Consult with the Cisco TAC to determine the correct value for your application. As a guideline, Cisco recommends that the hysteresis value be set at 1°C. Valid entries are between 0 and 10°C. Setting this value to 0 disables this option.

Table 8-1   Alarm Threshold Attribute Definitions (continued)

Attribute	Variable Definition	Syntax	Maximum Access	Description
PWRBUSMIN	Power bus minimum voltage	Integer (350 to 700, 420 default)	Read-write	Minimum allowable power bus DC voltage. The default minimum power bus voltage is set at –42 VDC. Valid entries are between 350 and 700 and are in negative volts times 10. For example, if the voltage required is –40 VDC, the power bus setting is 400. The power bus threshold has a 1.5V tolerance and a 1.0V hysteresis. There is a potential ±1.5V inaccuracy in the ONS 15216 EDFA2 voltage measurement. If the minimum threshold is configured at 420 (-42 VDC), the alarm may raise anywhere between -42 to -40.5V and will not clear until the voltage measures above -43 VDC.
PWRBUSMAX	Power bus maximum voltage	Integer (350 to 700, 570 default)	Read-write	Maximum allowable power bus DC voltage. The default maximum power bus voltage is set at –57 VDC. Valid entries are between 350 and 700 and are in negative volts times 10. For example, if the voltage required is –57 VDC, the power bus setting is 570. The power bus threshold has a 1.5V tolerance and a 1.0V hysteresis. There is a potential ±1.5V inaccuracy in the ONS 15216 EDFA2 voltage measurement. If the maximum threshold is configured at 570 (-57 VDC), the alarm may raise anywhere between -57 to -58.5V and will not clear until the voltage measures below -56 VDC.

8.9 Set Password

To restrict access to the ONS 15216 EDFA2, use the **ED-PID** command (see the "9.6.13 ED-PID" section on page 9-23) to change the default user password according to the following syntax:

ED-PID:[<tid>]:<uid>:<ctag>::<oldpid>,<newpid>;

Note that the password must be a string of up to 10 characters, where at least 2 are non-alphabetic characters and at least 1 is a special character. The administrator can set a new password without entering the old password. See Example 8-9.

Example 8-9   Changing Current User's Password Using TL1

sidtidname:ONS15216 EDFA2> **ED-PID::CISCO15:130::OLDPW,*****;**

Note   The default user name for the administrator level is CISCO15 with no default password.

8.10 Add Users

Use the **ENT-USER-SECU** command (see the "9.6.14 ED-USER-SECU" section on page 9-23) to add new users to the ONS 15216 EDFA2 according to the following syntax:

```
ENT-USER-SECU:[<tid>]:<uid>:<ctag>::<pid>,,<al>[:];
```
The uid is the user name, pid is the password, and al is the access level (R, RW, RWA). Passwords must be an ASCII string of up to 10 characters, where at least 2 are non-alphabetic characters with at least one special character. Special characters are +, #, and %. The access levels are presented in the "9.5 Summary of Security Permissions for TL1 Commands" section on page 9-6. See Example 8-10 on page 8-12.

Example 8-10   Adding a New User Using TL1

sidtidname:ONS15216 EDFA2> **ENT-USER-SECU::jsmith:140::jspasswd,,RW;**

8.11 Log Off

At the end of a session, the user must log off of the ONS 15216 EDFA2. To log off, use the **CANC-USER** command (see the "9.6.4 CANC-USER" section on page 9-14) according to the following syntax:

```
CANC-USER:[<tid>]:<uid>:<ctag>;
```

See Example 8-11.

Example 8-11   Logging Off Using TL1

sidtidname:ONS15216 EDFA2> **CANC-USER::CISCO15:150;**

8.12 Back Up System Configuration

The configuration information for the ONS 15216 EDFA2 can be saved in a file for later use or to configure other ONS 15216 EDFA2 units. This file contains manufacturing information about the unit that is being backed up (such as part number and serial number), setup information for the unit (such as IP address and host name), all configuration information (such as alarm thresholds and pump mode), and the user database.

The backup file is saved with cyclic redundancy code (CRC) to ensure data integrity, and the user names, passwords, and other system settings are encrypted for security. The file header, which identifies the node name, IP address, and software version, is text readable. Only the configuration information and user database are copied back to the ONS 15216 EDFA2 during a restore.

Step 1   Back up the system configuration to a file on the FFS.

sidtidname:ONS15216 EDFA2> **CPY-MEM:Amp01::123::CFG,DBCFG,*filename*;**

```
    Amp01 2004-03-01 17:22:43
* þ12 REPT ALM EQPT
  þ"EQPT:MN,DBBACKUP,NSA,3-1,17-22-43,,:\"Database Backup In Progress\""
;

    Amp01 2004-03-01 17:22:45
M þ123 COMPLD
  þ/* CPY-MEM */
;

    Amp01 2004-03-01 17:22:46
A þ13 REPT ALM EQPT
  þ"EQPT:CL,DBBACKUP,NSA,3-1,17-22-46,,:\"Database Backup In Progress\""
;
```

Step 2   If desired, use the **COPY-RFILE** command to copy the file to a remote server. See the
"9.6.5 COPY-RFILE" section on page 9-15.

8.13 Restore System Configuration

The configuration information for the ONS 15216 EDFA2 can be restored form a file. During this
process, all configuration information (such as alarm thresholds and pump mode) and the user database
from the file are replaced in the ONS 15216 EDFA2 memory and FFS.

Before the restore begins, a cyclic redundancy code (CRC) check is performed to ensure data integrity.

Step 1   If desired, use the **COPY-RFILE** command to copy a backup file from a remote server. See the
"9.6.5 COPY-RFILE" section on page 9-15.

Step 2   Restore the system configuration from the file on the FFS.

sidtidname:ONS15216 EDFA2> **CPY-MEM:::123::*filename*,FFS,CFG;**

```
    Amp01 2004-03-01 17:23:34
* þ14 REPT ALM EQPT
  þ"EQPT:MN,DBRESTORE,NSA,3-1,17-23-34,,:\"Database Restore In Progress\""
;

    Amp01 2004-03-01 17:23:50
M þ123 COMPLD
  þ/* CPY-MEM */
;

    Amp01 2004-03-01 17:23:51
A þ15 REPT ALM EQPT
  þ"EQPT:CL,DBRESTORE,NSA,3-1,17-23-51,,:\"Database Restore In Progress\""
;
```

Step 3   Reboot the ONS 15216 EDFA2.

sidtidname:ONS15216 EDFA2> **INIT-SYS::ALL:124::1;**

After the processor reboots, user names and passwords from the new, restored user database must be used
for access.

9

TL1 Commands

This chapter provides the details of TL1 commands supported by the Cisco ONS 15216 EDFA2. This chapter also maps various TL1 command parameters to their SNMP counterpart attributes in the ONS 15216 EDFA2 MIB (CERENT-15216-EDFA-MIB.mib).

9.1 Connection to the ONS 15216 EDFA2

The ONS 15216 EDFA2 system supports up to ten simultaneous Telnet connections via the Ethernet LAN port. TL1 sessions are available on TCP/IP port 3082 for raw TL1 and/or port 3083 for TL1 over Telnet. When connected, the **ACT-USER** command activates a session. (See the "8.3 Log In via LAN Port Using Telnet (Optional)" section on page 8-3.)

9.2 Explanation of Command Parameters

TL1 messages are grouped into autonomous and non-autonomous types. Autonomous messages are generated as a result of activity on the network elements such as alarms, thresholds, alerts and status information. No request is required in order to receive autonomous messages. Non-autonomous messages consist of a request command and a response from the ONS 15216 EDFA2. Autonomous messages and non-autonomous commands use a common set of parameters. Some of the most common parameters are defined in the following sections.

9.2.1 Source Identifier (sid) and Target Identifier (tid)

The source identifier (*sid*) or target identifier (*tid*) parameters uniquely identify an ONS 15216 EDFA2. For the ONS 15216 EDFA2, *sid* and *tid* are the same. While the TL1 shell uses the sid/tid name in its command line prompt, the ASH shell uses the host name. The sid/tid name is the same as the sysName in the SNMP MIBs.

9.2.2 Command Code Modifier (ccm)

The command code modifier (*ccm*) identifies the object of the action being applied by the verb of the TL1 command. Some command code modifiers for the ONS 15216 EDFA2 are described in Table 9-1.

Table 9-1   Command Code Modifiers

ccm	Description
DWDM	Optical parameters.
EQPT	General parameters of the ONS 15216 EDFA2.
FXFR	File transfer parameters.

9.2.3 Access Identifier (aid)

The access identifier (*aid*) parameter uniquely identifies an object within the ONS 15216 EDFA2. For the ONS 15216 EDFA2, there are four specific *aid*s (1, EQPT, PWR-A, PWR-B) and the ALL *aid*, as described in Table 9-2. All autonomous messages identify their specific *aid* in the message. For all command inputs that require an *aid* as a mandatory parameter, the ALL *aid* is accepted as well as any relevant specific *aid*s. If the ALL *aid* is used in a command, the response contains the appropriate specific *aid*. For the commands **RTRV-ALM-EQPT** and **RTRV-COND-EQPT**, inputting a specific *aid* filters the response to information relevant to that *aid*.

Table 9-2   Access Identifiers

aid	Description
1	Directly affecting the optical signal.
EQPT	General parameters of the ONS 15216 EDFA2 (not directly affecting optical signal).
PWR-A	Affecting Power Bus A.
PWR-B	Affecting Power Bus B.
ALL	Any or all of the preceding (command input only).

9.2.4 Correlation Tag (ctag)

The correlation tag (*ctag*) is a unique tag associated with a command. If the user specifies a *ctag* while entering a command, the response of that command from the ONS 15216 EDFA2 TL1 agent carries the same *ctag* value. The *ctag* consists of no more than six alphanumeric characters.

9.3 Notation

The commands described in this document use the symbols shown in Table 9-3 to describe the command format. These symbols are derived from the Telcordia Network Maintenance: Network Element and Transport Surveillance Messages Manual (Generic Requirements, GR-833-CORE).

Table 9-3   TL1 Notation Symbols

Symbol	Meaning	Description
[ ]	Optional expression	Square brackets indicate the parameters are optional. An optional parameter means that if a user inputs an empty field for an optional parameter, then a default value (or a default action) will be substituted automatically in the transmitted input field. The default value, or null value, is defined in the parameter descriptions of the messages.
< >	Variable expression	Angle brackets enclose one or more variable items in the command line, e.g., <date>, <time>, <aid>, etc.
		Italics are used to note variables in paragraph text, e.g., *date*, *time*, *aid*, etc.
+	More than one time	Plus signs indicate that preceding symbol or group of symbols (enclosed in parentheses) may occur one or more times.
text	Indent of three spaces	An indented line indicates an entry of three spaces in the command line.

9.4 Summary of Autonomous Alarms and Messages

Table 9-4 summarizes the ONS 15216 EDFA2 autonomous alarms and cleared alarms.

Table 9-4   TL1 Autonomous Alarms and Cleared Alarms

TL1 Autonomous Message	Condition Type (condtype)	Condition Descriptor (conddescr)	Access Identifier (aid)	Default Notification Code (ntfcncde)[1]	Service Effect (srveff)[2]
REPT ALM DWDM[3]	LOS	Loss Of Signal (input power)	1	MJ/CL	SA
REPT ALM DWDM[3]	GAIN	Gain Out Of Range	1	MJ/CL	SA
REPT ALM DWDM[3]	LPOUT	Loss Of Output Power	1	MJ/CL	SA
REPT ALM EQPT	CTMP	Case Temperature Out Of Range	EQPT	MN/CL	NSA
REPT ALM EQPT	DBBACKUP	Database Backup In Progress	EQPT	MN/CL	NSA
REPT ALM EQPT	DBRESTORE	Database Restore In Progress	EQPT	MN/CL	NSA
REPT ALM EQPT	LCRNT1	Excessive Pump1 Current	EQPT	MN/CL	NSA
REPT ALM EQPT	LCRNT2	Excessive Pump2 Current	EQPT	MN/CL	NSA
REPT ALM EQPT	LTMP1	Excessive Pump1 Temperature	EQPT	MN/CL	NSA
REPT ALM EQPT	LTMP2	Excessive Pump2 Temperature	EQPT	MN/CL	NSA

Table 9-4   TL1 Autonomous Alarms and Cleared Alarms (continued)

TL1 Autonomous Message	Condition Type (condtype)	Condition Descriptor (conddescr)	Access Identifier (aid)	Default Notification Code (ntfcncde)[1]	Service Effect (srveff)[2]
REPT ALM EQPT	PWRBUSA	Power Bus A (voltage) Alarm	PWR-A	MN/CR[4] /CL	NSA
REPT ALM EQPT	PWRBUSB	Power Bus B (voltage) Alarm	PWR-B	MN/CR[4] /CL	NSA
REPT ALM EQPT	SFTWDOWN	Software Download In Progress	EQPT	MN/CL	NSA

1. CR = Critical, MJ = Major, MN = Minor, CL = Cleared (Alarm).

2. SA = Service Affecting, NSA = Non Service Affecting.

3. The messages for Loss of Signal (LOS), Gain Out of Range (GAIN), and Loss of Output Power (LPOUT) are prioritized (in the order just listed) so that only one message can be delivered at one time. For example, if the ONS 15216 EDFA2 detects both a loss of input signal and a loss of output power at the same time, it will deliver only the Loss of Signal (LOS) message to the user. This prioritized filtering of alarms does not occur with the SNMP delivery of alarms of the ONS 15216 EDFA2.

4. If the power system is in simplex mode, a power bus alarm is Critical by default. If the power system is in duplex mode, a single power bus alarm is Minor by default, and if an alarm is raised on both power buses, the second alarm is Critical.

Table 9-5 summarizes the ONS 15216 EDFA2 autonomous events.

Table 9-5   TL1 Autonomous Events

TL1 Autonomous Message	Condition Type (condtype)	Condition Descriptor (conddescr)	Access Identifier (aid)	Condition Effect (condeff)[1]
REPT EVT DWDM	ALSCHGD	ALS (automatic laser shutdown) Changed	1	TC
REPT EVT DWDM	CTRLMODE1	Pump1 Control Mode Changed	1	TC
REPT EVT DWDM	CTRLMODE2	Pump2 Control Mode Changed	1	TC
REPT EVT DWDM	GAIN	Gain Out Of Range (alarm)	1	SC/CL
REPT EVT DWDM	GAINCHGD	Overall Gain Changed	1	TC
REPT EVT DWDM	LOS	Loss Of Signal (input power) (alarm)	1	SC/CL
REPT EVT DWDM	LOSHYSTCHGD	LOS (loss of signal) Hysteresis Changed	1	TC
REPT EVT DWDM	LOSTHCHGD	LOS (loss of signal) Threshold Changed	1	TC
REPT EVT DWDM	LPOUT	Loss Of Output Power (alarm)	1	SC/CL
REPT EVT DWDM	LPOUTCHGD	Loss Of Output Power Setpoint Changed	1	TC

Table 9-5   TL1 Autonomous Events (continued)

TL1 Autonomous Message	Condition Type (condtype)	Condition Descriptor (conddescr)	Access Identifier (aid)	Condition Effect (condeff)[1]
REPT EVT DWDM	LPOUTDEVCHGD	Lpout (loss of output power) Deviation Changed	1	TC
REPT EVT DWDM	LPOUTHYSTCHGD	Lpout (loss of output power) Hysteresis Changed	1	TC
REPT EVT DWDM	PREATTCHGD	Pre-attenuation Changed	1	TC
REPT EVT EQPT	CONFIGSAVED	Config Saved	EQPT	TC
REPT EVT EQPT	CTMP	Case Temperature Out Of Range (alarm)	EQPT	SC/CL
REPT EVT EQPT	CUTOVERRESET	(Software) Reset After Cutover	EQPT	TC
REPT EVT EQPT	DBBACKUP	Database Backup In Progress (alarm)	EQPT	SC/CL
REPT EVT EQPT	DBBKRTCRCERR	Database Backup/Restore CRC Error	EQPT	TC
REPT EVT EQPT	DBBKRTERR	Database Backup/Restore Error	EQPT	TC
REPT EVT EQPT	DBBKRTFILEERR	Database Backup/Restore File Error	EQPT	TC
REPT EVT EQPT	DBBKRTOBJERR	Database Backup/Restore Object Error	EQPT	TC
REPT EVT EQPT	DBBKRTSNMPERR	Database Backup/Restore SNMP Error	EQPT	TC
REPT EVT EQPT	DBBKRTTOERR	Database Backup/Restore Timeout Error	EQPT	TC
REPT ALM EQPT	DBRESTORE	Database Restore In Progress (alarm)	EQPT	SC/CL
REPT EVT EQPT	LCRNT1	Excessive Pump1 Current (alarm)	EQPT	SC/CL
REPT EVT EQPT	LCRNT2	Excessive Pump2 Current (alarm)	EQPT	SC/CL
REPT EVT EQPT	LTMP1	Excessive Pump1 Temperature (alarm)	EQPT	SC/CL
REPT EVT EQPT	LTMP2	Excessive Pump2 Temperature (alarm)	EQPT	SC/CL
REPT EVT EQPT	MAXCTMPCHGD	Max Case Temperature Changed	EQPT	TC
REPT EVT EQPT	MAXCTMPHYSTCHGD	Max Ctmp (case temperature) Hysteresis Changed	EQPT	TC

Table 9-5   TL1 Autonomous Events (continued)

TL1 Autonomous Message	Condition Type (condtype)	Condition Descriptor (conddescr)	Access Identifier (aid)	Condition Effect (condeff)[1]
REPT EVT EQPT	MINCTMPCHGD	Min Case Temperature Changed	EQPT	TC
REPT EVT EQPT	MINCTMPHYSTCHGD	Min Ctmp (case temperature) Hysteresis Changed	EQPT	TC
REPT EVT EQPT	PWRBUSA	Power Bus A (voltage) Alarm	PWR-A	SC/CL
REPT EVT EQPT	PWRBUSB	Power Bus B (voltage) Alarm	PWR-B	SC/CL
REPT EVT EQPT	PWRBUSMAXCHGD	Power Bus Max (voltage) Changed	PWR-A	TC
REPT EVT EQPT	PWRBUSMINCHGD	Power Bus Min (voltage) Changed	PWR-A	TC
REPT EVT EQPT	PWRBUSMODE	Power Bus Mode Changed	PWR-B	TC
REPT EVT EQPT	SEVERITYCHGD	Severity Changed from CR|MJ|MN|NA|NR to CR|MJ|MN|NA|NR	EQPT	TC
REPT ALM EQPT	SFTWDOWN	Software Download In Progress (alarm)	EQPT	SC/CL
REPT EVT EQPT	SFTWDOWNERR	Software Load Error	EQPT	TC
REPT EVT EQPT	SOFTWARERESET	Software Reset	EQPT	TC
REPT EVT EQPT	SOFTWARERESETERR	Software Reset Error	EQPT	TC

1. TC = Transient Condition, SC = Standing Condition, CL = Cleared (Standing Condition).

Table 9-6 summarizes the ONS 15216 EDFA2 file transfer events.

Table 9-6   TL1 Autonomous File Transfer Events

Autonomous TL1 Message	File Transfer Status (fxfr_status)	File Transfer Result (fxfr_rslt)	Access Identifier (aid)
REPT EVT FXFR	START		EQPT
REPT EVT FXFR	COMPLD	SUCCESS	EQPT
		FAILURE	EQPT

9.5 Summary of Security Permissions for TL1 Commands

Table 9-7 summarizes the security permissions (access levels) for each available TL1 command and autonomous message.

Table 9-7   TL1 Commands and Messages Security Permissions (Access Levels)

Command or Message	Description	User Access Levels		
		R	RW	RWA
ACT-USER	Activates user session (login). See the "9.6.1 ACT-USER" section on page 9-10.	Yes	Yes	Yes
ALW-MSG-ALL	Allows automatic (REPT) messages. See the "9.6.2 ALW-MSG-ALL" section on page 9-11.	Yes	Yes	Yes
APPLY	Applies software cutover. See the "9.6.3 APPLY" section on page 9-14.	No	No	Yes
CANC-USER	Cancels user session (logoff). See the "9.6.4 CANC-USER" section on page 9-14.	Yes	Yes	Yes
COPY-RFILE	Copies remote or local file to FFS. See the "9.6.5 COPY-RFILE" section on page 9-15.	No	Yes	Yes
CPY-MEM	Copies log file from RAM to FFS. See the "9.6.6 CPY-MEM" section on page 9-16.	No	Yes	Yes
DLT-RFILE	Deletes file from FFS. See the "9.6.7 DLT-RFILE" section on page 9-18.	No	Yes	Yes
DLT-USER-SECU	Deletes a user. See the "9.6.8 DLT-USER-SECU" section on page 9-18.	No	No	Yes
ED-DAT	Edits date and time. See the "9.6.9 ED-DAT" section on page 9-19.	No	No	Yes
ED-DWDM	Edits optical parameters. See the "9.6.10 ED-DWDM" section on page 9-19.	No	Yes	Yes
ED-EQPT	Edits power bus mode. See the "9.6.11 ED-EQPT" section on page 9-21.	No	Yes	Yes
ED-NE-GEN	Edits general IP-related parameters. See the "9.6.12 ED-NE-GEN" section on page 9-21.	No	Yes	Yes
ED-PID	Edits user password. See the "9.6.13 ED-PID" section on page 9-23.	Yes (own UID)	Yes (own UID)	Yes (all UIDs)
ED-USER-SECU	Edits a user's name and parameters. See the "9.6.14 ED-USER-SECU" section on page 9-23.	No	No	Yes

Table 9-7   TL1 Commands and Messages Security Permissions (Access Levels) (continued)

Command or Message	Description	User Access Levels		
		R	RW	RWA
ENT-USER-SECU	Enters new user. See the "9.6.15 ENT-USER-SECU" section on page 9-24.	No	No	Yes
INH-MSG-ALL	Inhibits some automatic messages. See the "9.6.16 INH-MSG-ALL" section on page 9-25.	Yes	Yes	Yes
INIT-SYS	Initializes (reboots) system. See the "9.6.17 INIT-SYS" section on page 9-28.	No	Yes	Yes
REPT ALM DWDM	Message that reports optical alarm activation/clearing. See the "9.6.18 REPT ALM DWDM" section on page 9-29.	Yes	Yes	Yes
REPT ALM EQPT	Message that reports general alarm activation/clearing. See the "9.6.19 REPT ALM EQPT" section on page 9-31.	Yes	Yes	Yes
REPT EVT DWDM REPT EVT EQPT	Message that reports event logging. See the "9.6.20 REPT EVT DWDM / REPT EVT EQPT" section on page 9-33.	Yes	Yes	Yes
REPT EVT FXFR	Message that reports FTP file transfer. See the "9.6.21 REPT EVT FXFR" section on page 9-36.	Yes	Yes	Yes
RTRV-ALM-ALL	Retrieves all current alarms. See the "9.6.22 RTRV-ALM-ALL" section on page 9-37.	Yes	Yes	Yes
RTRV-ALM-DWDM	Retrieves current optical alarms. See the "9.6.23 RTRV-ALM-DWDM" section on page 9-40.	Yes	Yes	Yes
RTRV-ALM-EQPT	Retrieves current general alarms. See the "9.6.24 RTRV-ALM-EQPT" section on page 9-41.	Yes	Yes	Yes
RTRV-AO	Retrieves most-recent autonomous output (REPT) messages. See the "9.6.25 RTRV-AO" section on page 9-43.	Yes	Yes	Yes
RTRV-ATTR-ALL	Retrieves alarm severity of all alarms. See the "9.6.26 RTRV-ATTR-ALL" section on page 9-44.	Yes	Yes	Yes

Table 9-7   TL1 Commands and Messages Security Permissions (Access Levels) (continued)

Command or Message	Description	User Access Levels		
		R	RW	RWA
RTRV-ATTR-DWDM	Retrieves alarm severity of optical alarms. See the "9.6.27 RTRV-ATTR-DWDM" section on page 9-46.	Yes	Yes	Yes
RTRV-ATTR-EQPT	Retrieves alarm severity of general alarms. See the "9.6.28 RTRV-ATTR-EQPT" section on page 9-48.	Yes	Yes	Yes
RTRV-COND-ALL	Retrieves condition (state) of all current alarms. See the "9.6.29 RTRV-COND-ALL" section on page 9-49.	Yes	Yes	Yes
RTRV-COND-DWDM	Retrieves condition (state) of current optical alarms. See the "9.6.30 RTRV-COND-DWDM" section on page 9-52.	Yes	Yes	Yes
RTRV-COND-EQPT	Retrieves condition (state) of current general alarms. See the "9.6.31 RTRV-COND-EQPT" section on page 9-53.	Yes	Yes	Yes
RTRV-DFLT-SECU	Retrieves timeouts for access levels. See the "9.6.32 RTRV-DFLT-SECU" section on page 9-55.	No	No	Yes
RTRV-DWDM	Retrieves optical parameters. See the "9.6.33 RTRV-DWDM" section on page 9-56.	Yes	Yes	Yes
RTRV-EQPT	Retrieves power bus mode. See the "9.6.34 RTRV-EQPT" section on page 9-58.	Yes	Yes	Yes
RTRV-HDR	Retrieves header (pings NE). See the "9.6.35 RTRV-HDR" section on page 9-59.	Yes	Yes	Yes
RTRV-INV	Retrieves inventory parameters. See the "9.6.36 RTRV-INV" section on page 9-60.	Yes	Yes	Yes
RTRV-NE-GEN	Retrieves general IP-related parameters. See the "9.6.37 RTRV-NE-GEN" section on page 9-61.	Yes	Yes	Yes
RTRV-RFILE	Retrieves files on FFS. See the "9.6.38 RTRV-RFILE" section on page 9-62.	Yes	Yes	Yes

Table 9-7   TL1 Commands and Messages Security Permissions (Access Levels) (continued)

Command or Message	Description	User Access Levels		
		R	RW	RWA
RTRV-TH-DWDM	Retrieves optical thresholds. See the "9.6.39 RTRV-TH-DWDM" section on page 9-63.	Yes	Yes	Yes
RTRV-TH-EQPT	Retrieves general thresholds. See the "9.6.40 RTRV-TH-EQPT" section on page 9-64.	Yes	Yes	Yes
RTRV-TOD	Retrieves date and time. See the "9.6.41 RTRV-TOD" section on page 9-66.	Yes	Yes	Yes
RTRV-USER-SECU	Retrieves access level of user(s). See the "9.6.42 RTRV-USER-SECU" section on page 9-67.	Yes (own UID)	Yes (own UID)	Yes (all UIDs)
SET-ATTR-DWDM	Sets alarm severity of optical alarms. See the "9.6.43 SET-ATTR-DWDM" section on page 9-68.	No	Yes	Yes
SET-ATTR-EQPT	Sets alarm severity of general alarms. See the "9.6.44 SET-ATTR-EQPT" section on page 9-69.	No	Yes	Yes
SET-ATTR-SECUDFLT	Sets timeout values for access levels. See the "9.6.45 SET-ATTR-SECUDFLT" section on page 9-71.	No	No	Yes
SET-TH-DWDM	Sets optical thresholds. See the "9.6.46 SET-TH-DWDM" section on page 9-71.	No	Yes	Yes
SET-TH-EQPT	Sets general thresholds. See the "9.6.47 SET-TH-EQPT" section on page 9-72.	No	Yes	Yes
STA-LOCL-RST	Resets all parameters to manufacturer's default values. See the "9.6.48 STA-LOCL-RST" section on page 9-74.	No	No	Yes

9.6 TL1 Commands and Autonomous Messages

9.6.1 ACT-USER

Command Types   **ACT-USER**

Activates user session (login).

Syntax Description   ACT-USER:[<tid>]:<uid>:<ctag>::<pid>;

Example 9-1   ACT-USER Command

Amp01:ONS15216 EDFA2> **ACT-USER:Amp01:JOE:123::***;**

Table 9-8   ACT-USER Syntax Description

Parameter	Syntax	Description
uid	string	The user's identifier (user name). Can be any combination of up to 10 alphanumeric characters.
pid	string	The user's private identifier (password). The password must be a string of up to 10 characters, where at least 2 are non-alphabetic characters and at least 1 is a special character. Special characters are +, #, and %.

9.6.2 ALW-MSG-ALL

Command Types   **ALW-MSG-ALL**

Permits or resumes the dispatch of automatic messages from the ONS 15216 EDFA2 that were inhibited by an **INH-MSG-ALL** call. All alarms in existence at the time that this command restores them are transmitted via REPT ALM and REPT EVT messages. If a previously inhibited user executes ALW-MSG-ALL, the user will not receive notifications of alarms raised before execution of ALW-MSG-ALL.

Syntax Description   ALW-MSG-ALL:[<tid>]::<ctag>::[<ntfcncde>],[<condtype>][,];

Example 9-2   ALW-MSG-ALL Command

Amp01:ONS15216 EDFA2> **ALW-MSG-ALL:Amp01::123::MJ,LOS;**

Table 9-9   ALW-MSG-ALL Syntax Description

Parameter	Syntax	Description
ntfncde		Notification code of the alarm or event that is to be allowed (maps to cerent15216EdfaAlarmPriority for active alarms). A null maps to none of the codes, i.e., with a null, all existing *ntfncde* inhibitions are kept unchanged. Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NA	Not alarmed.

Table 9-9   ALW-MSG-ALL Syntax Description (continued)

Parameter	Syntax	Description
condtype		Condition type of the alarm or event that is to be allowed. (Maps to cerent15216EdfaLogEventID.) ALL maps to all types. A null maps to none of the types, i.e., with a null, all existing *condtype* inhibitions are kept unchanged. Possible *condtype* and corresponding *conddescr* (in quotes) are:
	LOS	"Loss of Signal" (input power) alarm (cerent15216EdfaAlarmLpin).
	GAIN	"Gain Out of Range" alarm (cerent15216EdfaAlarmGain).
	LPOUT	"Loss of Output Power" alarm (cerent15216EdfaAlarmLpout).
	CTMP	"Case Temperature Out of Range" alarm (cerent15216EdfaAlarmCtmp).
	DBBACKUP	"Database Backup In Progress" alarm (cerent15216EdfaOpDbBackup).
	DBRESTORE	"Database Restore In Progress" alarm (cerent15216EdfaOpDbRestore).
	LCRNT1	"Excessive Pump1 Current" alarm (cerent15216EdfaAlarmLcrnt1).
	LCRNT2	"Excessive Pump2 Current" alarm (cerent15216EdfaAlarmLcrnt2).
	LTMP1	"Excessive Pump1 Temperature" alarm (cerent15216EdfaAlarmLtmp1).
	LTMP2	"Excessive Pump2 Temperature" alarm (cerent15216EdfaAlarmLtmp2).
	POWERBUSA	"Power Bus A (voltage) Alarm" (cerent15216EdfaAlarmPowerBusA).
	POWERBUSB	"Power Bus B (voltage) Alarm" (cerent15216EdfaAlarmPowerBusB).
	SFTWDOWN	"Software Download In Progress" alarm (cerent15216EdfaOpLoad).

Table 9-9   ALW-MSG-ALL Syntax Description (continued)

Parameter	Syntax	Description
	ALSCHGD	"ALS (automatic laser shutdown) Changed" (cerent15216EdfaALSModeEnable).
	CONFIGSAVED	"Config Saved".
	CTRLMODE1	"Pump1 Control Mode Changed" (cerent15216EdfaControlMode for cerent15216EdfaPumpCfgPumpNumber=1).
	CTRLMODE2	"Pump2 Control Mode Changed" (cerent15216EdfaControlMode for cerent15216EdfaPumpCfgPumpNumber=2).
	CUTOVERRESET	(Software) "Reset after Cutover" (cerent15216EdfaOpCutover).
	DBBKRTCRCERR	"Database Backup/Restore CRC Error" (cerent15216EdfaActionOpResult).
	DBBKRTERR	"Database Backup/Restore Error" (cerent15216EdfaActionOpResult).
	DBBKRTFILEERR	"Database Backup/Restore File Error" (cerent15216EdfaActionOpResult).
	DBBKRTOBJERR	"Database Backup/Restore Object Error" (cerent15216EdfaActionOpResult).
	DBBKRTSNMPERR	"Database Backup/Restore SNMP Error" (cerent15216EdfaActionOpResult).
	DBBKRTTOERR	"Database Backup/Restore Timeout Error" (cerent15216EdfaActionOpResult).
	GAINCHGD	"Overall Gain Changed" (cerent15216EdfaConstGainOverallGain).
	LOSHYSTCHGD	"LOS (loss of signal) Hysteresis Changed" (cerent15216EdfaLOSHysteresis).
	LOSTHCHGD	"LOS (loss of signal) Threshold Changed" (cerent15216EdfaLOSThreshold).
	LPOUTCHGD	"Loss of Output Power Setpoint Changed" (cerent15216EdfaLpoutSetpoint).
	LPOUTDEVCHGD	"Lpout (loss of output power) Deviation Changed" (cerent15216EdfaLpoutDeviation).
	LPOUTHYSTCHGD	"Lpout (loss of output power) Hysteresis Changed" (cerent15216EdfaLpoutHysteresis).
	MAXCTMPCHGD	"Max Case Temperature Changed" (cerent15216EdfaCtmpMax).
	MAXCTMPHYSTCHGD	"Max Ctmp (case temperature) Hysteresis Changed" (cerent15216EdfaCtmpMaxHysteresis).
	MINCTMPCHGD	"Min Case Temperature Changed" (cerent15216EdfaCtmpMin).

Table 9-9   ALW-MSG-ALL Syntax Description (continued)

Parameter	Syntax	Description
	MINCTMPHYSTCHGD	"Min Ctmp (case temperature) Hysteresis Changed" (cerent15216EdfaCtmpMinHysteresis).
	PREATTCHGD	"Pre-attenuation Changed" (cerent15216EdfaVariableGainPreAttenuation).
	PWRBUSMAXCHGD	"Power Bus Max (voltage) Changed" (cerent15216EdfaPowerBusDCVoltageMax).
	PWRBUSMINCHGD	"Power Bus Min (voltage) Changed" (cerent15216EdfaPowerBusDCVoltageMin).
	PWRBUSMODE	"Power Bus Mode Changed" (cerent15216EdfaPowerBusMode).
	SEVERITYCHGD	"Severity Changed from CR|MJ|MN|NA|NR to CR|MJ|MN|NA|NR".
	SFTWDOWNERR	"Software Load Error".
	SOFTWARERESET	"Software Reset" (cerent15216EdfaOpReset).
	SOFTWARERESETERR	"Software Reset Error" (cerent15216EdfaActionOpResult).
	ALL	Any or all of the preceding (command input only).
	NULL	Defaults to ALL.

9.6.3 APPLY

Command Types

APPLY

Applies a software cutover in the memory. There are two boot file entries. This command exchanges boot file entries 1 and 2 so that when the system is restarted (by the **INIT-SYS** command), it boots with the image that was (before the execution of this command) at the second entry.

Syntax Description

`APPLY:[<tid>]::<ctag>;`

Example 9-3   APPLY Command

`Amp01:ONS15216 EDFA2> APPLY:Amp01::1234;`

9.6.4 CANC-USER

Command Types

CANC-USER

Cancels user session (logoff).

Syntax Description   `CANC-USER:[<tid>]:<uid>:<ctag>;`

Example 9-4   CANC-USER Command

`Amp01:ONS15216 EDFA2>` **`CANC-USER:Amp01:JOE:100;`**

Table 9-10   CANC-USER Syntax Description

Parameter	Syntax	Description
uid	string	The user's identifier (user name).

9.6.5 COPY-RFILE

Command Types   **COPY-RFILE**

Copies a local or remote file to the persistent memory (flash file system) on the ONS 15216 EDFA2. Depending on the value specified for the TYPE parameter, this command can be used to download a remote software image file to the ONS 15216 EDFA2 as its second boot entry (to cutover-upgrade later using the **APPLY** command), to copy a remote or local file to the ONS 15216 EDFA2 flash file system, or to copy a file on the ONS 15216 EDFA2 flash file system to a remote or local file. There may be a delay while this command executes. See the "9.6.21 REPT EVT FXFR" section on page 9-36 for information on the autonomous response messages.

Syntax Description   `COPY-RFILE:[<tid>]::<ctag>::TYPE=<type>,SRC=<src>,[DEST=<dest>],[OVERWRITE=<overwrite>];`

Example 9-5   COPY-RFILE Command and Response

```
Amp01:ONS15216 EDFA2> COPY-RFILE:Amp01::1234::TYPE=SWDL,SRC="ftp://user1:passwd@192.168.85
.10:21/bin/15216EdfaSw_2.2.1",DEST="file://localhost/15216EdfaSw_2.2.1",OVERWRITE=YES;
   Amp01 2002-04-30 11:34:05
M  100 COMPLD
   /* COPY-RFILE */
;
   Amp01 2002-04-30 11:34:05
A  7 REPT EVT FXFR
   EQPT:15216EdfaSw_2.2.1,START,,
;
   Amp01 2002-04-30 11:35:24
A  8 REPT EVT FXFR
   EQPT:15216EdfaSw_2.2.1,COMPLD,SUCCESS,1963195
;
```

Table 9-11   COPY-RFILE Syntax Description

Parameter	Syntax	Description
type		Specifies the type and direction of transfer. Possible values are:
	RFR	Restore a file from remote server to the ONS 15216 EDFA2's flash file system.
	RFBU	Backup a file from the ONS 15216 EDFA2's flash file system to the remote server (*overwrite* is always YES for this type).
	SWDL	Download a software image file to the ONS 15216 EDFA2's flash file system and update the second boot entry to point to this file.
src, dest	string	*src* and *dest* must both be URLs. Both FTP and file URLs are supported.
		An FTP URL has the following format:
		ftp:[//[<userid>[:<password>]@]<ftphost>[:<port>]]/<urlpath>
		A file URL (referring to the local system) has the following format:
		file://localhost/<urlpath>
		where
		<userid> is the FTP user identifier
		<password> is the FTP password for the user
		<ftphost> is the IP address of the FTP server
		<port> is the port number to connect to
		<urlpath> is the path in the following format: **<cwd1>/<cwd2>/…/<cwdn>/<filename>**
		where <cwd1>…<cwdn> are directory levels and <filename> is the file name
overwrite		Possible values are:
	YES	Overwrite existing file of the same name at the destination.
	NO	Do not overwrite if file with same name exists at the destination. This is the default if *overwrite* is null.

9.6.6 CPY-MEM

Command Types   **CPY-MEM**

Copies the log file or system configuration file in the non-persistent memory (RAM) or a specified file on the persistent memory (flash file system) to a file with a specified name on the persistent memory.

Syntax Description   `CPY-MEM:[<tid>]::<ctag>::[<fromfile>],[<fromdev>],[<tofile>];`

Example 9-6   CPY-MEM Command and Response (Copy LOG File from RAM as aolog.txt on FFS)

```
Amp01:ONS15216 EDFA2> CPY-MEM:Amp01::123::LOG,MEM,;
   Amp01 2002-07-16 09:49:01
M  123 COMPLD
   /* CPY-MEM */
;
```

Example 9-7   CPY-MEM Command and Response (Copy LOG File from RAM as aolog.txt on FFS using Null)

```
Amp01:ONS15216 EDFA2> CPY-MEM:Amp01::123::,,;
   Amp01 2002-07-16 09:46:01
M  123 COMPLD
   /* CPY-MEM */
;
```

Example 9-8   CPY-MEM Command and Response (Copy aolog.txt on FFS as logfile20020716.txt on FFS)

```
Amp01:ONS15216 EDFA2> CPY-MEM:Amp01::123::aolog.txt,FFS,logfile20020716;
   Amp01 2002-07-16 09:50:38
M  123 COMPLD
   /* CPY-MEM */
;
```

Table 9-12   CPY-MEM Syntax Description

Parameter	Syntax	Description
fromfile		Name of the source file. A null means LOG. Can be null only when *fromdev* is also null.
	CFG	ONS 15216 EDFA2 system configuration file, only when *fromdev* is specified to be DBCFG or null.
	LOG	ONS 15216 EDFA2 system log file, only when *fromdev* is specified to be MEM or null.
	any other string	The name of the source file when f*romdev* is specified to be FFS. If *fromdev* is specified to be MEM or null, any string other than LOG is invalid.
		File names are case sensitive.
fromdev		Device on which the source file exists. A null means MEM. Possible values are:
	DBCFG	ONS 15216 EDFA2 configuration parameters from IDROM, CFGROM, RAM, and FFS.
	MEM	ONS 15216 EDFA2 non-persistent memory (RAM).
	FFS	ONS 15216 EDFA2 persistent memory (flash file system).

Table 9-12   CPY-MEM Syntax Description (continued)

Parameter	Syntax	Description
tofile	CFG	ONS 15216 EDFA2 system configuration in memory. The system must be rebooted using INI-SYS for changes to the system configuration to take effect.
	any other string	The name string of the destination file. A null value is valid only when *fromfile* is LOG or null and *fromdev* is MEM or null. When null is valid, the system log file (LOG) is saved as aolog.txt. File names are case sensitive. If copying from RAM (MEM) and the destination file name already exists, the destination file is overwritten. If copying from FFS and the destination file name already exists, the execution fails.

9.6.7 DLT-RFILE

Command Types   **DLT-RFILE**

Deletes a file from the flash file system (FFS) of the ONS 15216 EDFA2.

Syntax Description   `DLT-RFILE:[<tid>]::<ctag>::FILE=<localfilename>;`

Example 9-9   DLT-RFILE Command

`Amp01:ONS15216 EDFA2>` **`DLT-RFILE:Amp01::1234::FILE=snmp.cfg;`**

Table 9-13   DLT-RFILE Syntax Description

Parameter	Syntax	Description
localfilename	string	Name of the file on the flash file system of the ONS 15216 EDFA2 that is to be deleted. File names are case sensitive.

9.6.8 DLT-USER-SECU

Command Types   **DLT-USER-SECU**

Deletes (removes) an existing user from the system.

Syntax Description   `DLT-USER-SECU:[<tid>]:<uid>:<ctag>;`

Example 9-10   DLT-USER-SECU Command

Amp01:ONS15216 EDFA2> **DLT-USER-SECU:Amp01:jsmith:123;**

Table 9-14   DLT-USER-SECU Syntax Description

Parameter	Syntax	Description
uid	string	The user identifier (user name) of the existing user to be removed.

9.6.9 ED-DAT

Command Types   **ED-DAT**

Edits the date and/or time of the ONS 15216 EDFA2.

Syntax Description   ED-DAT:[<tid>]::<ctag>::<utcdate>,<utctime>;

Example 9-11   ED-DAT Command

Amp01:ONS15216 EDFA2> **ED-DAT:Amp01::123::2001-12-18,02-24-55;**

Table 9-15   ED-DAT Syntax Description

Parameter	Syntax	Description
utcdate	yyyy-mm-dd	Change date to this value in universal coordinated time (UTC), which is the same as Greenwich Mean Time (GMT). Modifies cerent15216EdfaRtcDateAndTimeGMTString. Can not be null if *utctime* is also null.
utctime	hh-mm-ss	Change time to this value in universal coordinated time (UTC), which is the same as Greenwich Mean Time (GMT). (A time zone can not be set using TL1.) Modifies cerent15216EdfaRtcDateAndTimeGMTString. Can not be null if *utcdate* is also null.

9.6.10 ED-DWDM

Command Types   **ED-DWDM**

Configures the ONS 15216 EDFA2 optical control parameters.

Syntax Description   ED-DWDM:[<tid>]:<aid>:<ctag>:::[PUMP1CTRLMODE=<pump1ctrlmode>],[PUMP1CTRLVALUE=<pump1ctrlv
alue>],[PUMP2CTRLMODE=<pump2ctrlmode>],[PUMP2CTRLVALUE=<pump2ctrlvalue>],[OVERALLGAIN=<ove
rallgain>],[PREATT=<preatt>],[ALS=<als>];

Example 9-12   ED-DWDM Command

```
Amp01:ONS15216 EDFA2> ED-DWDM:Amp01:ALL:123:::PUMP1CTRLMODE=GAINTEMP;
```

Table 9-16   ED-DWDM Syntax Description

Parameter	Syntax	Description
aid		1 and ALL have same input effect.
	1	Directly affecting the optical signal.
	ALL	Any or all of the preceding (command input only).
pump1ctrlmode, pump2ctrlmode		Pump 1 or pump 2 control mode (maps to cerent15216EdfaPumpCfgControlMode for the corresponding pump). Generally, *pump1ctrlmode* and *pump2ctrlmode* must be the same value. One exception is OPWR which is not valid for pump 1 and can only be set for pump 2. Possible values are:
	GAINTEMP	Constant Gain Temperature Compensated mode (manufacturer default) (cerent15216EdfaPumpCfgControlMode set to constGainTempComp). Setting one pump sets the other pump to the same mode.
	OPWR	Constant Output Power mode (cerent15216EdfaPumpCfgControlMode set to constOutputPower). This is not a valid mode for pump 1. If pump 2 is set to OPWR, pump 1 gets automatically set to PWR.
	CRNT	Constant Pump Current mode (cerent15216EdfaPumpCfgControlMode set to constCurrent). Setting one pump sets the other pump to the same mode.
	PWR	Constant Pump Power mode (cerent15216EdfaPumpCfgControlMode set to constPower). Setting one pump sets the other pump to the same mode.
	IDLE	Pump is shut down (cerent15216EdfaPumpCfgControlMode set to idle). Setting one pump sets the other pump to the same mode.
pump1ctrlvalue, pump2ctrlvalue		Pump 1 or pump 2 control value. This value's interpretation depends on the control mode of the corresponding pump. Possible values are:
	0 - 650	Output power in units of 10 mW when mode is OPWR (sets cerent15216EdfaPumpCfgConstOutPower). The default value is 0.
	0 - 300	Current value in mA when mode is CRNT (sets cerent15216EdfaPumpCfgConstPumpCurrent). The default value is 0. Must set pump 1 and pump 2 at the same time.
	0 - 100	Pump power in mW when mode is PWR (sets cerent15216EdfaPumpCfgConstPumpPower). The default value is 0.
overallgain	130 - 220	Value of gain in units of 10 dB when mode is GAINTEMP (sets cerent15216EdfaConstGainOverallGain).

Table 9-16   ED-DWDM Syntax Description (continued)

Parameter	Syntax	Description
preatt	10 - 100	Gain pre-attenuation value in units of 10 dB when mode is other than GAINTEMP (sets cerent15216EdfaVariableGainPreAttenuation).
als		Automatic Laser Shutdown (sets cerent15216EdfaALSModeEnable).
	ENABLED	When input power (signal) goes below the LOSTH value, the laser pumps are shut down until the input signal is restored beyond the value of LOSHYST.
	DISABLED	ASE is present (typically –3.5 dBm) at the output during LOS state.

9.6.11 ED-EQPT

Command Types

ED-EQPT

Configures the ONS 15216 EDFA2 equipment (power bus) parameters.

Syntax Description

```
ED-EQPT:[<tid>]:<aid>:<ctag>:::PWRBUSMODE=<pwrbusmode>;
```

Example 9-13   ED-EQPT Command

```
Amp01:ONS15216 EDFA2> ED-EQPT:Amp01:ALL:123:::PWRBUSMODE=SIMPLEX;
```

Table 9-17   ED-EQPT Syntax Description

Parameter	Syntax	Description
aid	PWR-A PWR-B ALL	PWR-A, PWR-B, and ALL have same input effect.
pwrbusmode		Power bus mode. Possible values are:
	SIMPLEX	Simplex mode. Requires power only to bus A. Sets cerent15216EdfaPowerBusMode to simplex.
	DUPLEX	Duplex mode (default). Requires power to both bus A and bus B. Sets cerent15216EdfaPowerBusMode to duplex.

9.6.12 ED-NE-GEN

Command Types

ED-NE-GEN

Edit general parameters of the ONS 15216 EDFA2. Edits ONS 15216 EDFA2's sid (source identifier)/tid (target identifier), IP address, IP mask, and IP address of the default router. The ONS 15216 EDFA2 needs to be manually rebooted for the changes to take effect. (Use the **INIT-SYS** command to manually reboot after changing parameters.) Also edits the boot table content: to return to the TL1 shell from the ASH shell, use the ASH command **shell type modify tl1** (step 3. in "8.1 Log In via RS-232 (EIA/TIA-232) Port Using HyperTerminal" section on page 8-1).

Syntax Description

```
ED-NE-GEN:[<tid>]::<ctag>:::[NAME=<name>],[IPADDR=<ipaddr>],[IPMASK=<ipmask>],[DEFRTR=<def
rtr>],[BOOTRECORDTYPE1=<bootrectype1>],[BOOTFILENAME1=<bootfilename1>],[BOOTIPADDR1=<booti
paddr1>],[BOOTRECORDTYPE2=<bootrectype2>],[BOOTFILENAME2=<bootfilename2>],[BOOTIPADDR2=<bo
otipaddr2>],[CLI=<cli>];
```

Example 9-14   ED-NE-GEN Command

```
Amp01:ONS15216 EDFA2> ED-NE-GEN:Amp01::123:::NAME=Amp01,IPADDR=192.167.3.4,IPMASK=255.255.
255.0,DEFRTR=192.167.3.20,BOOTRECORDTYPE=TFTP,BOOTFILENAME2=15216EdfaSw_1.4.0,BOOTIPADDR2
=192.168.3.4,CLI=ASH;
```

Table 9-18   ED-NE-GEN Syntax Description

Parameter	Syntax	Description
name	string	System's sid/tid name (sysName).
ipaddr	string	IP address of the system (cerent15216EdfaSromIpMgmtEnetAddress).
ipmask	string	Subnet mask of the system (cerent15216EdfaSromIpMgmtEnetSubNetMask).
defrtr	string	IP address of the default router (cerent15216EdfaSromIpMgmtDefaultRouterAddress).
bootrectype1		Boot record type (cerent15216EdfaBootType for first entry). Possible values are:
	FLASH	Boot from flash.
	TFTP	Boot through TFTP.
bootfilename1	string	Boot file name (cerent15216EdfaBootFileName for first entry). File names are case sensitive.
bootipaddr1	string	IP address to boot from if *bootrectype1* is set to TFTP (cerent15216EdfaBootIpAddress for first entry).
bootrectype2		Boot record type (cerent15216EdfaBootType for second entry). Possible values are:
	FLASH	Boot from flash.
	TFTP	Boot through TFTP.
bootfilename2	string	Boot file name (cerent15216EdfaBootFileName for second entry). File names are case sensitive.
bootipaddr2	string	IP address to boot from if *bootrectype2* is set to TFTP (cerent15216EdfaBootIpAddress for second entry).

Table 9-18   ED-NE-GEN Syntax Description (continued)

Parameter	Syntax	Description
cli		Default type of command line interface for all EIA/TIA-232 and default telnet port user sessions with the ONS 15216 EDFA2. Possible values are:
	TL1	TL1shell interface (manufacturer default).
	ASH	ASH shell interface – ONS 15216 EDFA2's native interface.

9.6.13 ED-PID

Command Types   **ED-PID**

Edits password.

Syntax Description   ED-PID:[<tid>]:<uid>:<ctag>::<oldpid>,<newpid>;

Example 9-15   ED-PID Command

Amp01:ONS15216 EDFA2> **ED-PID:Amp01:JOE:123::OLDPW,NEWPW;**

Table 9-19   ED-PID Syntax Description

Parameter	Syntax	Description
uid	string	The user's identifier (user name).
oldpid	string	The user's old password.
newpid	string	The user's new private identifier (password). Must be a string of up to 10 characters, where at least 2 are non-alphabetic characters and at least 1 is a special character. Special characters are +, #, and %.

9.6.14 ED-USER-SECU

Command Types   **ED-USER-SECU**

Edits the user identifier, password and access level of an existing user. Per TR-835, only those data parameters that are to be edited are entered while those that are unaffected are omitted. If any position-defined parameter is omitted, a comma is to be used as the delimiter.

Syntax Description   ED-USER-SECU:[<tid>]:<uid>:<ctag>::[<newuid>],[<pid>],,[<al>][:];

Example 9-16   ED-USER-SECU Command

```
Amp01:ONS15216 EDFA2> ED-USER-SECU:Amp01:jsmith:123::johnsmith,****,,RW;
```

Table 9-20   ED-USER-SECU Syntax Description

Parameter	Syntax	Description
uid	string	The user identifier (user name) of the existing user whose parameters are being modified.
newuid	string	New user identifier (user name) for the existing user. Can be any combination of up to 10 alphanumeric characters.
pid	string	The user's new private identifier (password). Must be a string of up to 10 characters, where at least 2 are non-alphabetic characters and at least 1 is a special character. Special characters are +, #, and %.
al		New access level of the user. See "9.5 Summary of Security Permissions for TL1 Commands" section on page 9-6 for access level permissions.
	R	Read only privileges.
	RW	Read and write privileges.
	RWA	Read, write, and administrative privileges.

9.6.15 ENT-USER-SECU

Command Types

ENT-USER-SECU

Creates a new user in the system; specifies the user identifier, password and access level of the new user.

Syntax Description

```
ENT-USER-SECU:[<tid>]:<uid>:<ctag>::<pid>,,<al>[:];
```

Example 9-17   ENT-USER-SECU Command

```
Amp01:ONS15216 EDFA2> ENT-USER-SECU:Amp01:jsmith:123::****,,RW;
```

Table 9-21   ENT-USER-SECU Syntax Description

Parameter	Syntax	Description
uid	string	The user identifier (user name) of the new user being created. Can be any combination of up to 10 alphanumeric characters.
pid	string	The user's private identifier (password). Must be a string of up to 10 characters, where at least 2 are non-alphabetic characters and at least 1 is a special character. Special characters are +, #, and %.

Table 9-21   ENT-USER-SECU Syntax Description (continued)

Parameter	Syntax	Description
al		Access level of the user. See "9.5 Summary of Security Permissions for TL1 Commands" section on page 9-6 for access level permissions.
	R	Read only privileges.
	RW	Read and write privileges.
	RWA	Read, write, and administrative privileges.

9.6.16 INH-MSG-ALL

Command Types

INH-MSG-ALL

Prohibits the dispatch of some automatic messages from the ONS 15216 EDFA2 as specified in the parameters. Does not affect response from RTRV commands.

Syntax Description

`INH-MSG-ALL:[<tid>]::<ctag>::[<ntfcncde>],[<condtype>][,];`

Example 9-18   INH-MSG-ALL Command

`Amp01:ONS15216 EDFA2>` **`INH-MSG-ALL:Amp01::123::MJ,LOS;`**

Table 9-22   INH-MSG-ALL Syntax Description

Parameter	Syntax	Description
ntfncde		Notification code of the alarm or event that is to be allowed (maps to cerent15216EdfaAlarmPriority for active alarms). A null maps to none of the codes, i.e., with a null, all existing *ntfncde* inhibitions are kept unchanged. Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NA	Not alarmed.

Table 9-22   INH-MSG-ALL Syntax Description (continued)

Parameter	Syntax	Description
condtype		Condition type of the alarm or event that is to be inhibited (maps to cerent15216EdfaLogEventID). ALL maps to all types. A null maps to none of the types, i.e., with a null, all existing *condtype* allowances are kept unchanged. Possible *condtype* and corresponding *conddescr* (in quotes) are:
	LOS	"Loss of Signal" (input power) alarm (cerent15216EdfaAlarmLpin).
	GAIN	"Gain Out of Range" alarm (cerent15216EdfaAlarmGain).
	LPOUT	"Loss of Output Power" alarm (cerent15216EdfaAlarmLpout).
	CTMP	"Case Temperature Out of Range" alarm (cerent15216EdfaAlarmCtmp).
	DBBACKUP	"Database Backup In Progress" alarm (cerent15216EdfaOpDbBackup).
	DBRESTORE	"Database Restore In Progress" alarm (cerent15216EdfaOpDbRestore).
	LCRNT1	"Excessive Pump1 Current" alarm (cerent15216EdfaAlarmLcrnt1).

Table 9-22   INH-MSG-ALL Syntax Description (continued)

Parameter	Syntax	Description
	LCRNT2	"Excessive Pump2 Current" alarm (cerent15216EdfaAlarmLcrnt2).
	LTMP1	"Excessive Pump1 Temperature" alarm (cerent15216EdfaAlarmLtmp1).
	LTMP2	"Excessive Pump2 Temperature" alarm (cerent15216EdfaAlarmLtmp2).
	POWERBUSA	"Power Bus A (voltage) Alarm" (cerent15216EdfaAlarmPowerBusA).
	POWERBUSB	"Power Bus B (voltage) Alarm" (cerent15216EdfaAlarmPowerBusB).
	SFTWDOWN	"Software Download In Progress" alarm (cerent15216EdfaOpLoad).
	ALSCHGD	"ALS (automatic laser shutdown) Changed" (cerent15216EdfaALSModeEnable).
	CONFIGSAVED	"Config Saved".
	CTRLMODE1	"Pump1 Control Mode Changed" (cerent15216EdfaControlMode for cerent15216EdfaPumpCfgPumpNumber=1).
	CTRLMODE2	"Pump2 Control Mode Changed" (cerent15216EdfaControlMode for cerent15216EdfaPumpCfgPumpNumber=2).
	CUTOVERRESET	(Software) "Reset after Cutover" (cerent15216EdfaOpCutover).
	DBBKRTCRCERR	"Database Backup/Restore CRC Error" (cerent15216EdfaActionOpResult).
	DBBKRTERR	"Database Backup/Restore Error" (cerent15216EdfaActionOpResult).
	DBBKRTFILEERR	"Database Backup/Restore File Error" (cerent15216EdfaActionOpResult).
	DBBKRTOBJERR	"Database Backup/Restore Object Error" (cerent15216EdfaActionOpResult).
	DBBKRTSNMPERR	"Database Backup/Restore SNMP Error" (cerent15216EdfaActionOpResult).
	DBBKRTTOERR	"Database Backup/Restore Timeout Error" (cerent15216EdfaActionOpResult).
	GAINCHGD	"Overall Gain Changed" (cerent15216EdfaConstGainOverallGain).
	LOSHYSTCHGD	"LOS (loss of signal) Hysteresis Changed" (cerent15216EdfaLOSHysteresis).
	LOSTHCHGD	"LOS (loss of signal) Threshold Changed" (cerent15216EdfaLOSThreshold).

Table 9-22   INH-MSG-ALL Syntax Description (continued)

Parameter	Syntax	Description
	LPOUTCHGD	"Loss of Output Power Setpoint Changed" (cerent15216EdfaLpoutSetpoint).
	LPOUTDEVCHGD	"Lpout (loss of output power) Deviation Changed" (cerent15216EdfaLpoutDeviation).
	LPOUTHYSTCHGD	"Lpout (loss of output power) Hysteresis Changed" (cerent15216EdfaLpoutHysteresis).
	MAXCTMPCHGD	"Max Case Temperature Changed" (cerent15216EdfaCtmpMax).
	MAXCTMPHYSTCHGD	"Max Ctmp (case temperature) Hysteresis Changed" (cerent15216EdfaCtmpMaxHysteresis).
	MINCTMPCHGD	"Min Case Temperature Changed" (cerent15216EdfaCtmpMin).
	MINCTMPHYSTCHGD	"Min Ctmp (case temperature) Hysteresis Changed" (cerent15216EdfaCtmpMinHysteresis).
	PREATTCHGD	"Pre-attenuation Changed" (cerent15216EdfaVariableGainPreAttenuation).
	PWRBUSMAXCHGD	"Power Bus Max (voltage) Changed" (cerent15216EdfaPowerBusDCVoltageMax).
	PWRBUSMINCHGD	"Power Bus Min (voltage) Changed" (cerent15216EdfaPowerBusDCVoltageMin).
	PWRBUSMODE	"Power Bus Mode Changed" (cerent15216EdfaPowerBusMode).
	SEVERITYCHGD	"Severity Changed from CR|MJ|MN|NA|NR to CR|MJ|MN|NA|NR".
	SFTWDOWNERR	"Software Load Error".
	SOFTWARERESET	"Software Reset" (cerent15216EdfaOpReset).
	SOFTWARERESETERR	"Software Reset Error" (cerent15216EdfaActionOpResult).
	ALL	Any or all of the preceding (command input only).
	NULL	Defaults to ALL.

9.6.17 INIT-SYS

Command Types   **INIT-SYS**

Reboots the system.

Syntax Description   `INIT-SYS:[<tid>]:<aid>:<ctag>::<ph>;`

Example 9-19   INIT-SYS Command

```
Amp01:ONS15216 EDFA2> INIT-SYS:Amp01:ALL:1234::1;
```

Table 9-23   INIT-SYS Syntax Description

Parameter	Syntax	Description
aid	string EQPT ALL	EQPT and ALL have same input effect.
ph	integer 1	Level of initialization. Always 1.

9.6.18 REPT ALM DWDM

Command Types

REPT ALM DWDM

Reports when a DWDM alarm is logged or cleared (derived from cerent15216EdfaAlarmState).

✎
Note   The REPT ALM DWDM messages for Loss of Signal, Gain Out of Range, and Loss of Output Power are prioritized (in the order just listed) so that only one message can be delivered at one time. For example, if the ONS 15216 EDFA2 detects both a loss of input signal and a loss of output power at the same time, it will deliver only the Loss of Signal message to the user. This prioritized filtering of alarms does not occur with the SNMP delivery of alarms of the ONS 15216 EDFA2.

Syntax Description

```
    <sid> <date> <time>
<almcde> <atag> REPT ALM DWDM
   "<aid>:<ntfcncde>,<condtype>,<srveff>,<ocrdat>,<ocrtm>,,:<conddescr>"
;
```

Example 9-20   REPT ALM DWDM Message

```
    Amp01 2001-06-18 14:50:44
** 142 REPT ALM DWDM
   "1:MJ,LOS,SA,6-18,14-50-44,,:\"Loss Of Signal\""
;
```

Table 9-24   REPT ALM DWDM Syntax Description

Parameter	Syntax	Description
time	hh:mm:ss	Time of origination of TL1 message.

Table 9-24   REPT ALM DWDM Syntax Description (continued)

Parameter	Syntax	Description
almcde		The alarm severity code for the TL1 message. Possible values are:
	*C	Critical alarm.
	**	Major alarm.
	*	Minor alarm.
	A	No alarm. Occurs only when *ntfncde* is NA.
atag	0 - 999	An integer between 0 and 999 used as a sequence number in autonomous messages.
aid		Always 1.
	1	Directly affecting the optical signal.
conddescr		Detailed text description of the event. The *conddescr* is 1 to 64 characters of ASCII text. See *condtype* below.
condtype		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	LOS	"Loss of Signal" (input power) alarm (cerent15216EdfaAlarmLpin).
	GAIN	"Gain Out of Range" alarm (cerent15216EdfaAlarmGain).
	LPOUT	"Loss of Output Power" alarm (cerent15216EdfaAlarmLpout).
date	yyyy-mm-dd	Date of origination of TL1 message.
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	CL	Cleared alarm.
	NA	Not alarmed.
ocrdat	m-d	Date (month-day) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
ocrtm	h-m-s	Time (hour-minute-second) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
sid	string	Source identifier uniquely identifies the source of a TL1 autonomous command.
srveff		Effect on service. Possible values are:
	SA	Service affecting.
	NSA	Non-service affecting.

9.6.19 REPT ALM EQPT

Command Types

REPT ALM EQPT

Reports when a general alarm (not directly affecting optical signal) is logged or cleared (derived from cerent15216EdfaAlarmState).

Syntax Description

```
   <sid> <date> <time>
<almcde> <atag> REPT ALM EQPT
   "<aid>:<ntfcncde>,<condtype>,<srveff>,<ocrdat>,<ocrtm>,,:<conddescr>"
;
```

Example 9-21   REPT ALM EQPT Message

```
   Amp01 2001-06-18 14:48:44
*  141 REPT ALM EQPT
   "EQPT:MN,LCRNT1,NSA,6-18,14-48-44,,:\"Excessive Pump1 Current\""
;
```

Table 9-25   REPT ALM EQPT Syntax Description

Parameter	Syntax	Description
almcde		The alarm severity code for the TL1 message. Possible values are:
	*C	Critical alarm.
	**	Major alarm.
	*	Minor alarm.
	A	No alarm. Occurs only when *ntfncde* is NA.
atag	0 - 999	An integer between 0 and 999 used as a sequence number in autonomous messages .
aid		Possible values are:
	EQPT	General parameters of the ONS 15216 EDFA2.
	PWR-A	Affecting Power Bus A.
	PWR-B	Affecting Power Bus B.
conddescr		Detailed text description of the event. The *conddescr* is 1 to 64 characters of ASCII text. See *condtype* below.

Table 9-25   REPT ALM EQPT Syntax Description (continued)

Parameter	Syntax	Description
condtype		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	CTMP	"Case Temperature Out of Range" alarm (cerent15216EdfaAlarmCtmp).
	DBBACKUP	"Database Backup In Progress" (cerent15216EdfaOpDbBackup).
	DBRESTORE	"Database Restore In Progress" (cerent15216EdfaOpDbRestore).
	LCRNT1	"Excessive Pump1 Current" alarm (cerent15216EdfaAlarmLcrnt1).
	LCRNT2	"Excessive Pump2 Current" alarm (cerent15216EdfaAlarmLcrnt2).
	LTMP1	"Excessive Pump1 Temperature" alarm (cerent15216EdfaAlarmLtmp1).
	LTMP2	"Excessive Pump2 Temperature" alarm (cerent15216EdfaAlarmLtmp2).
	PWRBUSA	"Power Bus A (voltage) Alarm" (cerent15216EdfaAlarmPowerBusA).
	PWRBUSB	"Power Bus B (voltage) Alarm" (cerent15216EdfaAlarmPowerBusB).
	SFTWDOWN	"Software Download In Progress" (cerent15216EdfaOpLoad).
date	yyyy-mm-dd	Date of origination of TL1 message.
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	CL	Cleared alarm.
	NA	Not alarmed.
ocrdat	m-d	Date (month-day) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
ocrtm	h-m-s	Time (hour-minute-second) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
sid	string	Source identifier uniquely identifies the source of a TL1 autonomous command.
srveff		Effect on service. Possible values are:
	SA	Service affecting.
	NSA	Non-service affecting.
time	hh:mm:ss	Time of origination of TL1 message.

9.6.20 REPT EVT DWDM / REPT EVT EQPT

Command Types

REPT EVT DWDM or REPT EVT EQPT

Reports autonomous events. Reports when an event is logged.

Syntax Description

```
    <sid> <date> <time>
A   <atag> REPT EVT <ccm>
    "<aid>:<condtype>,<condeff>,<ocrdat>,<ocrtm>,,,,:<conddescr>"
;
```

Example 9-22   REPT EVT DWDM Message

```
    Amp01 2001-06-18 14:48:44
A   141 REPT EVT DWDM
    "1:CTRLMODE1,TC,6-18,14-48-44,,,,:\"Pump1 Control Mode Changed\""
;
```

Example 9-23   Example REPT EVT EQPT Standing Condition Message

```
    Amp01 2003-07-25 18:06:52
A 1 REPT EVT EQPT
    "EQPT:DBBACKUP,SC,7-25,18-6-52,,,,:\"DATABASE BACKUP\""
;
```

Example 9-24   Example REPT EVT EQPT Cleared Standing Condition Message

```
    Amp01 2003-07-25 18:06:52
A 1 REPT EVT EQPT
    "EQPT:DBBACKUP,CL,7-25,18-6-52,,,,:\"DATABASE BACKUP\""
;
```

Table 9-26   REPT EVT DWDM / REPT EVT EQPT Syntax Description

Parameter	Syntax	Description
atag	0 - 999	An integer between 0 and 999 used as a sequence number in autonomous messages .
aid		Possible values are:
	1	Directly affecting the optical signal.
	EQPT	General parameters of the ONS 15216 EDFA2.
	PWR-A	Affecting Power Bus A.
	PWR-B	Affecting Power Bus B.

Table 9-26   REPT EVT DWDM / REPT EVT EQPT Syntax Description (continued)

Parameter	Syntax	Description
conddescr		Detailed text description of the event. The *conddescr* is 1 to 64 characters of ASCII text. See *condtype* below.
condtype (ccm)		Condition type identifies the type of event (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	ALSCHGD (DWDM)	"ALS (automatic laser shutdown) Changed" (cerent15216EdfaALSModeEnable).
	CTRLMODE1 (DWDM)	"Pump1 Control Mode Changed" (cerent15216EdfaControlMode for cerent15216EdfaPumpCfgPumpNumber=1).
	CTRLMODE2 (DWDM)	"Pump2 Control Mode Changed" (cerent15216EdfaControlMode for cerent15216EdfaPumpCfgPumpNumber=2).
	GAIN (DWDM)	"Gain Out of Range" alarm (cerent15216EdfaAlarmGain).
	GAINCHGD (DWDM)	"Overall Gain Changed" (cerent15216EdfaConstGainOverallGain).
	LOS (DWDM)	"Loss of Signal" (input power) alarm (cerent15216EdfaAlarmLpin).
	LOSHYSTCHGD (DWDM)	"LOS (loss of signal) Hysteresis Changed" (cerent15216EdfaLOSHysteresis).
	LOSTHCHGD (DWDM)	"LOS (loss of signal) Threshold Changed" (cerent15216EdfaLOSThreshold).
	LPOUT (DWDM)	"Loss of Output Power" alarm (cerent15216EdfaAlarmLpout).
	LPOUTCHGD (DWDM)	"Loss of Output Power Setpoint Changed" (cerent15216EdfaLpoutSetpoint).
	LPOUTDEVCHGD (DWDM)	"Lpout (loss of output power) Deviation Changed" (cerent15216EdfaLpoutDeviation).
	LPOUTHYSTCHGD (DWDM)	"Lpout (loss of output power) Hysteresis Changed" (cerent15216EdfaLpoutHysteresis).
	PREATTCHGD (DWDM)	"Pre-attenuation Changed" (cerent15216EdfaVariableGainPreAttenuation).
	CONFIGSAVED (EQPT)	"Config Saved".
	CTMP (EQPT)	"Case Temperature Out of Range" alarm (cerent15216EdfaAlarmCtmp).
	CUTOVERRESETERR (EQPT)	(Software) "Reset After Cutover Error".

Table 9-26   REPT EVT DWDM / REPT EVT EQPT Syntax Description (continued)

Parameter	Syntax	Description
	DBBACKUP (EQPT)	"Database Backup In Progress" alarm (cerent15216EdfaOpDbBackup).
	DBBKRTCRCERR (EQPT)	"Database Backup/Restore CRC Error" (cerent15216EdfaActionOpResult).
	DBBKRTERR (EQPT)	"Database Backup/Restore Error" (cerent15216EdfaActionOpResult).
	DBBKRTFILEERR (EQPT)	"Database Backup/Restore File Error" (cerent15216EdfaActionOpResult).
	DBBKRTOBJERR (EQPT)	"Database Backup/Restore Object Error" (cerent15216EdfaActionOpResult).
	DBBKRTSNMPERR (EQPT)	"Database Backup/Restore SNMP Error" (cerent15216EdfaActionOpResult).
	DBBKRTTOERR (EQPT)	"Database Backup/Restore Timeout Error" (cerent15216EdfaActionOpResult).
	DBRESTORE (EQPT)	"Database Restore In Progress" alarm (cerent15216EdfaOpDbRestore).
	LCRNT1 (EQPT)	"Excessive Pump1 Current" alarm (cerent15216EdfaAlarmLcrnt1).
	LCRNT2 (EQPT)	"Excessive Pump2 Current" alarm (cerent15216EdfaAlarmLcrnt2).
	LTMP1 (EQPT)	"Excessive Pump1 Temperature" alarm (cerent15216EdfaAlarmLtmp1).
	LTMP2 (EQPT)	"Excessive Pump2 Temperature" alarm (cerent15216EdfaAlarmLtmp2).
	MAXCTMPCHGD (EQPT)	"Max Case Temperature Changed" (cerent15216EdfaCtmpMax).
	MAXCTMPHYSTCHGD (EQPT)	"Max Ctmp (case temperature) Hysteresis Changed" (cerent15216EdfaCtmpMaxHysteresis).
	MINCTMPCHGD (EQPT)	"Min Case Temperature Changed" (cerent15216EdfaCtmpMin).
	MINCTMPHYSTCHGD (EQPT)	"Min Ctmp (case temperature) Hysteresis Changed" (cerent15216EdfaCtmpMinHysteresis).
	PWRBUSA (EQPT)	"Power Bus A (voltage) Alarm" (cerent15216EdfaAlarmPowerBusA).
	PWRBUSB (EQPT)	"Power Bus B (voltage) Alarm" (cerent15216EdfaAlarmPowerBusB).
	PWRBUSMAXCHGD (EQPT)	"Power Bus Max (voltage) Changed" (cerent15216EdfaPowerBusDCVoltageMax).
	PWRBUSMINCHGD (EQPT)	"Power Bus Min (voltage) Changed" (cerent15216EdfaPowerBusDCVoltageMin).

Table 9-26   REPT EVT DWDM / REPT EVT EQPT Syntax Description (continued)

Parameter	Syntax	Description
	PWRBUSMODE (EQPT)	"Power Bus Mode Changed" (cerent15216EdfaPowerBusMode).
	SEVERITYCHGD (EQPT)	"Severity Changed from CR|MJ|MN|NA|NR to CR|MJ|MN|NA|NR".
	SFTWDOWN (EQPT)	"Software Download In Progress" alarm (cerent15216EdfaOpLoad).
	SFTWDOWNERR (EQPT)	"Software Load Error".
	SOFTWARERESET (EQPT)	"Software Reset" (cerent15216EdfaOpReset).
	SOFTWARERESETERR (EQPT)	"Software Reset Error" (cerent15216EdfaActionOpResult).
condeff		Effect of the condition.
	TC	Transient condition.
	SC	Standing condition.
	CL	Cleared standing condition.
date	yyyy-mm-dd	Date of origination of TL1 message.
ocrdat	m-d	Date (month-day) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
ocrtm	h-m-s	Time (hour-minute-second) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
sid	string	Source identifier uniquely identifies the source of a TL1 autonomous command.
srveff		Effect on service. Possible values are:
	SA	Service affecting.
	NSA	Non-service affecting.
time	hh:mm:ss	Time of origination of TL1 message.

9.6.21 REPT EVT FXFR

Command Types   **REPT EVT FXFR**

Reports autonomous events related to the FTP file transfer (see "9.6.5 COPY-RFILE" section on page 9-15). Reports when an event related to the file transfer is logged.

Syntax Description

```
   <sid> <date> <time>
A  <atag> REPT EVT FXFR
   "<aid>:<filename>,<fxfr_status>[,<fxfr_rslt>][,<bytes_xfrd>]"
;
```

Example 9-25   REPT EVT FXFR Message

```
   Amp01 2001-06-18 14:48:44
A  141 REPT EVT FXFR
   "EQPT:VMRLS20.EXE,COMPLD,SUCCESS,8051"
;
```

Table 9-27   REPT EVT FXFR Syntax Description

Parameter	Syntax	Description
atag	0 - 999	An integer between 0 and 999 used as a sequence number in autonomous messages.
aid		Always EQPT.
	EQPT	General parameters of the ONS 15216 EDFA2.
bytes_xfrd		Total number of bytes transferred when *fxfr_status* is COMPLD. See *fxfr_status* below.
filename		Identifies the name of the file that is being transferred.
fxfr_rslt		File transfer result indicates success or failure of the file transfer. This is displayed only when the file transfer has completed (i.e., *fxfr_status* is COMPLD). Possible values are:
	SUCCESS	File transfer was successful.
	FAILURE	File transfer failed.
fxfr_status		File transfer status of ONS 15216 EDFA2's file transfer at the current time. (The option IP (in progress) has not been implemented.) Possible values are:
	START	File transfer has started.
	COMPLD	File transfer has completed.
date	yyyy-mm-dd	Date of origination of TL1 message.
sid	string	Source identifier uniquely identifies the source of a TL1 autonomous command.
time	hh:mm:ss	Time of origination of TL1 message.

9.6.22 RTRV-ALM-ALL

Command Types   **RTRV-ALM-ALL**

Generates a report on all active alarms. Note that the ccm does not appear in the response for EQPT alarms.

Note   The messages for Loss of Signal (LOS), Gain Out of Range (GAIN), and Loss of Output Power (LPOUT) are prioritized (in the order just listed) so that only one message can be delivered at one time. For example, if the ONS 15216 EDFA2 detects both a loss of input signal and a loss of output power at the same time, it will deliver only the Loss of Signal (LOS) message to the user. This prioritized filtering of alarms does not occur with the SNMP delivery of alarms of the ONS 15216 EDFA2.

Syntax Description

```
RTRV-ALM-ALL:[<tid>]::<ctag>::[<ntfcncde>],[<condtype>],[<srveff>][,,,,,];
   <sid> <date> <time>
M  <ctag> COMPLD
   "<aid>,<ccm>:<ntfcncde>,<condtype>,<srveff>,<ocrdat>,<ocrtm>,,:<conddescr>"
;
```

Example 9-26   RTRV-ALM-ALL Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-ALM-ALL:Amp01::229::MN,LCRNT1,NSA,,;
   Amp01 2002-06-20 14:30:00
M  229 COMPLD
   "1,DWDM:MJ,LOS,SA,6-20,14-25-30,,:\"Loss Of Signal\""
   "EQPT,EQPT:MN,LCRNT1,NSA,6-20,14-25-30,,:\"Excessive Pump1 Current\""
;
```

Table 9-28   RTRV-ALM-ALL Syntax Description

Parameter	Syntax	Description
aid		Possible values are:
	1	Directly affecting the optical signal
	EQPT	General parameters of the ONS 15216 EDFA2 (not directly affecting optical signal).
	PWR-A	Affecting Power Bus A.
	PWR-B	Affecting Power Bus B.
conddescr		Detailed text description of the event. The *conddescr* is 1 to 64 characters of ASCII text. See *condtype* below

Table 9-28   RTRV-ALM-ALL Syntax Description (continued)

Parameter	Syntax	Description
condtype (ccm)		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	LOS (DWDM)	"Loss of Signal" (input power) alarm (cerent15216EdfaAlarmLpin).
	GAIN (DWDM)	"Gain Out of Range" alarm (cerent15216EdfaAlarmGain).
	LPOUT (DWDM)	"Loss of Output Power" alarm (cerent15216EdfaAlarmLpout).
	CTMP (EQPT)	"Case Temperature Out of Range" alarm (cerent15216EdfaAlarmCtmp).
	DBBACKUP (EQPT)	"Database Backup In Progress" (cerent15216EdfaOpDbBackup).
	DBRESTORE (EQPT)	"Database Restore In Progress" (cerent15216EdfaOpDbRestore).
	LCRNT1 (EQPT)	"Excessive Pump1 Current" alarm (cerent15216EdfaAlarmLcrnt1).
	LCRNT2 (EQPT)	"Excessive Pump2 Current" alarm (cerent15216EdfaAlarmLcrnt2).
	LTMP1 (EQPT)	"Excessive Pump1 Temperature" alarm (cerent15216EdfaAlarmLtmp1).
	LTMP2 (EQPT)	"Excessive Pump2 Temperature" alarm (cerent15216EdfaAlarmLtmp2).
	PWRBUSA (EQPT)	"Power Bus A (voltage) Alarm" (cerent15216EdfaAlarmPowerBusA).
	PWRBUSB (EQPT)	"Power Bus B (voltage) Alarm" (cerent15216EdfaAlarmPowerBusB).
	SFTWDOWN (EQPT)	"Software Download In Progress" (cerent15216EdfaOpLoad).
date	yyyy-mm-dd	Date of origination of TL1 message.
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NULL	Defaults to ALL.
ocrdat	m-d	Date (month-day) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
ocrtm	h-m-s	Time (hour-minute-second) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).

Table 9-28   RTRV-ALM-ALL Syntax Description (continued)

Parameter	Syntax	Description
sid	string	Source identifier uniquely identifies the source of a TL1 autonomous command.
srveff		Effect on service. Possible values are:
	SA	Service affecting.
	NSA	Non-service affecting.
time	hh:mm:ss	Time of origination of TL1 message.

9.6.23 RTRV-ALM-DWDM

Command Types

RTRV-ALM-DWDM

Generates a report on active DWDM alarms.

Note   The messages for Loss of Signal (LOS), Gain Out of Range (GAIN), and Loss of Output Power (LPOUT) are prioritized (in the order just listed) so that only one message can be delivered at one time. For example, if the ONS 15216 EDFA2 detects both a loss of input signal and a loss of output power at the same time, it will deliver only the Loss of Signal (LOS) message to the user. This prioritized filtering of alarms does not occur with the SNMP delivery of alarms of the ONS 15216 EDFA2.

Syntax Description
```
RTRV-ALM-DWDM:[<tid>]:<aid>:<ctag>::[<ntfcncde>],[<condtype>],[<srveff>][,,,,,];
    <sid> <date> <time>
M   <ctag> COMPLD
    "<aid>,<ccm>:<ntfcncde>,<condtype>,<srveff>,<ocrdat>,<ocrtm>,,:<conddescr>"
;
```

Example 9-27   RTRV-ALM-DWDM Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-ALM-DWDM:Amp01:ALL:229::,,;
    Amp01 2002-06-20 14:30:00
M   229 COMPLD
    "1,DWDM:MJ,LOS,SA,6-20,14-25-30,,:\"Loss Of Signal\""
;
```

Table 9-29   RTRV-ALM-DWDM Syntax Description

Parameter	Syntax	Description
aid		1 and ALL have same input effect.
	1	Directly affecting the optical signal.
	ALL	Any or all of the preceding (command input only).
conddescr		Detailed text description of the event. The *conddescr* is 1 to 64 characters of ASCII text. See *condtype* below.

Table 9-29   RTRV-ALM-DWDM Syntax Description (continued)

Parameter	Syntax	Description
condtype		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	LOS	"Loss of Signal" (input power) alarm (cerent15216EdfaAlarmLpin).
	GAIN	"Gain Out of Range" alarm (cerent15216EdfaAlarmGain).
	LPOUT	"Loss of Output Power" alarm (cerent15216EdfaAlarmLpout).
date	yyyy-mm-dd	Date of origination of TL1 message.
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NULL	Defaults to ALL.
ocrdat	m-d	Date (month-day) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
ocrtm	h-m-s	Time (hour-minute-second) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
sid	string	Source identifier uniquely identifies the source of a TL1 autonomous command.
srveff		Effect on service. Possible values are:
	SA	Service affecting.
	NSA	Non-service affecting.
time	hh:mm:ss	Time of origination of TL1 message.

9.6.24 RTRV-ALM-EQPT

Command Types   **RTRV-ALM-EQPT**

Generates a report on all active alarms.

Syntax Description
```
RTRV-ALM-EQPT:[<tid>]:<aid>:<ctag>::[<ntfcncde>],[<condtype>],[<srveff>][,,,,,];
    <sid> <date> <time>
M  <ctag> COMPLD
    "<aid>:<ntfcncde>,<condtype>,<srveff>,<ocrdat>,<ocrtm>,,:<conddescr>"
;
```

Example 9-28   RTRV-ALM-EQPT Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-ALM-EQPT:Amp01:ALL:229::MN,LCRNT1,NSA,,;
   Amp01 2002-06-20 14:30:00
M  229 COMPLD
   "EQPT:MN,LCRNT1,NSA,6-20,14-25-30,,:\"Excessive Pump1 Current\""
;
```

Table 9-30   RTRV-ALM-EQPT Syntax Description

Parameter	Syntax	Description
aid		Possible valies are:
	EQPT	General parameters of the ONS 15216 EDFA2.
	PWR-A	Affecting Power Bus A.
	PWR-B	Affecting Power Bus B.
	ALL	Any or all of the preceding (command input only).
conddescr		Detailed text description of the event. The *conddescr* is 1 to 64 characters of ASCII text. See *condtype* below.
condtype		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	CTMP	"Case Temperature Out of Range" alarm (cerent15216EdfaAlarmCtmp).
	DBBACKUP	"Database Backup In Progress" (cerent15216EdfaOpDbBackup).
	DBRESTORE	"Database Restore In Progress" (cerent15216EdfaOpDbRestore).
	LCRNT1	"Excessive Pump1 Current" alarm (cerent15216EdfaAlarmLcrnt1).
	LCRNT2	"Excessive Pump2 Current" alarm (cerent15216EdfaAlarmLcrnt2).
	LTMP1	"Excessive Pump1 Temperature" alarm (cerent15216EdfaAlarmLtmp1).
	LTMP2	"Excessive Pump2 Temperature" alarm (cerent15216EdfaAlarmLtmp2).
	PWRBUSA	"Power Bus A (voltage) Alarm" (cerent15216EdfaAlarmPowerBusA).
	PWRBUSB	"Power Bus B (voltage) Alarm" (cerent15216EdfaAlarmPowerBusB).
	SFTWDOWN	"Software Download In Progress" (cerent15216EdfaOpLoad).
date	yyyy-mm-dd	Date of origination of TL1 message.

Table 9-30   RTRV-ALM-EQPT Syntax Description (continued)

Parameter	Syntax	Description
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NULL	Defaults to ALL.
ocrdat	m-d	Date (month-day) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
ocrtm	h-m-s	Time (hour-minute-second) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
sid	string	Source identifier uniquely identifies the source of a TL1 autonomous command.
srveff		Effect on service. Possible values are:
	SA	Service affecting.
	NSA	Non-service affecting.
time	hh:mm:ss	Time of origination of TL1 message.

9.6.25 RTRV-AO

Command Types

RTRV-AO

Retrieves autonomous output.

Allows the operating system to retrieve a copy of queued autonomous messages or missing autonomous messages. Examples of autonomous messages are REPT ALM and REPT EVT.

Users can retrieve up to the latest 1000 autonomous messages (alarms and events). Normally, users should limit the retrieval to less than 200 messages to prevent alarm reporting and other active users from being impacted. To retrieve more than 200 messages, it is recommended that the user saves the autonomous message log to a file using the **CPY-MEM** command and then get the file through FTP using the **COPY-RFILE** command.

If none of the stored automatic messages satisfy the selection criteria, then a complete normal response is sent. If one or more stored autonomous messages satisfy the criteria, then the messages should be reported in the normal response in ATAG order.

Syntax Description

```
RTRV-AO:[<tid>]::<ctag>:::[ATAGSEQ=<atagseq>][,MSGTYPE=<msgtype>];
```

Example 9-29   RTRV-AO Command

```
Amp01:ONS15216 EDFA2> RTRV-AO:Amp01::123:::ATAGSEQ=20&&30,MSGTYPE=EVT;
```

Table 9-31   RTRV-AO Syntax Description

Parameter	Syntax	Description
atagseq		*atag* is an integer between 0 and 999 used by the ONS 15216 EDFA2 to sequentially number in autonomous messages. *atagseq* can be a single *atag* number or a range of numbers in the form *AA&&BB*, where *AA* and *BB* are integers. If null, the 20 latest messages will be retrieved.
msgtype		Type of message. A null value means both ALM and EVT.
	ALM	Alarm message.
	EVT	Event message.

9.6.26 RTRV-ATTR-ALL

Command Types

RTRV-ATTR-ALL

Retrieves the notification codes for all attributes.

Syntax Description

```
RTRV-ATTR-ALL:[<tid>]::<ctag>::[<ntfcncde>],[<condtype>][,,,];
   <sid> <date> <time>
M  <ctag> COMPLD
   "<aid>,<ccm>:<ntfcncde>,<condtype>,,,"
;
```

Example 9-30   RTRV-ATTR-ALL Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-ATTR-ALL:Amp01::229::,,,,,;
   Amp01 2002-06-20 14:30:00
M  229 COMPLD
  þ"EQPT,EQPT:MN,LCRNT1,,"
  þ"EQPT,EQPT:MN,LCRNT2,,"
  þ"EQPT,EQPT:MN,LTMP1,,"
  þ"EQPT,EQPT:MN,LTMP2,,"
  þ"1,DWDM:MJ,LOS,,"
  þ"1,DWDM:MJ,GAIN,,"
  þ"1,DWDM:MJ,LPOUT,,"
  þ"EQPT,EQPT:MN,CTMP,,"
  þ"PWR-A,EQPT:MN,PWRBUSA,,"
  þ"PWR-B,EQPT:MN,PWRBUSB,,"
  þ"EQPT,EQPT:MN,DBBACKUP,,"
  þ"EQPT,EQPT:MN,DBRESTORE,,"
  þ"EQPT,EQPT:MN,SFTWDOWN,,"
;
```

Table 9-32   RTRV-ATTR-ALL Syntax Description

Parameter	Syntax	Description
aid		Possible values are:
	1	Directly affecting the optical signal.
	EQPT	General parameters of the ONS 15216 EDFA2.
	PWR-A	Affecting Power Bus A.
	PWR-B	Affecting Power Bus B.
	ALL	Any or all of the preceding (command input only).
	NULL	Defaults to ALL.
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NA	Not alarmed.
	NR	Not reported.
	ALL	Any or all of the preceding (command input only).
	NULL	Deafults to ALL.

Table 9-32   RTRV-ATTR-ALL Syntax Description (continued)

Parameter	Syntax	Description
condtype		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	LOS (DWDM)	"Loss of Signal" (input power) alarm (cerent15216EdfaAlarmLpin).
	GAIN (DWDM)	"Gain Out of Range" alarm (cerent15216EdfaAlarmGain).
	LPOUT (DWDM)	"Loss of Output Power" alarm (cerent15216EdfaAlarmLpout).
	CTMP (EQPT)	"Case Temperature Out of Range" alarm (cerent15216EdfaAlarmCtmp).
	DBBACKUP (EQPT)	"Database Backup In Progress" (cerent15216EdfaOpDbBackup).
	DBRESTORE (EQPT)	"Database Restore In Progress" (cerent15216EdfaOpDbRestore).
	LCRNT1 (EQPT)	"Excessive Pump1 Current" alarm (cerent15216EdfaAlarmLcrnt1).
	LCRNT2 (EQPT)	"Excessive Pump2 Current" alarm (cerent15216EdfaAlarmLcrnt2).
	LTMP1 (EQPT)	"Excessive Pump1 Temperature" alarm (cerent15216EdfaAlarmLtmp1).
	LTMP2 (EQPT)	"Excessive Pump2 Temperature" alarm (cerent15216EdfaAlarmLtmp2).
	PWRBUSA (EQPT)	"Power Bus A (voltage) Alarm" (cerent15216EdfaAlarmPowerBusA).
	PWRBUSB (EQPT)	"Power Bus B (voltage) Alarm" (cerent15216EdfaAlarmPowerBusB).
	SFTWDOWN (EQPT)	"Software Download In Progress" (cerent15216EdfaOpLoad).
	ALL	Any or all of the above.
	NULL	Defaults to ALL.

9.6.27 RTRV-ATTR-DWDM

Command Types

RTRV-ATTR-DWDM

Retrieves the notification codes for DWDM attributes.

Syntax Description

```
RTRV-ATTR-DWDM:[<tid>]:[aid]:<ctag>::[<ntfcncde>],[<condtype>][,,,];
    <sid> <date> <time>
M  <ctag> COMPLD
```

```
        "<aid>,<ccm>:<ntfcncde>,<condtype>,,,"
;
```

Example 9-31   RTRV-ATTR-DWDM Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-ATTR-DWDM:Amp01:1:229::MJ,,,,;
    Amp01 2002-06-20 14:30:00
M  229 COMPLD
    "1,DWDM:MJ,LOS,,,"
    "1,DWDM:MJ,GAIN,,"
    "1,DWDM:MJ,LPOUT,,"
;
```

Table 9-33   RTRV-ATTR-DWDM Syntax Description

Parameter	Syntax	Description
aid		1 and ALL have same input effecct.
	1	Directly affecting the optical signal.
	ALL	Any or all of the preceding (command input only).
	NULL	Defaults to ALL.
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NA	Not alarmed.
	NR	Not reported.
	ALL	Any or all of the preceding (command input only).
	NULL	Defaults to ALL.
condtype		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	LOS	"Loss of Signal" (input power) alarm (cerent15216EdfaAlarmLpin).
	GAIN	"Gain Out of Range" alarm (cerent15216EdfaAlarmGain).
	LPOUT	"Loss of Output Power" alarm (cerent15216EdfaAlarmLpout).
	ALL	Any or all of the above.
	NULL	Defaults to ALL.

9.6.28 RTRV-ATTR-EQPT

Command Types

RTRV-ATTR-EQPT

Retrieves the notification codes for the eqiupment attributes.

Syntax Description

```
RTRV-ATTR-EQPT:[<tid>]:[aid]:<ctag>::[<ntfncde>],[<condtype>][,,,];
    <sid> <date> <time>
M   <ctag> COMPLD
    "<aid>,<ccm>:<ntfncde>,<condtype>,,,"
;
```

Example 9-32   RTRV-ATTR-EQPT Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-ATTR-EQPT:Amp01::229::,,,,,;
    Amp01 2002-06-20 14:30:00
M   229 COMPLD
  þ"EQPT,EQPT:MN,LCRNT1,,"
  þ"EQPT,EQPT:MN,LCRNT2,,"
  þ"EQPT,EQPT:MN,LTMP1,,"
  þ"EQPT,EQPT:MN,LTMP2,,"
  þ"EQPT,EQPT:MN,CTMP,,"
  þ"PWR-A,EQPT:MN,PWRBUSA,,"
  þ"PWR-B,EQPT:MN,PWRBUSB,,"
  þ"EQPT,EQPT:MN,DBBACKUP,,"
  þ"EQPT,EQPT:MN,DBRESTORE,,"
  þ"EQPT,EQPT:MN,SFTWDOWN,,"
;
```

Table 9-34   RTRV-ATTR-EQPT Syntax Description

Parameter	Syntax	Description
aid		Possible values are:
	EQPT	General parameters of the ONS 15216 EDFA2.
	PWR-A	Affecting Power Bus A.
	PWR-B	Affecting Power Bus B.
	ALL	Any or all of the preceding (command input only).
	NULL	Defaults to ALL.
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NA	Not alarmed.
	NR	Not reported.
	ALL	Any or all of the preceding (command input only).
	NULL	Defaults to ALL.

Table 9-34   RTRV-ATTR-EQPT Syntax Description (continued)

Parameter	Syntax	Description
condtype		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	CTMP	"Case Temperature Out of Range" alarm (cerent15216EdfaAlarmCtmp).
	DBBACKUP	"Database Backup In Progress" (cerent15216EdfaOpDbBackup).
	DBRESTORE	"Database Restore In Progress" (cerent15216EdfaOpDbRestore).
	LCRNT1	"Excessive Pump1 Current" alarm (cerent15216EdfaAlarmLcrnt1).
	LCRNT2	"Excessive Pump2 Current" alarm (cerent15216EdfaAlarmLcrnt2).
	LTMP1	"Excessive Pump1 Temperature" alarm (cerent15216EdfaAlarmLtmp1).
	LTMP2	"Excessive Pump2 Temperature" alarm (cerent15216EdfaAlarmLtmp2).
	PWRBUSA	"Power Bus A (voltage) Alarm" (cerent15216EdfaAlarmPowerBusA).
	PWRBUSB	"Power Bus B (voltage) Alarm" (cerent15216EdfaAlarmPowerBusB).
	SFTWDOWN	"Software Download In Progress" (cerent15216EdfaOpLoad).
	ALL	Any or all of the above.
	NULL	Defaults to ALL.

9.6.29 RTRV-COND-ALL

Command Types   **RTRV-COND-ALL**

Generates a report on the condition (state) of all alarms and standing conditions.

Note   The messages for Loss of Signal (LOS), Gain Out of Range (GAIN), and Loss of Output Power (LPOUT) are prioritized (in the order just listed) so that only one message can be delivered at one time. For example, if the ONS 15216 EDFA2 detects both a loss of input signal and a loss of output power at the same time, it will deliver only the Loss of Signal (LOS) message to the user. This prioritized filtering of alarms does not occur with the SNMP delivery of alarms of the ONS 15216 EDFA2.

Syntax Description

```
RTRV-COND-ALL:[<tid>]::<ctag>::[<condtype>][,,,];
   <sid> <date> <time>
M  <ctag> COMPLD
   "<aid>,<ccm>:<ntfcncde>,<condtype>,<srveff>,<ocrdat>,<ocrtm>,,,<conddescr>"
;
```

Example 9-33   RTRV-COND-ALL Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-COND-ALL:Amp01::229::;
   Amp01 2002-06-20 14:30:00
M  229 COMPLD
   "1,DWDM:MJ,LOS,SA,6-20,14-25-30,,,\"Loss Of Signal\""
   "EQPT,EQPT:MN,LCRNT1,NSA,6-20,14-25-30,,,\"Excessive Pump1 Current\""
;
```

Table 9-35   RTRV-COND-ALL Syntax Description

Parameter	Syntax	Description
aid		Possible values are:
	1	Directly affecting the optical signal.
	EQPT	General parameters of the ONS 15216 EDFA2.
	PWR-A	Affecting Power Bus A.
	PWR-B	Affecting Power Bus B.
conddescr		Detailed text description of the event. The *conddescr* is 1 to 64 characters of ASCII text. See *condtype* below.

Table 9-35   RTRV-COND-ALL Syntax Description (continued)

Parameter	Syntax	Description
condtype (ccm)		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	LOS (DWDM)	"Loss of Signal" (input power) alarm (cerent15216EdfaAlarmLpin).
	GAIN (DWDM)	"Gain Out of Range" alarm (cerent15216EdfaAlarmGain).
	LPOUT (DWDM)	"Loss of Output Power" alarm (cerent15216EdfaAlarmLpout).
	CTMP (EQPT)	"Case Temperature Out of Range" alarm (cerent15216EdfaAlarmCtmp).
	DBBACKUP (EQPT)	"Database Backup In Progress" (cerent15216EdfaOpDbBackup).
	DBRESTORE (EQPT)	"Database Restore In Progress" (cerent15216EdfaOpDbRestore).
	LCRNT1 (EQPT)	"Excessive Pump1 Current" alarm (cerent15216EdfaAlarmLcrnt1).
	LCRNT2 (EQPT)	"Excessive Pump2 Current" alarm (cerent15216EdfaAlarmLcrnt2).
	LTMP1 (EQPT)	"Excessive Pump1 Temperature" alarm (cerent15216EdfaAlarmLtmp1).
	LTMP2 (EQPT)	"Excessive Pump2 Temperature" alarm (cerent15216EdfaAlarmLtmp2).
	PWRBUSA (EQPT)	"Power Bus A (voltage) Alarm" (cerent15216EdfaAlarmPowerBusA).
	PWRBUSB (EQPT)	"Power Bus B (voltage) Alarm" (cerent15216EdfaAlarmPowerBusB).
	SFTWDOWN (EQPT)	"Software Download In Progress" (cerent15216EdfaOpLoad).
date	yyyy-mm-dd	Date of origination of TL1 message.
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NA	Not alarmed.
	NR	Not reported.
ocrdat	m-d	Date (month-day) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
ocrtm	h-m-s	Time (hour-minute-second) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).

Table 9-35   RTRV-COND-ALL Syntax Description (continued)

Parameter	Syntax	Description
sid	string	Source identifier uniquely identifies the source of a TL1 autonomous command.
srveff		Effect on service. Possible values are:
	SA	Service affecting.
	NSA	Non-service affecting.
time	hh:mm:ss	Time of origination of TL1 message.

9.6.30 RTRV-COND-DWDM

Command Types

RTRV-COND-DWDM

Generates a report on the condition (state) of DWDM alarms and standing conditions.

Note The messages for Loss of Signal (LOS), Gain Out of Range (GAIN), and Loss of Output Power (LPOUT) are prioritized (in the order just listed) so that only one message can be delivered at one time. For example, if the ONS 15216 EDFA2 detects both a loss of input signal and a loss of output power at the same time, it will deliver only the Loss of Signal (LOS) message to the user. This prioritized filtering of alarms does not occur with the SNMP delivery of alarms of the ONS 15216 EDFA2.

Syntax Description
```
RTRV-COND-DWDM:[<tid>]:<aid>:<ctag>::[<condtype>][,,,];
    <sid> <date> <time>
M  <ctag> COMPLD
    "<aid>,<ccm>:<ntfcncde>,<condtype>,<srveff>,<ocrdat>,<ocrtm>,,,<conddescr>"
;
```

Example 9-34   RTRV-COND-DWDM Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-COND-DWDM:Amp01:ALL:229::LOS;
    Amp01 2002-06-20 14:30:00
M  229 COMPLD
    "1,DWDM:MJ,LOS,SA,6-20,14-25-30,,,\"Loss Of Signal\""
;
```

Table 9-36   RTRV-COND-DWDM Syntax Description

Parameter	Syntax	Description
aid		1 and ALL have same input effect.
	1	Directly affecting the optical signal.
	ALL	Any or all of the preceding (command input only).
conddescr		Detailed text description of the event. The *conddescr* is 1 to 64 characters of ASCII text. See *condtype* below.

Table 9-36   RTRV-COND-DWDM Syntax Description (continued)

Parameter	Syntax	Description
condtype		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	LOS	"Loss of Signal" (input power) alarm (cerent15216EdfaAlarmLpin).
	GAIN	"Gain Out of Range" alarm (cerent15216EdfaAlarmGain).
	LPOUT	"Loss of Output Power" alarm (cerent15216EdfaAlarmLpout).
date	yyyy-mm-dd	Date of origination of TL1 message.
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NA	Not alarmed.
	NR	Not reported.
ocrdat	m-d	Date (month-day) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
ocrtm	h-m-s	Time (hour-minute-second) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
sid	string	Source identifier uniquely identifies the source of a TL1 autonomous command.
srveff		Effect on service. Possible values are:
	SA	Service affecting.
	NSA	Non-service affecting.
time	hh:mm:ss	Time of origination of TL1 message.

9.6.31 RTRV-COND-EQPT

Command Types **RTRV-COND-EQPT**

Generates a report on the condition (state) of general alarms and standing conditions.

Syntax Description
```
RTRV-COND-EQPT:[<tid>]:<aid>:<ctag>::[<condtype>][,,,];
    <sid> <date> <time>
M  <ctag> COMPLD
    "<aid>:<ntfcncde>,<condtype>,<srveff>,<ocrdat>,<ocrtm>,,,<conddescr>"
;
```

Example 9-35   RTRV-COND-EQPT Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-COND-EQPT:Amp01:ALL:229::LCRNT1;
   Amp01 2002-06-20 14:30:00
M  229 COMPLD
   "EQPT:MN,LCRNT1,NSA,6-20,14-25-30,,,\"Excessive Pump1 Current\""
;
```

Table 9-37   RTRV-COND-EQPT Syntax Description

Parameter	Syntax	Description
aid		EQPT and ALL have same input effect.
	EQPT	General parameters of the ONS 15216 EDFA2.
	PWR-A	Affecting Power Bus A.
	PWR-B	Affecting Power Bus B.
	ALL	Any or all of the preceding (command input only).
conddescr		Detailed text description of the event. The *conddescr* is 1 to 64 characters of ASCII text. See *condtype* below.
condtype		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	CTMP	"Case Temperature Out of Range" alarm (cerent15216EdfaAlarmCtmp).
	DBBACKUP	"Database Backup In Progress" alarm (cerent15216EdfaOpDbBackup).
	DBRESTORE	"Database Restore In Progress" alarm (cerent15216EdfaOpDbRestore).
	LCRNT1	"Excessive Pump1 Current" alarm (cerent15216EdfaAlarmLcrnt1).
	LCRNT2	"Excessive Pump2 Current" alarm (cerent15216EdfaAlarmLcrnt2).
	LTMP1	"Excessive Pump1 Temperature" alarm (cerent15216EdfaAlarmLtmp1).
	LTMP2	"Excessive Pump2 Temperature" alarm (cerent15216EdfaAlarmLtmp2).
	PWRBUSA	"Power Bus A (voltage) Alarm" (cerent15216EdfaAlarmPowerBusA).
	PWRBUSB	"Power Bus B (voltage) Alarm" (cerent15216EdfaAlarmPowerBusB).
	SFTWDOWN	"Software Download In Progress" alarm (cerent15216EdfaOpLoad).
date	yyyy-mm-dd	Date of origination of TL1 message.

Table 9-37   RTRV-COND-EQPT Syntax Description (continued)

Parameter	Syntax	Description
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NA	Not alarmed.
	NR	Not reported.
ocrdat	m-d	Date (month-day) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
ocrtm	h-m-s	Time (hour-minute-second) of the event occurrence (derived from cerent15216EdfaDateAndTimeString).
sid	string	Source identifier uniquely identifies the source of a TL1 autonomous command.
srveff		Effect on service. Possible values are:
	SA	Service affecting.
	NSA	Non-service affecting.
time	hh:mm:ss	Time of origination of TL1 message.

9.6.32 RTRV-DFLT-SECU

Command Types

RTRV-DFLT-SECU

Retrieves the timeout value(s) for user access level(s).

Syntax Description

```
RTRV-DFLT-SECU:[<tid>]:<aid>:<ctag>;
   <sid> <date> <time>
M  <ctag> COMPLD
   "<aid>:AL=<al>,TMOUT=<timeout>"
;
```

Example 9-36   RTRV-DFLT-SECU Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-DFLT-SECU:Amp01:ALL:123;
   Amp01 2002-01-12 08:01:05
M  123 COMPLD
   "EQPT:AL=R,TMOUT=60"
   "EQPT:AL=RW,TMOUT=30"
   "EQPT:AL=RWA,TMOUT=15"
;
```

Table 9-38   RTRV-DFLT-SECU Syntax Description

Parameter	Syntax	Description
date	yyyy-mm-dd	Date of origination of TL1 message.
time	hh:mm:ss	Time of origination of TL1 message.
aid		EQPT and ALL have same input effect.
	EQPT	General parameters of the ONS 15216 EDFA2.
	ALL	Any or all of the preceding (command input only).
al		Access level of the user. See "9.5 Summary of Security Permissions for TL1 Commands" section on page 9-6 for access level permissions.
	R	Read only privileges.
	RW	Read and write privileges.
	RWA	Read, write, and administrative privileges.
timeout	integer	Timeout in minutes.

9.6.33 RTRV-DWDM

Command Types

RTRV-DWDM

Retrieves the ONS 15216 EDFA2 optical control configuration.

Syntax Description

```
RTRV-DWDM:[<tid>]:<aid>:<ctag>;
    <sid> <date> <time>
M  <ctag> COMPLD
   "<aid>:INPWRMICROW=<inputpoweruw>,INPWRDBM=<inputpowerdbm>,OUTPWRMILLIW=<outputpowermw>
,OUTPWRDBM=<outputpowerdbm>,PUMP1CTRLMODE=<pump1ctrlmode>,PUMP1CTRLVALUE=<pump1ctrlvalue>,
PUMP2CTRLMODE=<pump2ctrlmode>,PUMP2CTRLVALUE=<pump2ctrlvalue>,PUMP1CTRLMODEMEASURED=<pump1
ctrlmodemeasured>,PUMP1CTRLVALUEMEASURED=<pump1ctrlvaluemeasured>,PUMP2CTRLMODEMEASURED=<p
ump2ctrlmodemeasured>,PUMP2CTRLVALUEMEASURED=<pump2ctrlvaluemeasured>,OVERALLGAINMEASURED=
<gainmeasured>,CONFIGGAIN=<gain>,PREATTMEASURED=<preattmeasured>,ALS=<als>"
;
```

Example 9-37   RTRV-DWDM Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-DWDM:Amp01:ALL:123;
    Amp01 2002-06-20 14:30:00
M  124 COMPLD
   "1:INPWRMICROW=1934,INPWRDBM=-714,OUTPWRMILLIW=3532,OUTPWRDBM=1548,PUMP1CTRLMODE=GAINTE
MP,PUMP1CTRLVALUE=220,PUMP2CTRLMODE=GAINTEMP,PUMP2CTRLVALUE=220,PUMP1CTRLMODEMEASURED=GAIN
TEMP,PUMP1CTRLVALUEMEASURED=220,PUMP2CTRLMODEMEASURED=GAINTEMP,PUMP2CTRLVALUEMEASURED=220,
OVERALLGAINMEASURED=225,CONFIGGAIN=220,PREATTMEASURED=-5,ALS=DISABLED"
;
```

Table 9-39   RTRV-DWDM Syntax Description

Parameter	Syntax	Description
date	yyyy-mm-dd	Date of origination of TL1 message.
time	hh:mm:ss	Time of origination of TL1 message.
aid		1 and ALL have same input effect.
	1	Directly affecting the optical signal.
	ALL	Any or all of the preceding (command input only).
inputpoweruw	0 - 99999	Input power (signal) in units of 10 microW (cerent15216EdfaInPoweruW).
inputpowerdbm	–999999 - 999999	Input power (signal) in units of 100 dBm (cerent15216EdfaInPowerdBm).
outputpowermw	0 - 999999	Output power in units of 100 mW (cerent15216EdfaOutPowermW).
outputpowerdbm	–99999 - 99999	Output power in units of 100 dBm (cerent15216EdfaOutPowerdBm).
pump1ctrlmode, pump2ctrlmode		Pump 1 or pump 2 configured control mode (maps to cerent15216EdfaPumpCfgControlMode for the corresponding pump). Possible values are:
	GAINTEMP	Constant Gain Temperature Compensated mode (manufacturer default) (cerent15216EdfaPumpCfgControlMode set to constGainTempComp).
	OPWR	Constant Output Power mode (cerent15216EdfaPumpCfgControlMode set to constOutputPower). A valid mode only for pump 2.
	CRNT	Constant Pump Current mode (cerent15216EdfaPumpCfgControlMode set to constCurrent).
	PWR	Constant Pump Power mode (cerent15216EdfaPumpCfgControlMode set to constPower).
	IDLE	Pump is shut down (cerent15216EdfaPumpCfgControlMode set to idle).
pump1ctrlvalue, pump2ctrlvalue		Pump 1 or pump 2 configured control value. This value's interpretation depends on the control mode of the corresponding pump. Possible values are:
	0 - 650	Output power in units of 10 mW when mode is OPWR (gets cerent15216EdfaPumpCfgConstOutPower).
	0 - 300	Current value in mA when mode is CRNT (gets cerent15216EdfaPumpCfgConstPumpCurrent).
	0 - 100	Pump power in mW when mode is PWR (gets cerent15216EdfaPumpCfgConstPumpPower).
pump1ctrlmodemeasured, pump2ctrlmodemeasured		Pump 1 or pump 2 measured control mode. Possible values are same as pump1ctrlmode and pump2ctrlmode, as shown above.

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Table 9-39   RTRV-DWDM Syntax Description (continued)

Parameter	Syntax	Description
pump1ctrlvaluemeasured, pump2ctrlvaluemeasured		Pump 1 or pump 2 measured control value. Possible values are same as pump1ctrlvalue and pump2ctrlvalue, as shown above.
gainmeasured	0 - 230	Value of gain in units of 10 dB when mode is GAINTEMP (gets cerent15216EdfaConstGainOverallGainMeasured).
gain	130 - 220	Value of configured gain setpoint in units of 10 dB when mode is GAINTEMP (gets cerent15216EdfaConstGainOverallGainMeasured). Same as OVERALLGAIN.
preattmeasured	0 - 110	Gain pre-attenuation value in units of 10 dB (gets cerent15216EdfaVariableGainPreAttenuationMeasured).
als		Automatic Laser Shutdown (sets cerent15216EdfaALSModeEnable).
	ENABLED	When input power (signal) goes below the LOSTH value, the laser pumps are shut down until the input signal is restored beyond the value of LOSHYST.
	DISABLED	ASE is present (typically –3.5 dBm) at the output during LOS state.

9.6.34 RTRV-EQPT

Command Types

RTRV-EQPT

Retrieves the ONS 15216 EDFA2 equipment parameter configuration.

Syntax Description

```
RTRV-EQPT:[<tid>]:<aid>:<ctag>;
    <sid> <date> <time>
M  <ctag> COMPLD
    "<aid>:PWRBUSMODE=<pwrbusmode>"
;
```

Example 9-38   RTRV-EQPT Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-EQPT:Amp01:ALL:123;
    Amp01 2002-06-20 14:30:00
M  123 COMPLD
    "PWR-B:PWRBUSMODE=DUPLEX"
;
```

Table 9-40   RTRV-EQPT Syntax Description

Parameter	Syntax	Description
date	yyyy-mm-dd	Date of origination of TL1 message.
time	hh:mm:ss	Time of origination of TL1 message.
aid		PWR-A, PWR-B, and ALL have same input effect.
	PWR-A	Affecting Power Bus A.
	PWR-B	Affecting Power Bus B.
	ALL	Any or all of the preceding (command input only).
pwrbusmode		Power bus mode setting (cerent15216EdfaPowerBusMode). Possible values are:
	SIMPLEX	Simplex mode. Requires power only to bus A (cerent15216EdfaPowerBusMode set to simplex).
	DUPLEX	Duplex mode (manufacturer default). Requires power to both bus A and bus B (cerent15216EdfaPowerBusMode set to duplex).

9.6.35 RTRV-HDR

Command Types

RTRV-HDR

Retrieves header. Sends standard keep-alive message used to ping the ONS 15216 EDFA2. It also returns the current date, time, and sid/tid name of the ONS 15216 EDFA2 in the reply.

Syntax Description

```
RTRV-HDR:[<tid>]::<ctag>;
   <sid> <date> <time>
M  <ctag> COMPLD
;
```

Example 9-39   RTRV-HDR Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-HDR:Amp01::100;
   Amp01 2001-06-08 08:10:50
M  100 COMPLD
;
```

Table 9-41   RTRV-HDR Syntax Description

Parameter	Syntax	Description
date	yyyy-mm-dd	Date of origination of TL1 message.
time	hh:mm:ss	Time of origination of TL1 message.

9.6.36 RTRV-INV

Command Types

RTRV-INV

Retrieves the inventory information of the ONS 15216 EDFA2.

Syntax Description

```
RTRV-INV:[<tid>]:<aid>:<ctag>;
   <sid> <date> <time>
M  <ctag> COMPLD
   "<aid>:CLEI=<cleicode>,DESCR=<descr>,NAME=<name>,HARDWAREREV=<hwrev>,FIRMWAREREV=<fwrev
>,SOFTWAREREV=<swrev>,SERIALNUM=<serialnum>,MFGNAME=<mfg>,MODELNAME=<model>,MODELNAME=<mod
el>"
;
```

Example 9-40 RTRV-INV Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-INV:Amp01:ALL:123;
   Amp01 2002-01-12 08:01:05
M  123 COMPLD
   "EQPT:CLEI=IPI01AA0AAA,DESCR=ONS15216 EDFA2,NAME=Amp01,HARDWAREREV=74-3608-01-A0-C0,FIR
MWAREREV=v2.3.15,SOFTWAREREV=v2.4.0,SERIALNUM=DIT0533000P,MFGNAME=Cisco Systems,MODELNAME=
216EDFA2-A"
;
```

Table 9-42 RTRV-INV Syntax Description

Parameter	Syntax	Description
date	yyyy-mm-dd	Date of origination of TL1 message.
time	hh:mm:ss	Time of origination of TL1 message.
aid		EQPT and ALL have same input effect.
	EQPT	General parameters of the ONS 15216 EDFA2.
	ALL	Any or all of the preceding (command input only).
cleicode	string	CLEI code (cerent15216EdfaCLEI).
descr	string	System description (cerent15216EdfaPhysicalDescr).
fwrev	string	Firmware revision number (cerent15216EdfaPhysicalFirmwareRev).
hwrev	string	Hardware revision number (cerent15216EdfaPhysicalHardwareRev).
mfg	string	Manufacturer name (cerent15216EdfaPhysicalMfgName).
model	string	Model name (cerent15216EdfaPhysicalModelName).
name	string	System's sid/tid name (sysName).
serialnum	string	System serial number (cerent15216EdfaPhysicalSerialNum).
swrev	string	Software revision number (cerent15216EdfaPhysicalSoftwareRev).

9.6.37 RTRV-NE-GEN

Command Types

RTRV-NE-GEN

Retrieves general parameters of the ONS 15216 EDFA2. Retrieves sid/tid name, IP address and mask, and default router information. Also retrieves the boot table content.

Syntax Description

```
RTRV-NE-GEN:[<tid>]::<ctag>;
    <sid> <date> <time>
M  <ctag> COMPLD
    "<aid>:NAME=<name>,IPADDR=<ipaddr>,IPMASK=<ipmask>,DEFRTR=<defrtr>,MACADDRESS=<macaddre
ss>,BOOTRECORDTYPE1=<bootrectype1>,BOOTFILENAME1=<bootfilename1>,BOOTIPADDR1=<bootipaddr1>
,BOOTRECORDTYPE2=<bootrectype2>,BOOTFILENAME2=<bootfilename2>,BOOTIPADDR2=<bootipaddr2>,CL
I=<cli>"
;
```

Example 9-41   RTRV-NE-GEN Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-NE-GEN:Amp01::123;
    Amp01 2002-01-12 08:01:05
M  123 COMPLD
    "EQPT:NAME=Amp01,IPADDR=172.22.87.100,IPMASK=255.255.255.0,DEFRTR=172.22.87.2,MACADDRES
S=000D56727245,BOOTRECORDTYPE1=FLASH,BOOTFILENAME1=15216EdfaSw_2.4.0,BOOTIPADDR1=0.0.0.0,B
OOTRECORDTYPE2=TFTP,BOOTFILENAME2=bin/15216EdfaSw_2.0.1,BOOTIPADDR2=172.22.128.249,CLI=TL1
"
;
```

Table 9-43   RTRV-NE-GEN Syntax Description

Parameter	Syntax	Description
aid		Always EQPT.
	EQPT	General parameters of the ONS 15216 EDFA2.
name	string	System's sid/tid name (sysName).
ipaddr	string	IP address of the system (cerent15216EdfaSromIpMgmtEnetAddress).
ipmask	string	Subnet mask of the system (cerent15216EdfaSromIpMgmtEnetSubNetMask).
defrtr	string	IP address of the default router (cerent15216EdfaSromIpMgmtDefaultRouterAddress).
macaddress	string	MAC address of the system (cerent15216EdfaSromIpMgmtMacAddress).
bootrectype1		Boot record type (cerent15216EdfaBootType for first entry). Possible values are:
	FLASH	Boot from flash.
	TFTP	Boot through TFTP.
bootfilename1	string	Boot file name (cerent15216EdfaBootFileName for first entry). File names are case sensitive.

Table 9-43   RTRV-NE-GEN Syntax Description (continued)

Parameter	Syntax	Description
bootipaddr1	string	IP address to boot from if *bootrectype1* is set to TFTP (cerent15216EdfaBootIpAddress for first entry).
bootrectype2		Boot record type (cerent15216EdfaBootType for second entry). Possible values are:
	FLASH	Boot from flash.
	TFTP	Boot through TFTP.
bootfilename2	string	Boot file name (cerent15216EdfaBootFileName for second entry). File names are case sensitive.
bootipaddr2	string	IP address to boot from if *bootrectype2* is set to TFTP (cerent15216EdfaBootIpAddress for second entry).
cli		Default type of command line interface for all EIA/TIA-232 and default telnet port user sessions with the ONS 15216 EDFA2. Possible values are:
	TL1	TL1shell interface (manufacturer default).
	ASH	ASH shell interface – ONS 15216 EDFA2's native interface.

9.6.38 RTRV-RFILE

Command Types

RTRV-RFILE

Lists a specific file or all files on the flash file system of the ONS 15216 EDFA2.

Syntax Description

```
RTRV-RFILE:[<tid>]::<ctag>::[<localfilename>+];
    <sid> <date> <time>
M   <ctag> COMPLD
    "<aid>:<localfilename>"
;
```

Example 9-42   RTRV-RFILE Command and Response (List all Files)

```
Amp01:ONS15216 EDFA2> RTRV-RFILE:Amp01::123;
    Amp01 2002-01-12 08:01:05
M   123 COMPLD
    "EQPT:snmp.cfg,15216EdfaSw_2.4.0,passwd"
;
```

Example 9-43   RTRV-RFILE Command and Response (List a Specific File)

```
Amp01:ONS15216 EDFA2> RTRV-RFILE:Amp01::123::snmp.cfg;
    Amp01 2002-01-12 08:01:05
M   123 COMPLD
    "EQPT:snmp.cfg"
;
```

Table 9-44   RTRV-RFILE Syntax Description

Parameter	Syntax	Description
aid		Always EQPT.
	EQPT	General parameters of the ONS 15216 EDFA2.
localfilename	string	Name of the file on the flash file system of the ONS 15216 EDFA2 that is to be listed. A null value in the request means all files are to be listed. A null value in the response means the file specified does not exist. File names are case sensitive.

9.6.39 RTRV-TH-DWDM

Command Types

RTRV-TH-DWDM

Retrieves optical threshold and set point values for the ONS 15216 EDFA2.

Syntax Description

```
RTRV-TH-DWDM:[<tid>]:<aid>:<ctag>::[<thresholdtype>][,][,];
    <sid> <date> <time>
M  <ctag> COMPLD
    "<aid>,DWDM:<thresholdtype>,,,<thresholdvalue>"
;
```

Example 9-44   RTRV-TH-DWDM Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-TH-DWDM:Amp01:ALL:123::LPOUTDEV;
    Amp01 2001-06-08 09:00:05
M  123 COMPLD
    "1,DWDM:LPOUTDEV,,,1000"
;
```

Table 9-45   RTRV-TH-DWDM Syntax Description

Parameter	Syntax	Description
date	yyyy-mm-dd	Date of origination of TL1 message.
time	hh:mm:ss	Time of origination of TL1 message.
aid		1 and ALL have same input effect.
	1	Directly affecting the optical signal.
	ALL	Any or all of the preceding (command input only).

Table 9-45   RTRV-TH-DWDM Syntax Description (continued)

Parameter	Syntax	Description
threshholdtype and thresholdvalue pairs		Type of threshold or set point that is to be retrieved. A null value is equivalent to ALL. Possible to specify values for one or more of the following:
	LOSHYST	Loss of signal (input power) hysteresis (cerent15216EdfaLOSHysteresis). *thresholdvalue* can be between 0 and 1000, with default of 100, in units of 100 dB.
	LOSTH	Loss of signal (input power) threshold (cerent15216EdfaLOSThreshold). *thresholdvalue* can be between −3100 and −1500, with default of −3000, in units of 100 dBm.
	LPOUTDEV	Loss of output power deviation (cerent15216EdfaLpoutDeviation). *thresholdvalue* can be between 0 and 1000, with default of 200, in units of 100 dB.
	LPOUTHYST	Loss of output power hysteresis (cerent15216EdfaLpoutHysteresis). *thresholdvalue* can be between 0 and 1000, with default of 100, in units of 100 dB.
	LPOUTSETPT	Loss of output power set point (cerent15216EdfaLpoutSetpoint). This read-only value is only valid when amplifier is in Constant Output Power (OPWR) and Constant Pump Power (PWR) modes. Can be disregarded when in Constant Gain Temperature Compensated (GAINTEMP) or Constant Pump Current (CRNT) mode. *thresholdvalue* is read-only and automatically determined by the pump control mode with a possible value between 0 and 1000 in units of 10 mW.

9.6.40 RTRV-TH-EQPT

Command Types   **RTRV-TH-EQPT**

Retrieves general threshold values for the ONS 15216 EDFA2.

Syntax Description
```
RTRV-TH-EQPT:[<tid>]:<aid>:<ctag>::[<thresholdtype>][,][,];
   <sid> <date> <time>
M  <ctag> COMPLD
   "<aid>:<thresholdtype>,,,<thresholdvalue>"
;
```

Example 9-45   RTRV-TH-EQPT Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-TH-EQPT:Amp01:ALL:123::;
    Amp01 2001-06-08 09:00:05
M  123 COMPLD
    "EQPT:MAXCTMP,,,65"
    "EQPT:MAXCTMPHYST,,,1"
    "EQPT:MINCTMP,,,-5"
    "EQPT:MINCTMPHYST,,,1"
    "PWR-A:PWRBUSMIN,,,420"
    "PWR-A:PWRBUSMAX,,,570"
    "PWR-B:PWRBUSMIN,,,420"
    "PWR-B:PWRBUSMAX,,,570"
;
```

Table 9-46   RTRV-TH-EQPT Syntax Description

Parameter	Syntax	Description
date	yyyy-mm-dd	Date of origination of TL1 message.
time	hh:mm:ss	Time of origination of TL1 message.
aid		Possible values are:
	EQPT	General parameters of the ONS 15216 EDFA2.
	PWR-A	Affecting Power Bus A.
	PWR-B	Affecting Power Bus B.
	ALL	Any or all of the preceding (command input only).

Table 9-46   RTRV-TH-EQPT Syntax Description (continued)

Parameter	Syntax	Description
threshholdtype and thresholdvalue pairs		Type of threshold or set point that is to be retrieved. A null value is equivalent to ALL. Possible to specify values for one or more of the following:
	MAXCTMP	Maximum case temperature (cerent15216EdfaCtmpMax). *thresholdvalue* can be between 20 and 70, with default of 70 in units of °C.
	MAXCTMPHYST	Maximum case temperature hysteresis (cerent15216EdfaCtmpMaxHysteresis). *thresholdvalue* can be between 0 and 10, with default of 1, in units of °C.
	MINCTMP	Minimum case temperature (cerent15216EdfaCtmpMin). *thresholdvalue* can be between –10 and 10, with default of –5, in units of °C.
	MINCTMPHYST	Minimum case temperature hysteresis (cerent15216EdfaCtmpMinHysteresis). *thresholdvalue* can be between 0 and 10, with default of 1, in units of °C.
	PWRBUSMIN	Power bus minimum voltage (cerent15216EdfaPowerBusDCVoltageMin). *thresholdvalue* can be between 350 and 700, with default of 420, in units of –10 VDC.
	PWRBUSMAX	Power bus maximum voltage (cerent15216EdfaPowerBusDCVoltageMax). *thresholdvalue* can be between 350 and 700, with default of 570, in units of –10 VDC.

9.6.41 RTRV-TOD

Command Types

RTRV-TOD

Retrieves the date and time of the ONS 15216 EDFA2.

Syntax Description

```
RTRV-TOD:[<tid>]::<ctag>[::];
    <sid> <date> <time>
M   <ctag> COMPLD
    "<tmody>,<tmtype>,<tmsrcdv>,<tmsrcst>"
;
```

Example 9-46   RTRV-TOD Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-TOD:Amp01::123;
    Amp01 2002-06-20 14:30:00
```

```
M  123 COMPLD
   "2002,06,20,14,30,00,000,UTC,GPS,IS-ACT"
;
```

Table 9-47   RTRV-TOD Syntax Description

Parameter	Syntax	Description
date	yyyy-mm-dd	Date of origination of TL1 message.
time	hh:mm:ss	Time of origination of TL1 message.
tmody format:		Time of day of the format: YYYY,MM,DD,HH,MM,SS,sss
YYYY MM DD HH MM SS sss	 01 - 12 01 - 31 00 - 23 00 - 59 00 - 59 000	Current calendar year Month Day Hour Minutes Seconds Sub-seconds, currently fixed at 000.
tmtype	UTC	Type of time, currently fixed at universal coordinated time (UTC), which is the same as Greenwich Mean Time (GMT).
tmsrcdv	GPS	Time source deviation, currently fixed at GPS.
tmsrcst	IS-ACT	State of the time source, of the format <primaryState>-<secondaryState> (per Telcordia GR-1093-CORE), currently fixed at IS-ACT (In_Service, Active).

9.6.42 RTRV-USER-SECU

Command Types

RTRV-USER-SECU

Retrieves the access level of an existing user from the system. Does not return the password.

Syntax Description

```
RTRV-USER-SECU:[<tid>]:<uid>:<ctag>;
   <sid> <date> <time>
M  <ctag> COMPLD
   "<uid>,<al>"
;
```

Example 9-47   RTRV-USER-SECU Command and Response

```
Amp01:ONS15216 EDFA2> RTRV-USER-SECU:Amp01:jsmith:123;
   Amp01 2002-05-13 17:23:16
M  123 COMPLD
   "jsmith,RW"
;
```

Table 9-48   RTRV-USER-SECU Syntax Description

Parameter	Syntax	Description
sid	string	Source identifier uniquely identifies the source of a TL1 autonomous command.
al		Access level of the user. See "9.5 Summary of Security Permissions for TL1 Commands" section on page 9-6 for access level permissions.
	R	Read only privileges.
	RW	Read and write privileges.
	RWA	Read, write, and administrative privileges.
uid	string	User identifier (user name) of the existing user. If no user identifier is specified and the current user has RWA access level, it will list all existing users and their security levels.

9.6.43 SET-ATTR-DWDM

Command Types   **SET-ATTR-DWDM**

Sets the alarm severity (notification code) that is reported when a DWDM alarm is raised or cleared (derived from cerent15216EdfaAlarmState).

The notification code NA (Not Alarmed) reports a detected condition type by a REPT EVT message. The condition can be retrieved with the RTRV-COND command. The notification code NR (Not Reported) is not be reported by REPT EVT, but is retrievable via the RTRV-COND command.

Note   The REPT ALM DWDM messages for Loss of Signal, Gain Out of Range, and Loss of Output Power are prioritized (in the order just listed) so that only one message can be delivered at one time. This prioritization is not affected by the provisioned alarm severity. For example, if the ONS 15216 EDFA2 detects both a loss of input signal and a loss of output power at the same time, it will deliver only the Loss of Signal message to the user. This prioritized filtering of alarms does not occur with the SNMP delivery of alarms on the ONS 15216 EDFA2.

Syntax Description   `SET-ATTR-DWDM:[<TID>]:[<aid>]:<ctag>::[<ntfcncde>],[<condtype>][,,,];`

Example 9-48   SET-ATTR-DWDM Command

`Amp01:ONS15216 EDFA2> SET-ATTR-DWDM:Amp01:ALL:123::CR,LOS;`

Table 9-49   SET-ATTR-DWDM Syntax Description

Parameter	Syntax	Description
aid		1 and ALL have same input effect.
	1	Directly affecting the optical signal.
	ALL	Any or all of the preceding (command input only).
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NA	Not alarmed.
	NR	Not reported.
	NULL	Deafults to NA.
condtype		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	LOS	"Loss of Signal" (input power) alarm (cerent15216EdfaAlarmLpin).
	GAIN	"Gain Out of Range" alarm (cerent15216EdfaAlarmGain).
	LPOUT	"Loss of Output Power" alarm (cerent15216EdfaAlarmLpout).
	NULL	Defaults to ALL.

9.6.44 SET-ATTR-EQPT

Command Types   **SET-ATTR-EQPT**

Sets the alarm severity that is reported when a EQPT alarm is logged or cleared (derived from cerent15216EdfaAlarmState).

The notification code NA (NotAlarm) reports a detected condition type by a REPT EVT message. The condition can be retrieved with the RTRV-COND command. The notification code NR (Not Reported) is not be reported by REPT EVT, but is retrievable via the RTRV-COND command.

Syntax Description   `SET-ATTR-EQPT:[<TID>]:[<aid>]:<ctag>::[<ntfcncde>],[<condtype>][,,,];`

Example 9-49   SET-ATTR-EQPT Command

`Amp01:ONS15216 EDFA2>` **`SET-ATTR-EQPT:Amp01:PWR-A:123::CR,PWRBUSA,,,;`**

Table 9-50   SET-ATTR-EQPT Syntax Description

Parameter	Syntax	Description
aid		Possible values are:
	EQPT	General parameters of the ONS 15216 EDFA2.
	PWR-A	Affecting Power Bus A.
	PWR-B	Affecting Power Bus B.
	ALL	Any or all of the preceding (command input only).
ntfncde		Notification code (maps to cerent15216EdfaAlarmPriority). Possible values are:
	CR	Critical alarm.
	MJ	Major alarm.
	MN	Minor alarm.
	NA	Not alarmed.
	NR	Not reported.
	NULL	Deafults to NA.
condtype		Condition type identifies the type of alarm (maps to cerent15216EdfaLogEventID). Possible *condtype* and corresponding *conddescr* (in quotes) are:
	CTMP	"Case Temperature Out of Range" alarm (cerent15216EdfaAlarmCtmp).
	DBBACKUP	"Database Backup In Progress" (cerent15216EdfaOpDbBackup).
	DBRESTORE	"Database Restore In Progress" (cerent15216EdfaOpDbRestore).
	LCRNT1	"Excessive Pump1 Current" alarm (cerent15216EdfaAlarmLcrnt1).
	LCRNT2	"Excessive Pump2 Current" alarm (cerent15216EdfaAlarmLcrnt2).
	LTMP1	"Excessive Pump1 Temperature" alarm (cerent15216EdfaAlarmLtmp1).
	LTMP2	"Excessive Pump2 Temperature" alarm (cerent15216EdfaAlarmLtmp2).
	PWRBUSA	"Power Bus A (voltage) Alarm" (cerent15216EdfaAlarmPowerBusA).
	PWRBUSB	"Power Bus B (voltage) Alarm" (cerent15216EdfaAlarmPowerBusB).
	SFTWDOWN	"TFTP Software Load" (cerent15216EdfaOpLoad).
	NULL	Defaults to ALL.

9.6.45 SET-ATTR-SECUDFLT

Command Types   **SET-ATTR-SECUDFLT**

Sets the timeout value of user sessions for users with a specific access level. If no communication occurs for this time, the user session is closed by the ONS 15216 EDFA2 TL1 agent. Users affected by changes to the timeout must log out and log in again for the change to take effect.

Syntax Description   `SET-ATTR-SECUDFLT:[<tid>]::<ctag>::AL=<al>,TMOUT=<timeout>[,][,][,][,][,];`

Example 9-50   SET-ATTR-SECUDFLT Command

`Amp01:ONS15216 EDFA2>` **`SET-ATTR-SECUDFLT:Amp01::123::AL=RW,TMOUT=45;`**

Table 9-51   SET-ATTR-SECUDFLT Syntax Description

Parameter	Syntax	Description
al		Access level for which the timeout is being set. See "9.5 Summary of Security Permissions for TL1 Commands" section on page 9-6 for access level permissions.
	R	Read only privileges.
	RW	Read and write privileges.
	RWA	Read, write, and administrative privileges.
timeout	0 - 99	Value of the timeout in minutes for the corresponding access level. Defaults are: R = 60 min. RW = 30 min. RWA = 15 min. 0 means no timeout.

9.6.46 SET-TH-DWDM

Command Types   **SET-TH-DWDM**

Sets optical threshold values for the ONS 15216 EDFA2.

Syntax Description   `SET-TH-DWDM:[<tid>]:<aid>:<ctag>::<thresholdtype>,<thresholdvalue>[,,];`

Example 9-51   SET-TH-DWDM Command

`Amp01:ONS15216 EDFA2>` **`SET-TH-DWDM:Amp01:ALL:123::LOSTH,-1500;`**

Table 9-52   SET-TH-DWDM Syntax Description

Parameter	Syntax	Description
aid		1 and ALL have same input effect.
	1	Directly affecting the optical signal.
	ALL	Any or all of the preceding (command input only).
threshholdtype and thresholdvalue pairs	string	Type of threshold that is to be set. The threshold is set to the *thresholdvalue* that follows the comma. Possible to specify values for one or more of the following:
	LOSHYST	Loss of signal (input power) hysteresis (cerent15216EdfaLOSHysteresis). *thresholdvalue* can be between 0 and 1000, with default of 100, in units of 100 dB.
	LOSTH	Loss of signal (input power) threshold (cerent15216EdfaLOSThreshold). *thresholdvalue* can be between –3100 and –1500, with default of –3000, in units of 100 dBm.
	LPOUTDEV	Loss of output power deviation (cerent15216EdfaLpoutDeviation). *thresholdvalue* can be between 0 and 1000, with default of 200, in units of 100 dB.
	LPOUTHYST	Loss of output power hysteresis (cerent15216EdfaLpoutHysteresis). *thresholdvalue* can be between 0 and 1000, with default of 100, in units of 100 dB.

9.6.47 SET-TH-EQPT

Command Types   **SET-TH-EQPT**

Sets general threshold values for the ONS 15216 EDFA2.

Syntax Description   `SET-TH-EQPT:[<tid>]:<aid>:<ctag>::<thresholdtype>,<thresholdvalue>[,,];`

Example 9-52   SET-TH-EQPT Command

`Amp01:ONS15216 EDFA2>` **`SET-TH-EQPT:Amp01:ALL:123::MAXCTMP,60;`**

Table 9-53   SET-TH-EQPT Syntax Description

Parameter	Syntax	Description
aid		Possible values are:
	EQPT	General parameters of the ONS 15216 EDFA2.
	PWR-A	Sets Power Bus A and Power Bus B.
	PWR-B	Sets Power Bus A and Power Bus B.
	ALL	Any or all of the preceding (command input only).
threshholdtype and thresholdvalue pairs	string	Type of threshold that is to be set. The threshold is set to the *thresholdvalue* that follows the comma. Possible to specify values for one or more of the following:
	MAXCTMP	Maximum case temperature (cerent15216EdfaCtmpMax). *thresholdvalue* can be between 20 and 70, with default of 70 in units of $^{\circ}$C.
	MAXCTMPHYST	Maximum case temperature hysteresis (cerent15216EdfaCtmpMaxHysteresis). *thresholdvalue* can be between 0 and 10, with default of 1, in units of $^{\circ}$C.
	MINCTMP	Minimum case temperature (cerent15216EdfaCtmpMin). *thresholdvalue* can be between –10 and 10, with default of –5, in units of $^{\circ}$C.
	MINCTMPHYST	Minimum case temperature hysteresis (cerent15216EdfaCtmpMinHysteresis). *thresholdvalue* can be between 0 and 10, with default of 1, in units of $^{\circ}$C.
	PWRBUSMIN	Power bus minimum voltage (cerent15216EdfaPowerBusDCVoltageMin). *thresholdvalue* can be between 350 and 700, with default of 420, in units of –10 VDC. The power bus threshold has a 1.0V tolerance and a 1.0V hysteresis. If the minimum threshold is configured at 400 (-40 VDC), the alarm may raise anywhere between -42 to -40.5V and will not clear until the voltage goes above -41VDC.
	PWRBUSMAX	Power bus maximum voltage (cerent15216EdfaPowerBusDCVoltageMax). *thresholdvalue* can be between 350 and 700, with default of 570, in units of –10 VDC. The power bus threshold has a 1.0V tolerance and a 1.0V hysteresis. If the maximum threshold is configured at 570 (-57 VDC), the alarm may raise anywhere between -57 to -58.5V and will not clear until the voltage goes below -56 VDC.

9.6.48 STA-LOCL-RST

Command Types   **STA-LOCL-RST**

Instructs the ONS 15216 EDFA2 to restore all the manufacturing default settings and reset the unit. The files on the flash file system (FFS), the date and time, and the values of manufacturing calibration are not affected. When this command is entered the unit resets itself.

Warning   **This command resets the IP address, deletes the user directory, reverts CISCO15 to the default password, and resets other parameters to restore the unit to its state as shipped from manufacturing.**

Syntax Description   `STA-LOCL-RST:[<tid>]::<ctag>;`

Example 9-53   STA-LOCL-RST Command

`Amp01:ONS15216 EDFA2>` **`STA-LOCL-RST:Amp01::10;`**

Troubleshooting

This chapter presents basic fault information and diagnosis (troubleshooting) procedures for the 2.1.0, 2.2.1, 2.3.0, and 2.4.0 product releases of the Cisco ONS 15216 EDFA2. Only TL1 information about the alarm notifications and commands is provided.

This chapter describes the behavior of the ONS 15216 EDFA2 in the most expected troubleshooting situations. It does not address all possible causes of a particular situation or all possible solutions. For additional help, please review the *Release Notes* for the software version(s) being used.

If a situation is experienced that cannot be resolved, contact the Cisco Technical Assistance Center (TAC) for help (see the "Obtaining Technical Assistance" section on page xxii). For all interactions with the Cisco TAC, have the current ONS 15216 EDFA2 status prepared as described in the "10.3 Status Information Needed by Cisco TAC" section on page 10-12.

This chapter includes the following sections:

10.1 Alarm Indicators

This section provides alarm indications, including LEDs and alarms.

10.1.1 LEDs and Office Alarms

The front panel of the ONS 15216 EDFA2 has five LEDs:

- POWER
- FAIL
- LOS
- Ethernet socket (2)

On the left side of the front panel of the ONS 15216 EDFA2 are the POWER, FAIL, and LOS alarm LEDs. The Ethernet LEDs are located at the top left and right sides of the Ethernet LAN port. When the module is powered on, a LED test is performed. For information about the LED test sequence, see the "3.2.2 Rack Installation and Power Supply Connection Procedures" section on page 3-2.

The POWER, FAIL, and LOS LEDs correspond to Office Alarm conditions sent via the RJ-45 ALARM port (if used). For additional alarm contact pinout information, see the "3.4.1 Alarm Out Relay Interface (RJ-45)" section on page 3-5.

10.1.1.1 POWER LED (Green)

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

- On: –48 VDC power supply is within allowable range. (Power Bus A and B are powered normally.)
- Off: If in duplex mode, both Power Bus A and B have failed (below –40 VDC) and remain below the minimum turn-on supply voltage (-43 VDC). If in simplex mode, Power Bus A has failed (below –40 VDC) and remains below the minimum turn-on supply voltage (-43 VDC). Note that the power bus turn-off threshold has a 1.5V tolerance.
- Flashing: PWRBUSA or PWRBUSB alarm. If in duplex mode, Power Bus A, or B, or both are out of the user-settable tolerance range. If in simplex mode, Power Bus A is out of the user-settable tolerance range. The tolerance range is defined by PWRBUSMIN and PWRBUSMAX. The power bus alarm threshold has a 1.5V tolerance and a 1.0V hysteresis.

See 10.1.3.4 PWRBUSA and PWRBUSB (Power Bus) Alarms, page 10-7 for information about how to troubleshoot a Power Bus alarm.

Office Alarm: In the off condition, the first pair (0) of alarm relay contacts in the RJ-45 ALARM connector changes from a normally open condition to a closed condition. The LED and alarm relay automatically reset when the alarm condition clears.

In the flashing condition, the fourth pair (3) of alarm relay contacts in the RJ-45 ALARM connector changes from a normally open condition to a closed condition. The LED and alarm relay automatically reset when the alarm condition clears.

10.1.1.2 FAIL LED (Red)

The FAIL LED is red when on. This LED indicates all alarm conditions except POWER and LOS, which have their own LEDs. The FAIL LED functions as follows:

- Off: The gain, output power, case temperature, laser pump current, and laser pump temperature are all within their specified ranges (or –48 VDC power has failed).

- On: GAIN, LPOUT, CTMP, LCRNT1, LCRNT2, LTMP1, and/or LTMP2 alarm. The gain, output power, case temperature, laser pump current, and/or laser pump temperature are out of tolerance. (A major internal failure has occurred.)

If on, access the ONS 15216 EDFA2 to determine which alarms have occurred (Example 10-1). See the sections 10.1.2 Troubleshooting Optical Alarms and 10.1.3 Troubleshooting Equipment Alarms that follow for information about how to troubleshoot a particular alarm.

Office Alarm: In the on condition, the second pair (1) of alarm relay contacts in the RJ-45 ALARM connector changes from a normally open to a closed condition. The LED and alarm relay automatically reset when the alarm condition clears.

Example 10-1   Checking Alarm Source

```
Amp01:ONS15216 EDFA2> RTRV-ALM-ALL:AMP01::123::,,,,,;

  þAmp01 2004-03-17 00:29:54
M þ123 COMPLD
  þ"EQPT,EQPT:MN,CTMP,NSA,3-17,0-29-43,,:\"Case Temperature Out Of Range\""
;
```

10.1.1.3 LOS LED (Yellow)

The Loss of Signal (LOS) LED is yellow when on. This LED functions as follows:

- Off: The optical input power is above the user-settable minimum threshold (or –48 VDC power has failed).

- On: LOS alarm. The optical input power to the ONS 15216 EDFA2 is below the threshold defined by LOSTH. The value of LOSHYST provides the hysteresis required for the alarm to clear.

If on, see 10.1.2.1 LOS (Loss of Signal) Alarm, page 10-4 for information about how to troubleshoot the LOS alarm.

Office Alarm: In the on condition, the third pair (2) of alarm relay contacts in the RJ-45 ALARM connector changes from a normally open condition to a closed condition. The LED and alarm relay automatically reset when the alarm condition clears.

10.1.1.4 Ethernet Socket LEDs

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

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

- If the right Ethernet socket LED is on or flashing, there is Ethernet activity (traffic).

Note   If the system is powered up without an Ethernet cable in the Ethernet socket (LAN port), the activity LED (right side) turns on and remains on even if there is not Ethernet traffic. See "10.2.8 LAN Port Activity LED Stays On" section on page 10-11.

10.1.2 Troubleshooting Optical Alarms

The ONS 15216 EDFA2 amplifier has two main categories of alarms: optical (DWDM) and equipment (EQPT). The optical alarms are directly related to the signal amplification and are usually service affecting. The ONS 15216 EDFA2 has three Optical alarms:

- LOS
- GAIN
- LPOUT

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

Most optical failures are due to dirty or damaged connectors, so it is very important to clean all connectors. Note that there is a connector inside the transmission equipment and that a problem may come from there as well as from the patchcord.

To clean the optical connectors, follow the procedure below:

Step 1   Turn off the optical amplifier and disconnect all optical power.

Warning   **Adhere to all safety procedures. Optical power can cause physical injury or damage to equipment. Turn off the device and disconnect all optical power before cleaning or inspection.**

Step 2   Remove and inspect the patchcord connectors using an optical fiber scope. Clean if required using a proprietary cartridge cleaner.

Step 3   Re-inspect the connector to verify cleanliness and clean again if necessary.

Step 4   If a removed patchcord connector is dirty, use a 2.5_m lint-free swab and insert it into the corresponding connector adapter sleeve. Gently rotate the swab on the opposing connector's end-face.

Step 5   Replace the dust cover on the adapters or reattach cables.

10.1.2.1 LOS (Loss of Signal) Alarm

This alarm is generated when the input signal is below the value of LOSTH. The value of LOSHYST provides the hysteresis required for the alarm to clear. Possible causes for this alarm are:

- Input power is below threshold value: Verify that the threshold value is set to the correct value for the particular ONS 15216 EDFA2 application (RTRV-TH-DWDM). Read the input power using the RTRV-DWDM command.

- No optical signal is present at the input (RTRV-DWDM): Verify that the transmitter is working correctly and that the upstream fiber is not broken (RTRV-DWDM).

- Power meter value is higher than the reading of the ONS 15216 EDFA2 software: Clean connector of fiber patchcord as well as the one from inside the ONS 15216 EDFA2 by removing the fiber access panel.

⚡

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

10.1.2.2 GAIN (Gain Out of Range) Alarm

This alarm is only valid when the ONS 15216 EDFA2 is in GAINTEMP mode. It occurs when the value of OVERALLGAINMEASURED has deviated more than 1.25 dB from the manufacturer-defined set point's allowable range. This condition has a 0.25 dB hysteresis.

The GAIN alarm is also triggered if the value of INPWRDBM goes outside the manufacturer-defined range by more than 0.7 dB. This condition has a 0.2 dB hysteresis.

Use the RTRV-DWDM command to retrieve the values of OVERALLGAINMEASURED and INPWRDBM.

If both GAIN and LOS alarm conditions occur at the same time, only the LOS alarm is generated via TL1. The GAIN alarm has a soak period of 1-2 seconds before being raised or cleared.

Possible causes for this alarm are:

- Input power is out of range: Verify that for the current gain setting, the input power is within the range. For example, if the Gain = 22, then the input range is –27 to –5 dBm. Every dB taken from the Gain is added to the input range, so if the Gain =21, then the input range is –26 to –4 dBm.

- VOA attenuation is drifting out of range: Verify that the VOA set value approximately equals the VOA current value.

  To determine this, you must use the ASH shell. You can begin an ASH Telnet session using the IP address of the ONS 15216 EDFA2 followed by port 8023.

  ```
  telnet ONS_15216_EDFA2_IP_Address 8023
  ```

  The following formula provides the setting of the VOA attenuation (in constGainTempComp mode):

  > "VOA set value (in units of 10 dB)" =
  > "**snmp attribute get local cerent15216EdfaPumpStatusGain 1**" –
  > "**snmp attribute get local cerent15216EdfaConstGainOverallGain**"

  The value of cerent15216EdfaPumpStatusGain 1 is the fixed gain of the amplifier module. The value of cerent15216EdfaConstGainOverallGain is the set target gain. Note that the minimum VOA value is approximately 1 dB, which corresponds to the maximum Gain of approximately 22 dB.

  The following formula provides the current value of the VOA attenuation:

  > "VOA current value (in units of 100 dB)" =
  > "**snmp attribute get local cerent15216EdfaInPowerdBm**" –
  > "**snmp attribute get local cerent15216EdfaPumpStatusInPowerdBm 1**"

  The value of cerent15216EdfaInPowerdBm (INPWRDBM) is the current signal power at the input before the VOA. The value of cerent15216EdfaPumpStatusInPowerdBm 1 is the signal power after the VOA.

  If the "VOA set value" is different than "VOA current value" by more than a typical variation of up to 0.5 dB, the unit must be returned to Cisco for repair.

10.1.2.3 LPOUT (Loss of Output Power) Alarm

This alarm is valid only when the ONS 15216 EDFA2 is in OPWR mode, which is rare because this mode applies to few applications and is generally not recommended. This alarm occurs if the unit is in OPWR mode and the output power is deviating more than the value of LPOUTDEV from the value of LPOUTSETPT. The value of LPOUTHYST is used to clear the alarm. Use RTRV-TH-DWDM to find the threshold values.

If both LPOUT and GAIN or LOS alarm conditions occur at the same time, only the GAIN or LOS alarm is generated via TL1.

Possible causes for this alarm are:

*   The input power may be too low to achieve the output power setting: Reduce the value of PUMP2CTRLVALUE using the ED-DWDM command until the alarm clears.

*   The LPOUTDEV value may be set too low for practical use: Increase the value of LPOUTDEV using the RTRV-TH-DWDM command.

10.1.3 Troubleshooting Equipment Alarms

The ONS 15216 EDFA2 amplifier has two main categories of alarms: optical (DWDM) and equipment (EQPT). The equipment alarms are directly related to general equipment conditions in the unit. The ONS 15216 EDFA2 has seven equipment alarms:

*   CTMP
*   LCRNT1
*   LCRNT2
*   LTMP1
*   LTMP2
*   PWRBUSA
*   PWRBUSB

10.1.3.1 CTMP (Case Temperature Out of Range) Alarm

This alarm occurs when the case temperature is out of the threshold range as defined by MINCTMP and MAXCTMP. The values of MINCTMPHYST and MAXCTMPHYST provide the hysteresis required for the alarm to clear. Possible causes for this alarm are:

*   The Min and Max thresholds may not reflect the ambient temperature where the ONS 15216 EDFA2 is located: Use RTRV-TH-EQPT to get the Min and Max temperature threshold and change the threshold using SET-TH-EQPT.

*   The ambient temperature is too high for a legitimate case temperature alarm to clear: Shut down the ONS 15216 EDFA2 and allow time for it to cool, and do not repower it until the ambient temperature is reduced.

10.1.3.2 LCRNT1 and LCRNT2 (Excessive Pump Current) Alarms

These alarms occur when the input power exceeds input range and the ONS 15216 EDFA2 is overdriving the pump laser to try to get the target Gain value. The manufacturer defines this condition as the drive current at greater than 95% of end of life value. The current must drop to 90% of the end-of-life value for the alarm to clear. Possible causes for this alarm are:

- The input power is too high for the gain setting: Reduce the input power by using an external attenuator or by changing the OVERALLGAIN value using the ED-DWDM command.

- One pump laser is degrading: The unit needs to be replaced. Contact the Cisco TAC.

10.1.3.3 LTMP1 and LTMP2 (Excessive Pump Temperature) Alarms

These alarms occur when the pump laser has reached a critical temperature threshold. That is, the chip temperature is deviating more than 10 degrees C from the manufacturer-defined set point.

- Ambient temperature is too high so the laser can't cool down: This condition is usually associated with a CTMP alarm. See the 10.1.3.1 CTMP (Case Temperature Out of Range) Alarm section above.

- The ONS 15216 EDFA2 has been operating with excessive pump current for a long period of time, causing the pump(s) to overheat: This condition is usually associated with a LCRNT1 or LCRNT2 alarm. See the 10.1.3.2 LCRNT1 and LCRNT2 (Excessive Pump Current) Alarms section above.

10.1.3.4 PWRBUSA and PWRBUSB (Power Bus) Alarms

These alarms occur when the Power Bus voltage is out of the threshold range as defined by PWRBUSMIN and PWRBUSMAX. The power bus threshold has a 1.5V tolerance and a 1.0V hysteresis. The 1.5V tolerance prevents early alarm conditions due to a potential ±1.5V inaccuracy in the ONS 15216 EDFA2 voltage measurement.

The problem may be an inappropriate setting of the Power Bus alarm or a power failure. First, check the alarm thresholds using RTRV-TH-EQPT (Example 10-2). The default values are POWERBUSMIN=420 (-42 VDC) and POWERBUSMAX=570 (-57 VDC). The command RTRV-ALM-EQPT responds with which POWERBUS is outside of the range. If Power Bus B is not being used, check that PWRBUSMODE=SIMPLEX using RTRV-TH-EQPT. If needed, use the command ED-EQPT to set the POWERBUSMODE to SIMPLEX (Example 10-3). If all the settings are correct, verify the DC voltage of the power source.

Example 10-2   Checking Power Thresholds

```
Amp01:ONS15216 EDFA2> RTRV-TH-EQPT:Amp01:PWR-A:123:PWRBUSMIN;

  þAmp01 2004-03-17 00:02:15
M þ123 COMPLD
  þ"PWR-A:PWRBUSMIN,,,420"
  þ"PWR-A:PWRBUSMAX,,,570"
;
```

Example 10-3   Changing Power Bus Mode to Simplex

```
Amp01:ONS15216 EDFA2> RTRV-ALM-EQPT:Amp01:PWR-B:124;

  þAmp01 2004-03-17 00:03:48
M þ124 COMPLD
  þ"PWR-B:MN,PWRBUSB,NSA,3-16,20-39-21,,:\"Power Bus B Alarm\""
```

```
;
Amp01:ONS15216 EDFA2> ED-EQPT:SID:PWR-B:125:Amp01::PWRBUSMODE=SIMPLEX;

   þAmp01 2004-03-17 00:23:07
A þ1 REPT EVT EQPT
   þ"PWR-B:PWRBUSMODE,TC,3-17,0-23-7,,,,:\"Power Bus Mode Changed\""
;

   þAmp01 2004-03-17 00:23:08
A þ2 REPT ALM EQPT
   þ"PWR-B:CL,PWRBUSB,NSA,3-17,0-23-8,,:\"Power Bus B Alarm\""
;

   þAmp01 2004-03-17 00:23:08
M þ125 COMPLD
   þ/* ED-EQPT */
;
```

10.2 Typical Troubleshooting Scenarios

This section provides several troubleshooting scenarios.

10.2.1 No Output Power after Adjusting Gain Settings

The no output power after adjusting gain setting issue occurs only with software version 2.1.0.

Release Notes 2.1.0 Caveat CSCdy50894

Explanation The VOA pre-attenuator is stuck at maximum attenuation if the gain setting is modified when the input power is below the minimum signal level.

Recommended Action Use the following series of sample commands to recover from the VOA being stuck at high attenuation:

For TL1:

```
name:ONS15216 EDFA2> ED-DWDM:name:all:100:::PUMP1CTRLMODE=PWR,PUMP1CTRLVALUE=50;
name:ONS15216 EDFA2> ED-DWDM:name:all:101:::PREATT=10;
name:ONS15216 EDFA2> ED-DWDM:name:all:102:::PUMP1CTRLMODE=GAINTEMP;
name:ONS15216 EDFA2> ED-DWDM:name:all:103:::OVERALLGAIN=160;
```

For ASH:

```
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaPumpCfgConstPumpPower
1 50
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaPumpCfgControlMode 1
constPower
ash:hostname:ONS15216 EDFA2> snmp attribute set local
cerent15216EdfaVariableGainPreAttenuation 10
ash:hostname:ONS15216 EDFA2> snmp attribute set local cerent15216EdfaConstGainOverallGain
160
```

10.2.2 2.0.1 to 2.2.1 Upgrade Attempt

To achieve a smooth software upgrade, the ONS 15216 EDFA2 must first get upgraded from software version v2.0.1 to v2.1.0 before being upgraded from v2.1.0 to v2.2.1.

If a unit has been upgraded directly from v2.0.1 to v2.2.1, some features of v2.2.1 may not operate properly. In addition, the CISCO15 user has only read write access and cannot perform administrative commands.

To fix this, the software must be reverted back to v2.0.1 using the uninstall procedure described in the 2.2.1 *Release Notes*, and then all firmware and software upgrade procedures must be performed in series, from v2.0.1 to v2.1.0 and then from v2.1.0 to v2.2.1. See the 2.1.0 and 2.2.1 *Release Notes* for the upgrade procedures.

10.2.3 Image File Download Incomplete

If there is insufficient space in the flash file system (FFS) during an image file download, the ONS 15216 EDFA2 may report that the download has completed successfully even though the file is incomplete. Follow the upgrade instructions precisely to ensure that the file downloads completely and the file length is checked.

If a new image does not boot correctly, check its file size using the ASH **ffs file list** command. The 2.0.1 image should be 1,683,299 bytes, the 2.1.0 image should be 2,021,467 bytes, and the 2.2.1 image should be 1,963,195 bytes. See the 2.3.0 *Release Notes* for the 2.3.0 image file size.

If the file length is incorrect, delete the file, clear FFS space, and download the image file again. See the 2.1.0, 2.2.1, and 2.3.0 *Release Notes* for the procedures.

10.2.4 Primary Boot Up Failure

If the primary software image fails to boot correctly, the ONS 15216 EDFA2 switches to booting from the second image. When this occurs, the RS-232 command line interface shows the switch from Image 0 to Image 1 as shown in Example 10-4.

Example 10-4   Bootup Switch to Second Image

```
*** EDFA Fw Boot Console (v2.3.15) ***

auto-boot
Loading Image (0)
open failed -1 file 15216EdfaSw_2.4.0
Loading Image (1)
.......................................................................................................
.....................................................
Amplifier FW v4.27, available FW v4.27 - no FW upgrade.
```

If the bootup screen is not observed from the RS-232 port, the primary boot failure may be discovered by checking the RTRV-INV and RTRV-NE-GEN commands and seeing that the second boot file name is active instead of the first. See Example 10-5.

Example 10-5   Checking Boot File

```
Amp01:ONS15216 EDFA2> RTRV-INV:Amp01:ALL:123;
   Amp01 2002-01-12 08:01:05
M  123 COMPLD
```

```
    "EQPT:CLEI=IPI01AA0AAA,DESCR=ONS15216 EDFA2,NAME=Amp01,HARDWAREREV=74-2256-05-A0-B4,FIR
MWAREREV=v2.3.15,SOFTWAREREV=v2.3.0,SERIALNUM=DIT0533000P,MFGNAME=Cisco Systems,MODELNAME=
ONS216EDFA"
;
Amp01:ONS15216 EDFA2> RTRV-NE-GEN:Amp01::124;
    Amp01 2002-01-12 08:01:25
M  124 COMPLD
    "EQPT:NAME=Amp01,IPADDR=172.22.87.100,IPMASK=255.255.255.0,DEFRTR=172.22.87.2,MACADDRES
S=000D56727245,BOOTRECORDTYPE1=FLASH,BOOTFILENAME1=15216EdfaSw_2.4.0,BOOTIPADDR1=0.0.0.0,B
OOTRECORDTYPE2=TFTP,BOOTFILENAME2=bin/15216EdfaSw_2.3.0,BOOTIPADDR2=172.22.128.249,CLI=TL1
"
;
```

The cause could be either a corrupt or incomplete image, or an incorrectly addressed or named boot entry. First, check the entry address and file name using the RTRV-NE-GEN command.

Often, a corrupt file is caused by it not being FTP'd in binary mode. If this is possible, redownload the file using the instructions in the *Release Notes,* the "9.6.5 COPY-RFILE" section on page 9-15, or Chapter 7, "File Transfers".

Sometimes, if the flash file system is full, the file may not download completely. See the "10.2.3 Image File Download Incomplete" section on page 10-9 above.

10.2.5 Complete Boot Up Failure

If the primary image fails to boot, the ONS 15216 EDFA2 boots the second image. If both fail, the ONS 15216 EDFA2 continues to try to alternately boot the images unsuccessfully.

If this occurs, the cause could be either corrupt or incomplete images, or incorrectly addressed or named boot entries. Follow the instructions below to correct these problems.

Note   If the ONS 15216 EDFA2 firmware is not version 2.3.14 or greater and the software has not been upgraded to 2.1.0 or greater, the CISCO15 user resets to read_write access level, not read_write_admin, which has full administrative control. Contact the Cisco TAC for assistance.

Step 1   Connect to the RS-232 (EIA/TIA-232) port.

Step 2   Open HyperTerminal. (HyperTerminal can be found in the Microsoft Windows Accessories menu.)

Step 3   While the dots are present in the HyperTerminal window during the reboot process, enter **Ctrl C** on the keyboard.

The ONS 15216 EDFA2 should boot from the firmware image. The prompt is %.

Step 4   At the hostname prompt, enter the following command within 60 seconds of rebooting:

```
hostname:edfaboot% login CISCO15
hostname:edfaboot% password
```

Step 5   At the hostname prompt, enter the following command:

```
hostname:edfaboot% ffs file list
```

Determine which image files are present. Ensure that there is enough space on the FFS for two images and that the images are complete. The 2.0.1 image should be 1,683,299 bytes, the 2.1.0 image should be 2,021,467 bytes, and the 2.2.1 image should be 1,963,195 bytes. See the 2.3.0 *Release Notes* for the 2.3.0 image file size. Use the **ffs file delete** command to remove any unwanted files as needed. Use the **network host ftp** command to download new images as needed.

Step 6   At the hostname prompt, enter the following command:

hostname:edfaboot% **srom cfg boot display**

Check that the entries are complete and accurately reflect the image file names. Use the **srom cfg boot modify** command to correct the boot entries as needed.

Step 7   When the problems with the images and boot entries have been completed, enter the following command:

hostname:edfaboot% **processor reset**

The ONS 15216 EDFA2 should boot up properly. If not, use this procedure again to correct any remaining problems.

10.2.6 No Response from RS-232 Port

If the ONS 15216 EDFA2 does not respond when connected to the RS-232 (EIA/TIA-232) port, check that the physical connection is good, that power is supplied to the unit (POWER LED is on or flashing), that the DB-9 pinout is correct (see the "3.4.4.6 PC Connection via Modem" section on page 3-14), that the port speed and communications configuration are correct (see the "3.4.3.2 Serial Connection Procedure" section on page 3-8), and that any terminal server settings (if used) are correct.

10.2.7 No Response from LAN Port

If the ONS 15216 EDFA2 does not respond on the RJ-45 LAN port, check that the physical connection is good, that power is supplied to the unit (POWER LED is on or flashing), that the IP address and subnet mask are correct (RTRV-NE-GEN command from RS-232 port), and that the application (Telnet) is trying to access the correct IP address.

To connect using the RS-232 port, see the "3.4.3.2 Serial Connection Procedure" section on page 3-8. Check the IP settings using RTRV-NE-GEN (Example 10-6).

Check the two LAN port LEDs to be sure that there is a connection to the unit (the left Ethernet socket LED is on) and that traffic is flowing (the right Ethernet socket LED is on or flashing). If the unit is not booting correctly and is continuously resetting itself, you must us the RS-232 port to address the issue as detailed in the "10.2.5 Complete Boot Up Failure" section on page 10-10.

Example 10-6   Checking IP Settings

```
Amp01:ONS15216 EDFA2> RTRV-NE-GEN:AMP01::ALL::;

  þAmp01 2004-03-17 00:37:40
M þall COMPLD

þ"EQPT:NAME=Amp01,IPADDR=10.7.4.113,IPMASK=255.255.255.0,DEFRTR=10.7.4.1,MACADDR=059a383d9
7,BOOTRECORDTYPE1=FLASH,BOOTFILENAME1=15216EdfaSw_2.3.0,BOOTIPADDR1=0.0.0.0,BOOTRECORDTYPE
2=TFTP,BOOTFILENAME2=users/misc/15216EdfaSw_2.1.0,BOOTIPADDR2=10.75.0.32,CLI=TL1"
;
```

10.2.8 LAN Port Activity LED Stays On

Release Notes 2.1.0, 2.2.1, and 2.3.0 Caveat CSCdx41604. Ethernet activity LED initialization.

Explanation When powered up without an Ethernet cable, the activity light remains on.

Recommended Action The Ethernet activity light works correctly when connected to the network.

10.2.9 Lost Password

If the root password for CISCO15 is lost, there is a procedure to reset it to regain full administrative control of the ONS 15216 EDFA2. The user must be connected to the ONS 15216 EDFA2 by serial communication, reset the power to the unit, and perform a series of commands within 60 seconds of rebooting, according to the following procedure. This procedure resets the default user password only; no other settings are affected.

⚠️
Warning **The ONS 15216 EDFA2 ceases its optical amplification function when power is off during this process. Traffic should be rerouted before this procedure begins.**

✏️
Note If the ONS 15216 EDFA2 firmware is not version 2.3.14 or greater and the software has not been upgraded to 2.1.0 or greater, the CISCO15 user resets to read_write access level, not read_write_admin, which has full administrative control. Contact the Cisco TAC for assistance.

Step 1 Connect to the RS-232 (EIA/TIA-232) port.

Step 2 Open HyperTerminal. (HyperTerminal can be found in the Microsoft Windows Accessories menu.)

Step 3 Perform hard power reset of the ONS 15216 EDFA2 (disconnect and reconnect power).

Step 4 While the dots are present in the HyperTerminal window during the reboot process, enter **Ctrl C** on the keyboard.

The ONS 15216 EDFA2 should boot from the firmware image. The prompt is %.

Step 5 At the hostname prompt, enter the following command within 60 seconds of rebooting:

```
hostname:edfaboot% user passwd set CISCO15 default
```

Step 6 At the hostname prompt, enter the following command:

```
hostname:edfaboot% login CISCO15
Password =
<enter>
```

Step 7 At the hostname prompt, enter the following command:

```
hostname:edfaboot% processor reset
```

After the processor reset, the default CISCO15 login password will be the default (the Enter key).

10.3 Status Information Needed by Cisco TAC

To get the most from an interaction with the Cisco Technical Assistance Center (TAC), the status information of the ONS 15216 EDFA2 should be collected in advance.

The following commands should be issued, and pasted into a text file.

- RTRV-INV::ALL:101;

- RTRV-NE-GEN:::102;

- RTRV-ALM-ALL:::103::;

- RTRV-DWDM::ALL:104;

- RTRV-EQPT::ALL:105;

- RTRV-TH-DWDM::ALL:106::;

- RTRV-TH-EQPT::ALL:107::;

If the TL1 shell is not active or working, the following ASH commands should be issued, and pasted into a text file.

- ffs file list

- srom id display

- srom cfg display

- srom cfg boot display

- snmp table display local cerent15216EdfaSromIpMgmtGroup

- snmp table display local entPhysicalEntry

- snmp row display local cerent15216EdfaCfgGroup

- snmp table display local cerent15216EdfaCommTrapEntry

- snmp row display local cerent15216EdfaOverallStatusGroup

- snmp table get local cerent15216EdfaAlarmEntry

- snmp table get local cerent15216EdfaPumpStatusEntry

- snmp table get local cerent15216EdfaCfgGroup