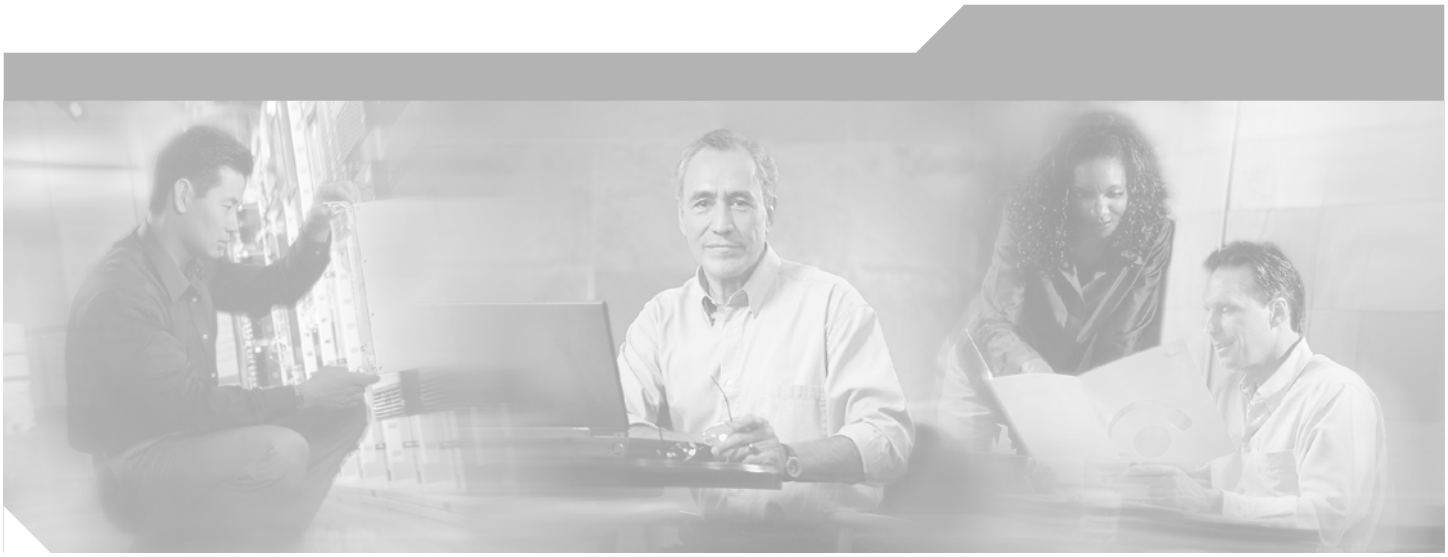

Cisco ONS 15501 User Guide

Release 4.0
January 2003

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Customer Order Number: DOC-7814134=
Text Part Number: 78-14134-03

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Cisco ONS 15501 User Guide

CONTENTS

Preface ix

Audience ix

Organization ix

Conventions x

Related Documentation xii

Obtaining Documentation xii

Cisco.com xii

Documentation CD-ROM xiii

Ordering Documentation xiii

Documentation Feedback xiii

Obtaining Technical Assistance xiv

Cisco.com xiv

Technical Assistance Center xiv

Cisco TAC Website xiv

Cisco TAC Escalation Center xv

Obtaining Additional Publications and Information xv

CHAPTER 1 **Product Overview** 1-1

Product Description 1-1

Optical Specifications 1-2

Key Features 1-3

Constant Gain Flatness 1-3

Optimized Automatic Gain Control 1-3

Variable Gain 1-4

Transient Suppression 1-4

Low Noise Figure 1-5

High Maximum Output Power 1-5

Network Management 1-5

Cisco ONS 15501 Applications 1-5

Point-to-Point Topologies 1-5

Ring Topologies 1-6

Adding or Dropping Wavelengths 1-7

Adjusting to Span Loss Changes 1-7

Cisco ONS 15501 Front Panel **1-8**
Cisco ONS 15501 LED Alarm Definitions **1-9**

CHAPTER 2 **Installing the Cisco ONS 15501** **2-1**
Creating a Site Log **2-1**
Required Tools and Parts **2-2**
Installation Checklist **2-2**
Rack-Mounting the Chassis **2-3**
Optical Connection **2-3**
DC Power Connection **2-4**
Grounding the Chassis **2-5**
Connecting the Power **2-5**
Communication Connections **2-6**
Setting Up Alarm Contacts **2-7**
Installation Commands **2-7**
Introductory Commands **2-7**
Review and Operational Commands **2-7**

CHAPTER 3 **Configuring the Cisco ONS 15501** **3-1**
Configuring Local Serial Communication **3-1**
Setting Up the Software **3-1**
Configuring a Basic System **3-2**
Monitoring Alarms and Traps **3-2**
Upgrading the Flash Image **3-3**
Configuring Remote Communication **3-3**
Configuring for Telnet **3-3**
Configuring for SNMP **3-4**
Alarm Contact Closures **3-4**

CHAPTER 4 **Command Reference** **4-1**
add-snmp-com **4-2**
add-snmp-mgr **4-3**
alarm **4-4**
boot-bank **4-5**
copyright **4-6**
del-snmp-com **4-7**
del-snmp-mgr **4-8**

ethmode **4-9**
gain **4-10**
gainmean **4-11**
gaintrig **4-12**
get-snmp-com **4-13**
get-snmp-mgr **4-14**
help **4-15**
hide-trap **4-17**
host-config **4-18**
inpwr **4-19**
inpwrmean **4-20**
inpwrtrig **4-21**
ip-config **4-22**
logout **4-23**
neighbor-in **4-24**
neighbor-out **4-26**
ntp **4-28**
ntp-ip **4-29**
optoutpwr **4-30**
outsigpwr **4-31**
outsigpwrmean **4-32**
outsigpwrtrig **4-33**
ping **4-34**
ps1 **4-35**
ps2 **4-36**
reboot **4-37**
resetmeantrig **4-38**
restore **4-39**
setgainmean **4-40**
setgaintrig **4-41**
setinpwrmean **4-42**
setinpwrtrig **4-43**
set-master-pwd **4-44**
setoutsigpwrmean **4-45**
setoutsigpwrtrig **4-46**

settempmean **4-47**
settemptrig **4-48**
set-time **4-49**
set-user-pwd **4-51**
sgain **4-52**
show-trap **4-53**
sinpwr **4-54**
soutsigpwr **4-55**
sps1 **4-56**
sps2 **4-57**
spump **4-58**
status **4-59**
stemp **4-60**
sw-download **4-61**
sys-info **4-63**
temp **4-64**
tempmean **4-65**
temptrig **4-66**
time **4-67**
timeout **4-68**
timezone **4-69**

CHAPTER 5 **Troubleshooting** **5-1**
Basic Diagnostic Procedures **5-1**
Verifying the Power Connection **5-1**
Verifying the Ethernet Connection **5-2**
Verifying the Alarm Connection **5-2**
Isolating the Problem **5-2**
Reading the Front Panel LEDs **5-2**
Password Recovery **5-3**
Technical Support **5-4**

APPENDIX A **Cisco ONS 15501 Alarms** 5

APPENDIX B **Technical Specifications** B-1

Cisco ONS 15501 Optical Specifications **B-1**

Cisco ONS 15501 Electrical Specifications **B-1**

Cisco ONS 15501 Mechanical Specifications **B-2**

Cisco ONS 15501 DC Input Power Requirements **B-2**

APPENDIX C **Connector Pinouts** C-1

APPENDIX D **Time Zone Codes** D-1

APPENDIX E **Translated Safety Warnings** E-1

Wrist Strap Warning **E-1**

Restricted Area Warning **E-2**

Qualified Personnel Warning **E-3**

DC Protection **E-4**

Disconnect Device Warning **E-5**

Laser Radiation Warning **E-6**

INDEX

Preface

This preface describes the audience, organization, and conventions for the *Cisco ONS 15501 User Guide*. It also provides information about how to obtain related documentation and technical assistance.

Audience

Only trained and qualified personnel should be allowed to install, maintain, or troubleshoot the Cisco ONS 15501. Such individuals must be familiar with general optical transmission technology to properly utilize the unit.

Organization

This guide includes the following chapters:

Chapter	Title	Description
Chapter 1	Product Overview	Describes the Cisco ONS 15501 and its key features and applications.
Chapter 2	Installing the Cisco ONS 15501	Describes how to install the Cisco ONS 15501.
Chapter 3	Configuring the Cisco ONS 15501	Describes how to configure the Cisco ONS 15501 for onsite or remote monitoring.
Chapter 4	Command Reference	Lists the CLI commands used in the Cisco ONS 15501 environment.
Chapter 5	Troubleshooting	Describes the basic fault investigation and diagnostic (troubleshooting) procedures for the Cisco ONS 15501.
Appendix A	Cisco ONS 15501 Alarms	Lists the alarms defined for the Cisco ONS 15501.
Appendix B	Technical Specifications	Lists the technical specifications for the Cisco ONS 15501.
Appendix C	Connector Pinouts	Illustrates the pin configuration of the RS-232 DB-9 type connector and the Alarm Out RJ-45 connector.

Chapter	Title	Description
Appendix D	Time Zone Codes	Lists time zones and their correlating abbreviations, which are used when setting the time of the system.
Appendix E	Translated Safety Warnings	Lists the warnings in this guide and translates them into different languages.

Conventions

Notes use the following conventions:

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

Cautions use the following conventions:

Caution Means *caution should be taken*. Cautions contain information that is important to follow so as not to cause harm to the equipment.

Warnings use the following conventions:

Warning **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 *Regulatory Compliance and Safety Information* document that accompanied this device.**

Waarschuwing **Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het document *Regulatory Compliance and Safety Information* (Informatie over naleving van veiligheids- en andere voorschriften) raadplegen dat bij dit toestel is ingesloten.**

Varoitus **Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä julkaisussa esiintyvien varoitusten käännökset löydät laitteen mukana olevasta *Regulatory Compliance and Safety Information* -kirjasesta (määräysten noudattaminen ja tietoa turvallisuudesta).**

Attention **Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez le document *Regulatory Compliance and Safety Information* (Conformité aux règlements et consignes de sécurité) qui accompagne cet appareil.**

Warnung **Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Dokument *Regulatory Compliance and Safety Information* (Informationen zu behördlichen Vorschriften und Sicherheit), das zusammen mit diesem Gerät geliefert wurde.**

Avvertenza **Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nel documento *Regulatory Compliance and Safety Information* (Conformità alle norme e informazioni sulla sicurezza) che accompagna questo dispositivo.**

Advarsel **Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i dokumentet *Regulatory Compliance and Safety Information* (Overholdelse av forskrifter og sikkerhetsinformasjon) som ble levert med denne enheten.**

Aviso **Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. Para ver as traduções dos avisos que constam desta publicação, consulte o documento *Regulatory Compliance and Safety Information* (Informação de Segurança e Disposições Reguladoras) que acompanha este dispositivo.**

¡Advertencia! **Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. Para ver una traducción de las advertencias que aparecen en esta publicación, consultar el documento titulado *Regulatory Compliance and Safety Information* (Información sobre seguridad y conformidad con las disposiciones reglamentarias) que se acompaña con este dispositivo.**

Varning! **Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. Se förklaringar av de varningar som förkommer i denna publikation i dokumentet *Regulatory Compliance and Safety Information* (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.**

Related Documentation

Refer to the following documents for additional information about the Cisco ONS 15501:

- *Regulatory Compliance and Safety Information for the Cisco ONS 15501*
- *Introduction to DWDM Technology*
- *Cisco ONS 15540 ESP Planning and Design Guide*
- *Cisco ONS 15540 ESP Configuration Guide and Command Reference*
- *Cisco ONS 15540 ESP Troubleshooting Guide*
- *Cisco ONS 15540 ESP MIB Quick Reference*
- *Glossary of Optical Networking Terms*

Obtaining Documentation

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

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

You can access the Cisco website at this URL:

http://www.cisco.com

International Cisco web sites can be accessed from this URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which may have shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription.

Registered Cisco.com users can order the Documentation CD-ROM (product number DOC-CONDOCCD=) through the online Subscription Store:

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

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You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:

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

- Registered Cisco.com users can order the Documentation CD-ROM (Customer Order Number DOC-CONDOCCD=) through the online Subscription Store:

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

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

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You can submit comments electronically on Cisco.com. On the Cisco Documentation home page, click **Feedback** at the top of the page.

You can email your comments to bug-doc@cisco.com.

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

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

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

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Cisco.com offers a suite of interactive, networked services that let you access Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com provides a broad range of features and services to help you with these tasks:

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

To obtain customized information and service, you can self-register on Cisco.com at this URL:

http://www.cisco.com

Technical Assistance Center

The Cisco TAC is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC website and the Cisco TAC Escalation Center. The avenue of support that you choose depends on the priority of the problem and the conditions stated in service contracts, when applicable.

We categorize Cisco TAC inquiries according to urgency:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

Cisco TAC Website

You can use the Cisco TAC website to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC website, go to this URL:

http://www.cisco.com/tac

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC website. Some services on the Cisco TAC website require a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

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

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC website, you can open a case online at this URL:

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

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC website so that you can describe the situation in your own words and attach any necessary files.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

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

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

Obtaining Additional Publications and Information

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

- 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://www.cisco.com/en/US/products/products_catalog_links_launch.html

- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: *Internetworking Terms and Acronyms Dictionary, Internetworking Technology Handbook, Internetworking Troubleshooting Guide,* and the *Internetworking Design Guide.* For current Cisco Press titles and other information, go to Cisco Press online at this URL:

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- *Packet* magazine is the Cisco monthly periodical that provides industry professionals with the latest information about the field of networking. You can access *Packet* magazine at this URL:

  http://www.cisco.com/en/US/about/ac123/ac114/about_cisco_packet_magazine.html

- *iQ Magazine* is the Cisco monthly periodical that provides business leaders and decision makers with the latest information about the networking industry. You can access *iQ Magazine* at this URL:

  http://business.cisco.com/prod/tree.taf%3fasset_id=44699&public_view=true&kbns=1.html

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

  http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html

- Training—Cisco offers world-class networking training, with current offerings in network training listed at this URL:

  http://www.cisco.com/en/US/learning/le31/learning_recommended_training_list.html

Product Overview

The Cisco ONS 15501 is a low-noise, gain-flattened C-band optical EDFA (erbium-doped fiber amplifier). This guide describes how to install and operate the Cisco ONS 15501.

The Cisco ONS 15501 complements high-performance digital transmitters in topologies requiring amplification of 1550-nm optical signals.

This chapter includes the following sections:

- Product Description, page 1-1
- Optical Specifications, page 1-2
- Key Features, page 1-3
- Cisco ONS 15501 Applications, page 1-5
- Cisco ONS 15501 Front Panel, page 1-8

Product Description

The Cisco ONS 15501 contains erbium-doped optical fiber, optical couplers, and one or more pump lasers and isolators. An optical signal (within a range of 1530 to 1563 nm) arrives at the input connector. The 1550- nm signal travels through a length of erbium-doped fiber cable. Inside the amplifier, light from a laser at a wavelength of 980 nm (called the pump laser) is used to amplify the signal at 1550 nm. The amplified signal is coupled to the output cable for transmission to a node. In longer cable runs, up to six Cisco ONS 15501 EDFAs can be connected in tandem.

The Cisco ONS 15501 uses 980-nm pump lasers that are built to meet Bellcore TR-NWT-000468 and MIL-883D standards. With a noise figure approaching the theoretical minimum, the amplifier achieves results superior to that obtained from a 1480-nm pump laser. The 980-nm pump laser has a long lifetime, exceeding one million hours. Use of a small number of high-quality components makes the Cisco ONS 15501 a highly reliable product.

The Cisco ONS 15501 is polarization, modulation, and frequency independent, and operates in gain-controlled mode. It is optimized for different input and output powers, and can be used as a preamplifier, inline amplifier, or booster. The unit provides excellent gain flatness for the cascading of amplifiers in DWDM applications.

The Cisco ONS 15501 is physically designed to fit into a 19-inch, 23-inch, or ETSI equipment rack, with front, middle, or rear mounting capability. It is equipped with connectors for optional monitoring either locally or remotely.

Optical Specifications

Table 1-1 lists the Cisco ONS 15501 optical specifications and Table 1-2 lists the Alarms thresholds. For other technical specifications, see Appendix B, "Technical Specifications."

Table 1-1 Cisco ONS 15501 Optical Specifications

Description	Specification
Wavelength range	1530 to 1563 nm
Input power range	–29 to 0 dBm
Saturated output power	17.3 ± 0.3 dBm
Noise figure	< 6.0 dB
Nominal gain	+17 dB
Gain flatness	< 1.5 dB
Settable variable gain	7 dB to 17 dB[1]
Automatic gain control accuracy	± 1.0 dB
Transient suppression response time	50 microseconds
Backward ASE (amplified spontaneous emission) power	< -25 dBm
PMD (polarization mode dispersion)	< 0.6 ps
Mode of operation	Unidirectional
Optical return loss	> 27 dB
Input and output isolation	> 30 dB
Polarization sensitivity	< 0.5 dB

1. Gain flatness is <1.5 dB for 13 to 17 dB; <2.0 dB for 7 to 13 dB.

Table 1-2 Alarm Thresholds

Threshold	Minimum Value Programmable	Factory Default	Maximum Value Programmable
Optical input mean	–10	–10	0
Optical input trigger	0	20	20
Signal mean	–6	0	0
Signal trigger	0	17.5	18
Gain mean[1]	7	17.5	17.5
Gain trigger	0	1	2
Temperature mean	20	30	40
Temperature trigger	20	25	30

1. Gain mean is the only settable parameter that affects system performance.

Some attributes (optical input, optical output, temperature, and gain) allow alarm trigger points to be set on them. The alarms are triggered, or asserted, when the measured value crosses the value of *Mean ± Trigger*. Once triggered the alarm is cleared only when the measured value is at *Mean ±90% of Trigger*. This approach builds a hysteresis window of 10% of ther trigger value. If chattering is noted for one of the alarms, increase the trigger value (so that the hysteresis is bigger) to eliminate the alarm chatter.

Key Features

The Cisco ONS 15501 has the following key features:

- Constant flat gain of 17 dB over the 1530 to 1563 nm band
- Optimized automatic gain control for the MAN
- Variable gain for flexibility in network design
- Typical transient suppression within 50 microseconds
- Low noise figure of < 6.0 dB
- Input power range of –29 to 0 dBm
- Network management

Constant Gain Flatness

The Cisco ONS 15501 is a constant gain amplifier. It does not deliver a constant output, but rather ensures that the output energy spectrum is gain-flattened irrespective of input power (up to the maximum allowed). If a channel is removed, the output level will drop at the wavelength that is removed, but the remaining energy spectrum will remain nearly flat over its wavelength band. The gain flatness is also only minimally affected if the input signal is not flat by several decibels.

Optimized Automatic Gain Control

The Cisco ONS 15501 has a wide input power range of –29 to 0 dBm, over which it maintains gain flatness as well as a low noise figure across the entire C band. The Cisco ONS 15501 maintains a high level of precision, as well as speed, which allows it to be used as a booster, inline or preamplifier, thus reducing sparing expenses. The constant gain and noise figure capabilities of the Cisco ONS 15501 make network designs simpler and more predictable.

The lower gain available in the Cisco ONS 15501, combined with its ability to handle input signal powers of up to 0 dBm, also enables the network designer to achieve much higher OSNR (optical signal-to-noise ratio) after cascading several EDFAs. In addition, it allows the network to expand beyond 32 wavelengths to a maximum of 128 wavelengths if necessary. The OSNR improvements of 6 dB is equivalent to a four-fold increase in the number of EDFAs that can be cascaded. Alternatively, the unit can accommodate signals with four times the data rate (for instance, OC-192 as opposed to OC-48). Thus, the limitations of higher gain EDFAs that have input powers limited to –6 dBm can be easily overcome by using the Cisco ONS 15501. Some representative figures are included in Table 1-3, assuming a flat input to the first Cisco ONS 15501.

Table 1-3 Relative OSNR in Cascading EDFAs

Number of Cascaded EDFAs	Number of Wavelengths	Worst Case OSNR[1] at 17 dB Gain[2] at Gain Minimum	OSNR, 23 dB Gain[3]
1	32	37.00 dB	31.00 dB
2	32	33.25 dB	27.25 dB
3	32	30.70 dB	24.70 dB
4	32	28.75 dB	22.70 dB
5	32	27.00 dB	21.00 dB
6	32	25.50 dB	19.50 dB

1. OSNR=optical signal-to-noise ratio.
2. 0 dBm total input power.
3. −6 dBm total; −21 dBm per channel.

Variable Gain

When the gain of an EDFA is fixed, the assumption is that all networks can be laid out with equally spaced EDFAs. In reality, this is rarely the case. For designs in which the spacing must be flexible, variable gain allows the network designer to tailor network requirements much more accurately. For instance, when an Cisco ONS 15501 is used as a preamplifier for receivers having an overload point of –8 dBm per wavelength, the output VOA (variable optical attenuator) can prevent overload by reducing the signal going to the receiver. Alternately, when EDFA spacing is only 10 dB, the output VOA can be enabled to avoid saturation of the next stage EDFA, ensuring that the entire network has good gain flatness and virtually consistent OSNR across all wavelengths.

The variable gain capabilities of the Cisco ONS 15501 greatly enhance the flexibility of an optical network. System operators can add or drop optical elements, such as OADM (optical add/drop multiplexer), without drastic network redesigns or costly equipment changes. When a change occurs in span loss, the adjustable gain can be used to reset the network to a better operating point.

Transient Suppression

Transients in the performance of EDFAs are inevitable whenever the number of signals or the relative power of signals change. For example, when channel rerouting or system failure (caused by a fiber cut or equipment malfunction) transfers all incoming power to a single “surviving channel,” that channel will momentarily experience a higher gain, which can cause BER (bit error rate) problems due to eye-pattern closure. The amount of time required by an amplifier to recover from such a change indicates its suitability for add/drop applications.

The most important parameters in transient suppression are the recovery time and the overshoot and undershoot amplitude. The recovery time for the signal amplitude to get within 10% of the “steady state” amplitude after the switching event is referred to as the *transient suppression time*. Smaller values are desirable. From a 10 dB change in power (simulating the adding or dropping of 29 out of 32 channels present), the Cisco ONS 15501 never exceeds 100 microseconds and is typically below 50 microseconds. The Cisco ONS 15501 can respond to the most drastic power changes with overshoots or undershoots of less than 1 dB.

Low Noise Figure

The low noise characteristics of the Cisco ONS 15501 allow over six amplifiers to be cascaded and still achieve an excellent OSNR at input powers as low as –21 dBm per channel. This enables seamless migration to higher speeds beyond OC-48 and to a larger number of channels.

High Maximum Output Power

The high maximum optical power of the Cisco ONS 15501 increases the number of wavelengths that can potentially be routed to it. The higher input power range available can be used to increase the number of wavelengths to 128 from 32, without having any spectral gain tilt effects.

Network Management

The Cisco ONS 15501 supports SNMP, and it has a console port to facilitate setup and monitoring. With a customer-supplied network monitor and the provided MIB file, all monitorable and settable parameters are available remotely.

Cisco ONS 15501 Applications

The Cisco ONS 15501 supports the following applications:

- Point-to-point topologies
- Ring topologies
- Adding or dropping wavelengths
- Adjusting to span loss changes

Point-to-Point Topologies

In a metropolitan point-to-point DWDM network, the Cisco ONS 15501 can function as a pre-, post-, and/or inline amplifier. Most metropolitan point-to-point DWDM networks require post-amplifiers, but if a given span length exceeds the unit gain (>17 dB), a preamplifier may also be required to handle the optical link loss budget. When the span length greatly exceeds 17 dB, an inline amplifier might also be required.

Because of the wide input power range (–29 to 0 dBm) of the Cisco ONS 15501, trunk attenuation is typically also necessary, especially when the unit is used as a post-amplifier. For instance, when the per channel output power from the node is –5 dBm in a 32-channel system, the total output power from the node is +10 dBm. Thus, at least 10 dB of trunk attenuation is required directly preceding the amplifier.

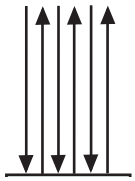
The Cisco ONS 15501 can also be tuned to meet post- or inline amplification input power requirements.

Assuming that the typical per channel power levels in a point-to-point network are identical at the source node, and that there are fewer than four amplifiers between source and destination nodes, it is not necessary to maintain per channel power equalization to satisfy each amplifier's total input power requirement and maintain acceptable OSNR for each channel.

Ring Topologies

An amplified ring topology requires more fine-tuning of power for each channel or band. Figure 1-1 illustrates a hubbed ring network utilizing counter-clockwise signal transmission. All bands (A, B, C and D) are transmitted from node 1. Node 2 terminates and transmits bands A and B; node 3 terminates and transmits band C; and node 4 terminates and transmits band D.

Figure 1-1 Power Equalization in an Amplified Ring Network



In general, EDFAs in a ring topology should be placed so they maintain the power level at the receiver, as well as the OSNR, of each channel. In this case, EDFAs serving as postamplifiers are located at nodes 2 and 4.

At node 2, the input power level of the EDFA is much higher than the input power level of the pass-through band (bands C and D), due to the added power from bands A and B. If trunk attenuation is employed directly before the EDFA at node 2 to keep the unit's total input power within the required range, the power levels of both the add bands (bands A and B) and the pass-through bands (bands C and D) are attenuated equally. As a result, the power level of the pass-through bands is much lower than that

of the add bands. This significantly degrades the OSNR of the pass-through bands, and in cases where there are more than two EDFAs in the ring, some of the channels in the ring will not meet OSNR requirements.

To solve this problem, optical power attenuation should be applied on a per channel or per band basis. More attenuation is typically required for the add bands than for the pass-through bands. At the EDFA input, the individual channel or band power levels should be equalized as close as possible to the maximum per channel input power level (for example, –15 dBm in a 32-channel system). This process of optical power equalization is necessary to obtain better OSNR.

Inserting attenuation devices such as VOAs (variable optical attenuators) between the OADM (optical add/drop multiplexer) and the transmitter allows optical power management of individual channels. Per band power management at the trunk line, between the OADM and the EDFA, is also an effective method. The Cisco ONS 15501 is capable of supporting either approach, and its wide input range (–29 to 0 dBm) makes it an ideal amplifier for a broad array of ring network designs.

Adding or Dropping Wavelengths

Automatic gain control reacts to the adding or dropping of wavelengths in a network, without requiring power equalization tuning. The fast response of the Cisco ONS 15501 reduces the impact of adding or dropping channels, and prevents BER hits.

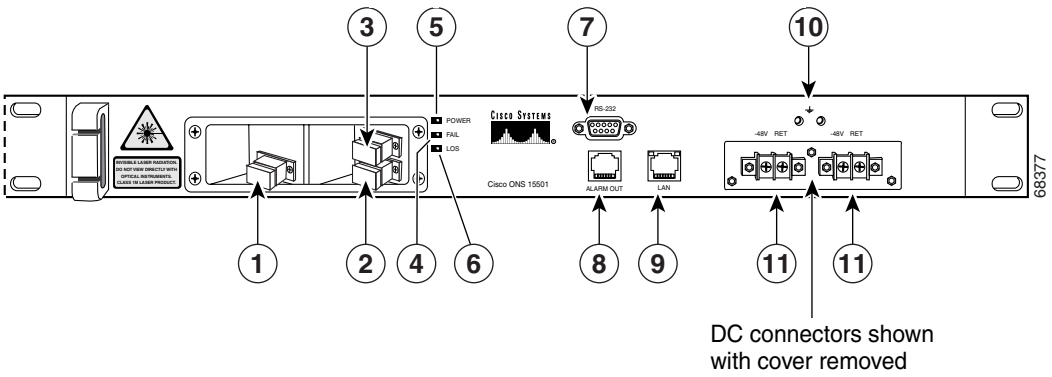
Adjusting to Span Loss Changes

It is typically necessary to adjust gain and attenuation values both for trunk attenuation and channel or band power equalization.

Cisco ONS 15501 Front Panel

Figure 1-2 shows the Cisco ONS 15501 front panel. The front panel provides an all-front access interface (fibers, power, alarm contact, and management) that complies with international standards. Table 1-4 explains the front panel features.

Figure 1-2 Cisco ONS 15501 Front Panel



1	Output monitor (connector)	**7**	RS-232 (connector)
2	Output (connector)	**8**	Alarm out (connector)
3	Input (connector)	**9**	LAN (connector)
4	Fail (red LED)	**10**	Frame ground attachment
5	Power (green LED)	**11**	Dual-circuit DC power input
6	LOS (loss of signal) (yellow LED)		

Table 1-4 Cisco ONS 15501 Front Panel Features

Feature	Description
Output monitor (connector)	Provides spectrum monitoring of the Cisco ONS 15501 output and uses an SC/UPC type bulkhead connector. (A shutter automatically closes when the cable is removed.)
Output (connector)	Provides output to an optical fiber cable and uses an SC/UPC type standard connector. (A shutter automatically closes when the cable is removed.)
Input (connector)	Provides optical fiber cable access to the input of the Cisco ONS 15501 and uses an SC/UPC type standard connector. (This is a nonshuttered connector.)
Fail (red LED)	Indicates a major failure, such as the pump laser, power supply, or the temperature level.
Power (green LED)	Indicates the unit is receiving normal operating power.
LOS (loss of signal) (yellow LED)	Indicates a loss of input signal when the input signal falls below the LOS threshold.

Table 1-4 Cisco ONS 15501 Front Panel Features (continued)

Feature	Description
RS-232 (connector)	Provides a console port for local monitoring of the Cisco ONS 15501 and uses a DB-9 type female connector. (See Appendix C, "Connector Pinouts.") This port should only be used for the evaluation of the unit by a trained technician. It is not designed for permanent connection.
Alarm out (connector)	Provides four pairs of dry contacts for an optional external alarm-monitoring system. Normally has closed contacts and uses an RJ-45 type connector. (See Appendix C, "Connector Pinouts.")
LAN (connector)	Provides Ethernet access for connecting to a remote SNMP monitoring location, and contains two LEDs. The left LED (green) indicates that an Ethernet connection is established. The right LED (yellow) indicates that a signal is being transmitted to the Ethernet. It uses an RJ-45 type connector.
Frame ground attachment	Provides tapped-screw mounting holes for attaching a frame ground lug and wiring.
Dual-circuit DC power input	Provides two sets of DC input barrier strip terminals. The right-hand strip terminal is for the primary DC power wiring; the left-hand strip terminal is for an optional backup DC power source. The left screw terminal of each strip is for –48 VDC; the right screw terminal is for the return path.

Cisco ONS 15501 LED Alarm Definitions

The Cisco ONS 15501 front panel has three LEDs:

- The green POWER LED turns on or off to reflect the following conditions:
  - On: Both power supply voltages are within tolerance (the Cisco ONS 15501 is powered normally).
  - Off: Both power supply voltages are outside of tolerance or unit is not powered up.
  - Blinking: One of the power supply voltages is outside of tolerance.
- The red FAIL LED turns on or off to reflect the following conditions:
  - On: The pump laser bias, pump laser temperature, or power supply is out of tolerance. This LED indicates a major internal failure, such as an overtemperature condition or a failure in the pump laser or power supply.
  - Off: The pump laser bias, pump laser temperature, and power supply are in the specified range.
- The yellow LOS LED turns on or off to reflect the following conditions:
  - On: Input signal level is below the loss-of-input threshold.
  - Off: Input signal level is above the minimum input power threshold.

CHAPTER 2

Installing the Cisco ONS 15501

This chapter describes the installation procedures for the Cisco ONS 15501 chassis and its components.

This chapter includes the following sections:

- Creating a Site Log, page 2-1
- Required Tools and Parts, page 2-2
- Installation Checklist, page 2-2
- Rack-Mounting the Chassis, page 2-3
- Optical Connection, page 2-3
- DC Power Connection, page 2-4
- Communication Connections, page 2-6
- Installation Commands, page 2-7

Before beginning any of the procedures in this document:

- Review the *Regulatory Compliance and Safety Information for the Cisco ONS 15501* document to avoid injury to yourself or damage to the equipment.
- Ensure that your equipment configuration meets the minimum requirements for the installation you will perform, and that you have all the parts and tools you need.

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.**

Creating a Site Log

We recommend keeping a site log (or a section of a larger site log) to record all actions related to the Cisco ONS 15501. The log should be kept near the chassis where anyone who works on the equipment can access it. Site log entries might include the following:

- Background information.
- Installation progress.

  Make a copy of the "Installation Checklist" section on page 2-2 and insert it into the site log. Make entries on the checklist as you complete each procedure.
- Maintenance procedures.

Use the site log as a record of ongoing system maintenance. Each time a procedure is performed on the Cisco ONS 15501, update the site log to reflect situations such as maintenance schedules and requirements, intermittent problems, changes and updates, configuration changes, and related comments and notes.

Required Tools and Parts

You need the following tools and parts to install the Cisco ONS 15501:

- Phillips screwdriver
- Wire cutters, as needed (for DC power wiring)
- Wire strippers, as needed (for DC power wiring)
- Crimp tool (for grounding wire)
- Digital voltmeter (with ohmmeter function)
- Grounding wire (8 AWG)
- Power supply connection wire (18 AWG)
- Listed two-hole copper grounding lug (0.25 in. [0.635 cm] diameter bolt hole size, 0.625 in. [1.5875 cm] center-to-center hole spacing)

Installation Checklist

The installation checklist includes the procedures for initial hardware installation of the Cisco ONS 15501. Mark the entries as you complete each procedure. Make a copy of this checklist, as needed, for the site log.

Installation checklist for site:

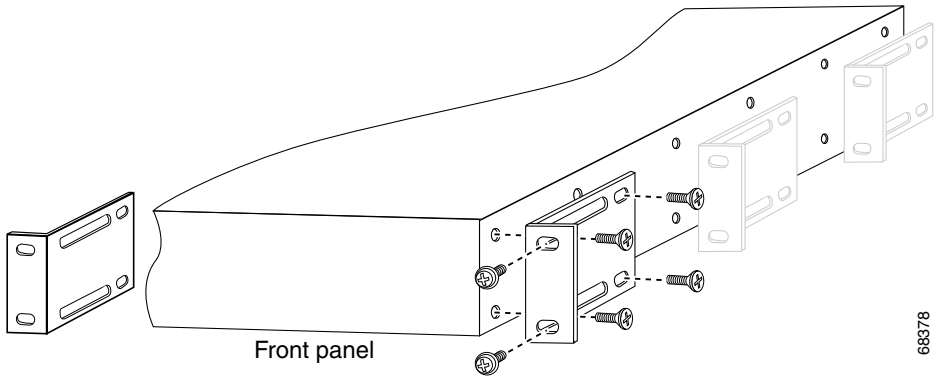
Product name:

Task	Verified By	Date
Background information placed in site log		
Cisco printed documentation received		
Cisco ONS 15501 received		
Accessories received		
Required tools available		
Additional equipment available		
Site power voltages verified		
Initial electrical connections established		
Cisco ONS 15501 fully installed		
Operation verified		

Rack-Mounting the Chassis

The Cisco ONS 15501 mounts in a standard 19-inch, 23-inch, or ETSI equipment rack and occupies 1RU (one rack unit is 1.75 inches) of vertical space. The unit is designed for front, middle, or rear mounting. It is attached to the rack as shown in Figure 2-1.

Figure 2-1 Rack-Mounting the Cisco ONS 15501



Caution Use only the hardware provided with the Cisco ONS 15501. Failure to use the provided hardware may result in unintended damage. If hardware is lost, contact Cisco Systems, Inc. for a replacement.

To install the Cisco ONS 15501 in a rack, follow these steps:

Step 1 Turn the Cisco ONS 15501 chassis so that the front panel is facing you.

Step 2 Determine the desired point of mounting and position the two mounting brackets accordingly.

Step 3 Attach the mounting brackets to the unit with the supplied screws using a Phillips screwdriver.

Step 4 Attach the unit to the rack with the supplied rack mounting screws using a Phillips screwdriver.

Optical Connection

Warning **Infra-red laser energy may be present on the cable connected to the receiving (input) connector. The transmitting (output) optical fiber connector and the monitoring (output monitor) connector are equipped with shutters that automatically close when a cable is removed. To avoid potential damage to the eyes, do not look directly into an optical fiber cable or a connector (whether shuttered or not). When an optical cable is not attached, place the supplied protective cap over the cable's connector. The output monitor output connector should be capped when not in use.**

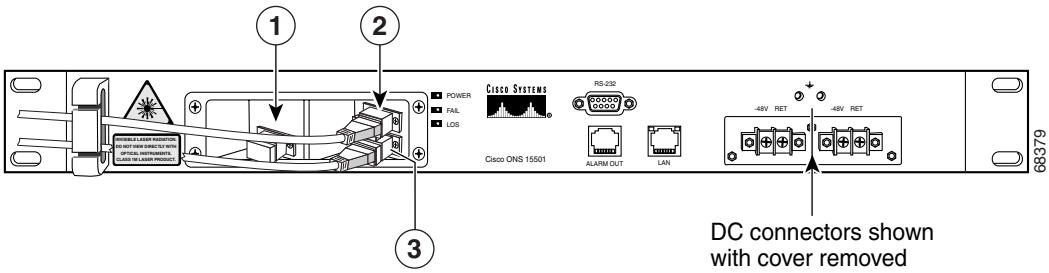
Warning **Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not stare into the beam or view directly with optical instruments. Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. Use of controls or adjustments or performance of procedures other than those specified may result in hazardous radiation exposure.**

To connect the customer-supplied optical fiber cable to the SC/UPC optical ports, follow these steps:

Step 1 Connect the input optical fiber cable to the input connector (see Figure 2-2). Avoid making sharp bends in the cable.

Step 2 Connect the output optical fiber cable to the output connector (see Figure 2-2). Avoid making sharp bends in the cable.

Figure 2-2 Cisco ONS 15501 Optical Connections



1	Output monitor	**3**	Output connector
2	Input connector		

DC Power Connection

The section describe how to ground the chassis and then connect DC power to it.

Caution Check the power at your site to ensure that you are receiving clean power (free of spikes and noise). Install a power conditioner, if necessary, to ensure proper voltages and power levels in the source voltage.

Caution Use only the hardware provided with the Cisco ONS 15501. Failure to use the provided hardware may result in unintended damage. If hardware is lost, contact Cisco Systems for a replacement.

Caution The protective cover for the DC power terminals should be installed at all times when the equipment is energized, except for any necessary maintenance or troubleshooting.

Warning **When installing or replacing the unit, the ground connection must always be made first and disconnected last.**

Grounding the Chassis

To connect the provided grounding lug to the tapped frame grounding holes and connect the customer-supplied grounding wire to the DC power terminal connectors, follow these steps:

Step 1 Verify that the primary and user-optional redundant external DC power circuits are disconnected at the source.

Step 2 Remove the cover from the DC power terminal connectors. Identify the two tapped frame grounding holes at the upper right side of the Cisco ONS 15501 front panel. (See Figure 2-3.)

Step 3 Remove the two screws provided for securing the ground lug to the Cisco ONS 15501.

Step 4 Connect the 8 AWG grounding wire to the grounding lug. The other end of the wire should be suitably grounded.

Step 5 Install the grounding lug on the Cisco ONS 15501, using the two provided screws and washers.

Step 6 Test for proper frame ground using the ohmmeter section of a digital voltmeter. Place one prod on the Cisco ONS 15501 and the other on the frame grounding bus to which the grounding lug and grounding wire is connected. Observe for a zero-resistance ground.

Note There is an alternate grounding point on the chassis, located on the left side of the rear panel.

Connecting the Power

To connect the power wiring to the DC power terminal connectors, follow these steps:

Step 1 Cut and strip the customer-supplied 8 AWG primary and redundant power supply wires, if necessary. Identify the –48 VDC wire and power return wire for the primary and redundant circuit.

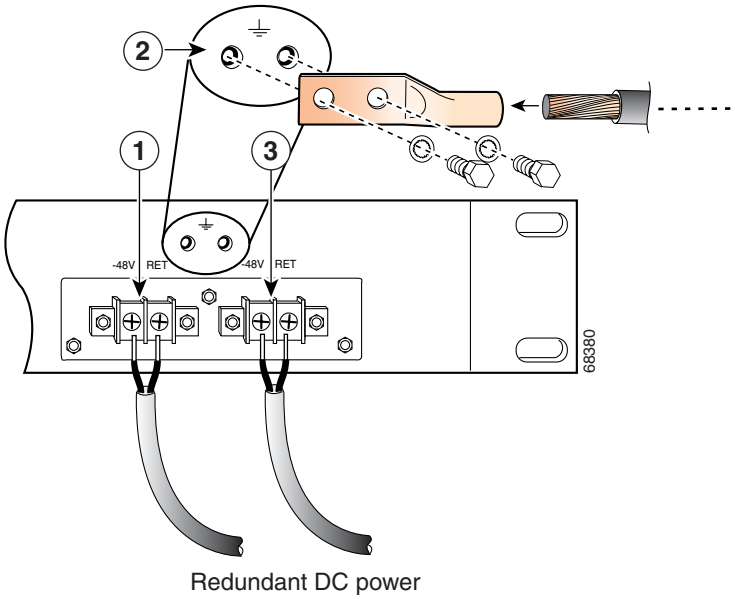
Step 2 Install the primary DC power wiring to the right-hand barrier strip. (See Figure 2-3.) The left-hand screw is the –48 V connection. The right-hand screw, marked “RET,” is the ground connection.

Step 3 Install the redundant DC power wiring to the left-hand barrier strip. (See Figure 2-3.) The left-hand screw is the –48 V connection. The right-hand screw, marked “RET,” is the ground connection.

Step 4 Replace the power connector cover.

Step 5 Apply power to the primary and redundant DC circuits.

Figure 2-3 Connecting the Cisco ONS 15501 to a DC Power Source



1	Primary DC power connections	**3**	Redundant DC power connections
2	Tapped frame grounding holes		

Communication Connections

The Cisco ONS 15501 communicates in three ways:

- SNMP (through Ethernet)
- Alarm contacts (through RJ-45 connector)
- Console port (through RS-232)

See Appendix C, “Connector Pinouts,”for the wiring layouts of the RJ-45 and RS-232 connectors.

See the “Configuring Local Serial Communication” section on page 3-1 for detailed information about the RS-232 console port.

Setting Up Alarm Contacts

To set up alarm contacts, follow these steps:

Step 1 Obtain an 8-conductor, 8 AWG solid-wire cable and terminate one end with an RJ-45 connector.

Step 2 Connect the stub end of the alarm cable to the alarm system contacts, either to miscellaneous discrete inputs on terminal equipment or to a central office alarm panel.

Step 3 Connect the RJ-45 connector to the Cisco ONS 15501.

See the"Alarm Contact Closures" section on page 3-4 and the "Cisco ONS 15501 LED Alarm Definitions" section on page 1-9.

Installation Commands

You can connect to a Cisco ONS 15501 locally using a serial connection or remotely through SNMP. See the "Configuring Local Serial Communication" section on page 3-1 for instructions on setting up either of these options. After you establish a connection, use the following commands to complete the hardware installation. See Chapter 4, "Command Reference," for a complete list of available commands.

Introductory Commands

You can use the following commands to establish communication with the Cisco ONS 15501 and to access additional information about the amplifier.

- **help —** Displays a list of all available commands
- **sys-info —** Displays the basic information on the system, including CLEI (Common Language Equipment Identifier) code, model number, serial number, MAC address, firmware version, and firmware build date

Review and Operational Commands

You can use the following commands to review the overall status of the Cisco ONS 15501.

- **alarm —** Displays a list of alarms in the system
- **status —** Displays the measured, alarm mean, and alarm trigger values for input power, internal case temperature, optical gain, and output signal power, as well as the measured values for optical output power

Configuring the Cisco ONS 15501

The Cisco ONS 15501 supports monitoring using CLI commands from the console port. It also supports remote monitoring using SNMP or Telnet (using TCP/IP over the Ethernet).

This chapter describes how to set up communications with a Cisco ONS 15501 and includes the following sections:

- Configuring Local Serial Communication, page 3-1
- Monitoring Alarms and Traps, page 3-2
- Upgrading the Flash Image, page 3-3
- Configuring Remote Communication, page 3-3
- Alarm Contact Closures, page 3-4

Configuring Local Serial Communication

To establish a serial communication link with a Cisco ONS 15501, the unit must first be properly installed and powered up. Table 3-1 lists the equipment required for setup.

Table 3-1 Equipment for Local Serial Communication Setup

Hardware	Comments
PC or Laptop	Customer-supplied
RS-232 cable with DB-9 connectors (see Appendix C, “Connector Pinouts”)	Customer-supplied

Setting Up the Software

To set up the software on the Cisco ONS 15501 for local serial communication, follow these steps:

Step 1 Launch the serial port communication utility on the PC or laptop and configure it to communicate at 9600 baud, no parity, 8 bit data, 1 stop bit, and no flow control.

Step 2 Connect the DB-9 end of the RS-232 data cable to the COM port on the PC or laptop.

Step 3 Connect the other end of the RS-232 data cable to the RS-232 serial port on the Cisco ONS 15501 front panel. (See Figure 1-2 on page 1-8.)

Note When connecting the serial port to a Cisco terminal server, configure the line for "no exec". When connecting to a modem, configure the modem for no echo.

Note Unexpected characters sent to the Cisco ONS 15501 during the bootup sequence may cause undesirable results.

Step 4 Press Enter to get the login prompt.

The Cisco ONS 15501 is now ready for basic system configuration.

Configuring a Basic System

To configure a basic system, follow these steps:

Step 1 Log in to the system using the default master password **edfa1**.

Step 2 Enter **host-config** *hostname* to set the host name. The maximum allowed length for *hostname* is 15 characters.

Step 3 Enter **ip-config** *ip-addr ip-subnet-mask def-gateway-ip* to set the IP address, subnet mask, and gateway address. In the absence of any arguments for subnetmask and gateway address, default values are inserted.

Step 4 Enter **ntp** *status* to enable the NTP, if appropriate, and enter **ntp-ip** *ip-addr1 ip-addr2* to set the IP address of the NTP server.

Step 5 Enter **set-time** *time* to set the time of the system if no NTP server is available. The time needs to be in the same format as this example, where PST is the time zone.

```
Fri Aug 24 10:50:31 2001 PST.
```

Note See Appendix D, "Time Zone Codes," for a list of time zones and correlating abbreviations.

Step 6 Enter **set-user-pwd** to set the user login password. The CLI then prompts the user for the default master password and the new user password. The default user password is **edfa**.

Step 7 Enter **set-master-pwd** to set a new master password if you logged in using the master password. The CLI prompts the user for the default master password and the new master password. The default master password is **edfa1**.

Monitoring Alarms and Traps

To configure the software on the Cisco ONS 15501 for console port-based monitoring, follow these steps:

Step 1 Enter **show-trap** to display the traps of the system.

Step 2 Enter **alarm** to display the alarms in the system.

Step 3 Enter **status** to check the optical and environmental status of the system.

Upgrading the Flash Image

To perform a field upgrade of a Flash image, follow these steps:

Step 1 Ensure that the IP addresses and the FTP servers, user accounts, path names, and filenames of the Flash image are correctly set up.

Step 2 Enter **show-trap** to verify that the trap display is turned on.

Step 3 Enter **sw-download ftp** *server-IP username password path filename flashbank* or **sw-download tftp** *server-IP filename flashbank* to transfer the image from the FTP (TFTP) server and burn it to the specified Flash bank. Make sure that the FTP (TFTP) server is accessible using the same username, password, path name, and filename.

Note Two traps are generated to indicate the beginning and ending of the FTP burn process. The image cannot be downloaded to a currently active bank.

Step 4 Once the **sw-download ftp** process is complete, enter **boot-bank** *flashbank* to set the boot bank from which the system next boots up.

Step 5 Enter **reboot** to reboot the system.

Configuring Remote Communication

To establish a remote communication link with a Cisco ONS 15501 through Telnet or SNMP, the unit must first be properly installed and powered up.

Configuring for Telnet

When the Ethernet pont on the Cisco ONS 15501 is connected to other Ethernet switches for network management purposes, we recommend that either end of the Ethernet port NOT be configured in autonegotiation mode, and that both ends of the Ethernet connection be configured in either 10 Mbps or 100 Mbps, half-duplex or full duplex mode.

Note The Cisco ONS 15501 default Ethernet boot mode is half-duplex at 10 Mbps.

For additional information, refer to the **ethmode** command in Chapter 4, “Command Reference,”.

To configure the Cisco ONS 15501 for Telnet, follow these steps:

Step 1 Connect the Cisco ONS 15501 to an Ethernet LAN using a standard RJ-45 cable.

Step 2 Make sure that the system network is properly set up by using the **ping** command to the IP address of the system.

Step 3 Enter **telnet** *target-ip-address* to log in remotely to the Cisco ONS 15501.

Note All commands supported by the Cisco ONS 15501 through the console port are also supported in a Telnet session.

Configuring for SNMP

When the Ethernet port on the Cisco ONS 15501 is connected to other Ethernet switches for network management purposes, we recommend that either end of the Ethernet port NOT be configured in autonegotiation mode, and that both ends of the Ethernet connection be configured in either 10 Mbps or 100 Mbps half-duplex or full duplex mode.

Note The Cisco ONS 15501 default Ethernet boot mode is half-duplex at 10 Mbps.

For additional information, refer to the **ethmode** command in Chapter 4, "Command Reference,".

To configure the Cisco ONS 15501 for SNMP, follow these steps:

Step 1 Connect the Cisco ONS 15501 to an Ethernet LAN using a standard RJ-45 cable.

Step 2 Enter **add-snmp-mgr** *manager-ip* to set the SNMP manager IP addresses. The maximum number of SNMP manager IP addresses is 16.

Step 3 Enter **get-snmp-mgr** to display the list of SNMP managers.

Step 4 Enter **del-snmp-mgr** *manager-ip* to delete an SNMP manager entry.

Step 5 Enter **add-snmp-com** *community-string* [**ro** | **rw**] to set the SNMP community string for remote monitoring. The maximum number of SNMP community strings is 16.

Step 6 Enter **get-snmp-com** to display the list of SNMP community strings.

Step 7 Enter **del-snmp-com** *community-string* to delete an SNMP community string entry.

Alarm Contact Closures

The Cisco ONS 15501 provides a front panel, single form C, discrete external alarm output. (See the "Cisco ONS 15501 Front Panel" section on page 1-8.) The external alarm output is through the eight wires of an RJ-45 connector.

The following events are reported by the discrete external alarms through individual alarm contacts:

- Alarm 1—Loss of input signal or input signal power below threshold
- Alarm 2—Failure in the pump laser or pump laser temperature
- Alarm 3—Loss of input power supply or power supply out of range
- Alarm 4—Undefined (always on; may be used for power indication)

Note The default state of the alarm contacts is Normally Closed. Depending on which fault condition occurs, specific alarm contacts open. The corresponding Cisco ONS 15501 LEDs turn on/off. (See the "Cisco ONS 15501 LED Alarm Definitions" section on page 1-9.)

Table 3-2 lists the RJ-45 pinouts for the alarms.

Table 3-2 Alarm Pinouts

Pinout	Alarm
1	Alarm 1+ (power)
2	Alarm 1-
3	Alarm 2+ (major)
4	Alarm 2-
5	Alarm 3+ (minor)
6	Alarm 3-
7	Alarm 4+ (no connection)
8	Alarm 4-

CHAPTER 4

Command Reference

This chapter describes the commands used in the Cisco ONS 15501 environment. The commands are listed alphabetically.

Note To display a list of available commands, enter **help**. To obtain the syntax for any individual command, enter **help** [*command*].

Note All commands are case insensitive.

Note Commands that change the configuration of the control module are protected by the master password. Commands that allow access to information but do not change the configuration are protected by the user password.

add-snmp-com

To add an SNMP community string to the system, use the **add-snmp-com** command.

add-snmp-com *community-string* [**ro**|**rw**]

Syntax Description

community-string	Specifies the SNMP community string to be added to the system. The string can be comprised of any alphanumeric combination. The maximum number of characters allowed is 21.
[**ro**|**rw**]	Specifies read only or both read and write access associated with the community string.

Defaults

ro is the default if access mode is not specified.

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The Cisco ONS 15501 supports up to 16 SNMP community strings.

Examples

The following example shows how to add an SNMP community string to the system.

```
edfa > add-snmp-com abcd
```

Related Commands

Command	Description
del-snmp-com	Deletes an SNMP community string from the system.
get-snmp-com	Displays an SNMP community string in the system.

add-snmp-mgr

To add or modify an SNMP manager entry to the system, use the **add-snmp-mgr** command.

add-snmp-mgr *manager-ip* [*version*]

Syntax Description

manager-ip	Specifies the IP address of the host running the SNMP manager.
version	Specifies the SNMP version. Valid values are **v1** or **v2c**.

Defaults

The default version is **v2c**.

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.
EDFA 4.0	Added version option.

Usage Guidelines

The Cisco ONS 15501 uses the SNMP manager address to direct SNMP trap and inform notifications. No notifications are sent unless at least one SNMP manager address is configured. The Cisco ONS 15501 accepts a maximum of 16 IP managers.

Examples

The following example shows how to add an SNMP manager entry to the system.

```
edfa > add-snmp-mgr 10.1.2.71
```

Related Commands

Command	Description
del-snmp-mgr	Deletes an SNMP manager entry from the system.
get-snmp-mgr	Displays an SNMP manager entry in the system.

alarm

To display a list of alarms in the system, use the **alarm** command.

alarm

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.
EDFA 4.0	Added time index to output.

Examples

The following example shows how to display a list of alarms in the system.

```
edfa > alarm
Power Supply voltage level out of range (PS1) - @ 9
```

boot-bank

To display the active and planned boot bank or to modify the active boot bank, use the **boot-bank** command.

boot-bank [*flash-bank*]

Syntax Description

flash-bank	Specifies the Flash bank from which the system is booted. This should be **1**, **2**, or **3**.

Defaults

Displays the active boot bank

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The active boot bank is the Flash bank from which the system was booted. The planned boot bank is the Flash bank from which the system will next be booted.

Examples

The following example shows how to modify the active boot bank.

```
edfa > boot-bank 2
```

The following example shows how to display the active boot bank.

```
edfa > boot-bank
Active flash bank number: 1
Planned flash bank number: 1
```

copyright

to display the copyright information, use the **copyright** command.

copyright

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 2.0	This command was introduced.

Examples The following example shows the copyright information.

```
edfa > copyright
*****************************************************************************
*
*       Copyright ¬ 2002, Motorola, Inc.
*
*       Motorola, Broadband Communications Sector
*       101 Tournament Dr.
*       Horsham, PA 19044
*
*   Based on software developed by, licensed under or Copyright
*   by one or more of
*    - GNU GENERAL PUBLIC LICENSE Version 2, June 1991
*    - Carnegie Mellon University
*    - Regents of the University of California
*    - University of California, Berkeley and its contributors.
*
*****************************************************************************
```

del-snmp-com

To delete an SNMP community string from the system, use the **del-snmp-com** command.

del-snmp-com *community-string*

Syntax Description

community-string	Specifies the SNMP community string to be deleted from the system.

Defaults

None

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples

The following example shows how to delete an SNMP community string from the system.

```
edfa > del-snmp-com abcd
```

Related Commands

Command	Description
add-snmp-com	Adds an SNMP community string to the system.
get-snmp-com	Displays an SNMP community string in the system.

del-snmp-mgr

To delete an SNMP manager entry from the system, use the **del-snmp-mgr** command.

del-snmp-mgr *manager-ip*

Syntax Description

manager-ip	Specifies the IP address of the host running the SNMP manager.

Defaults

None

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The Cisco ONS 15501 uses the SNMP manager address to direct SNMP trap and inform notifications. No notifications are sent unless at least one SNMP manager address is configured.

Examples

The following example shows how to delete an SNMP manager entry from the system.

```
edfa > del-snmp-mgr 10.1.2.71
```

Related Commands

Command	Description
add-snmp-mgr	Adds or modifies an SNMP manager entry.
get-snmp-mgr	Displays SNMP manager entry information.

ethmode

To display or modify the Ethernet boot mode, use the **ethmode** command.

ethmode *mode*

Syntax Description

mode	Specifies the Ethernet boot mode. The boot mode is specified as **0** for auto-sense; **1** for full-duplex at 100 Mbps; **2** for half-duplex at 100 Mbps; **3** for full-duplex at 10 Mbps; or **4** for half-duplex at10 Mbps.

Defaults

Displays the current Ethernet boot mode.

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The system default Ethernet boot mode is **4** for half-duplex at 10 Mbps.

After setting a new Ethernet boot mode, the system must be rebooted for the change to take affect.

Examples

The following example shows how to display the Ethernet boot mode.

```
edfa > ethmode
ethernet init-mode 4
```

The following example shows how to modify the Ethernet boot mode.

```
edfa > ethmode 3
ethernet init-mode updated to 3
```

gain

To display the measured optical signal gain, use the **gain** command.

gain

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The value for measured optical signal gain is displayed in decibels (dB).

Examples

The following example shows how to display the measured optical signal gain.

```
edfa > gain
17.50 (dB)
```

Related Commands

Command	Description
gainmean	Displays the configured signal gain and alarm mean level.
gaintrig	Displays the gain alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setgainmean	Sets the signal gain and alarm mean level.
setgaintrig	Sets the gain alarm trigger level.

gainmean

To display the configured signal gain and alarm mean level, use the **gainmean** command.

gainmean

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The value for configured Cisco ONS 15501 signal gain and alarm mean level is displayed in decibels (dB).

Examples

The following example shows how to display the configured signal gain and alarm mean level.

```
edfa > gainmean
17.50 (dB)
```

Related Commands

Command	Description
gain	Displays the measured optical signal gain.
gaintrig	Displays the gain alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setgainmean	Sets the signal gain and alarm mean level.
setgaintrig	Sets the gain alarm trigger level.

gaintrig

To display the gain alarm trigger level, use the **gaintrig** command.

gaintrig

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines The value for Cisco ONS 15501 gain alarm trigger level is displayed in decibels (dB).

Examples The following example shows how to display the gain alarm trigger level.

```
edfa > gaintrig
1.00 (dB)
```

Related Commands

Command	Description
gain	Displays the measured optical signal gain.
gainmean	Displays the configured signal gain and alarm mean level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setgainmean	Sets the signal gain and alarm mean level.
setgaintrig	Sets the gain alarm trigger level.

get-snmp-com

To display the SNMP community strings in the system, use the **get-snmp-com** command.

get-snmp-com *community-string*

Syntax Description

community-string	Specifies the SNMP community string to be displayed.

Defaults

Displays all SNMP community strings in the system

Command Types

Does not change configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples

The following example shows how to display an SNMP community string in the system.

```
edfa > get-snmp-com abcd
  A list of the SNMP community string
=====================================
private
abcd
```

Related Commands

Command	Description
add-snmp-com	Adds an SNMP community string to the system.
del-snmp-com	Deletes an SNMP community string from the system.

get-snmp-mgr

To display the SNMP manager entries in the system, use the **get-snmp-mgr** command.

get-snmp-mgr

Syntax Description

manager-ip	Specifies the IP address of the host running the SNMP manager.

Defaults

Displays all IP values of the SNMP manager

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

This command displays SNMP manager configuration information for all entries on the system.

Examples

The following example shows how to display the values of SNMP managers.

```
edfa > get-snmp-mgr
  A list of the SNMP manager IP addresses
========================================
209.128.68.147
10.1.2.71
```

Related Commands

Command	Description
add-snmp-mgr	Adds or modifies an SNMP manager entry to the system.
del-snmp-mgr	Deletes an SNMP manager entry from the system.

help

To display the syntax for an individual command or to display a list of available user commands, use the **help** command.

help [*command*]

Syntax Description

command	Specifies the command

Defaults

Displays a list of available user commands

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

If there is a command specified, the corresponding help for that command is printed. Without any command specified, a list of all commands is shown.

Examples

The following example shows the list of available commands when logged on with the user password.

```
edfa > help
     STATUS: Alarm, Gain, GainMean, GainTrig, InPwr, InPwrMean, InPwrTrig,
             OptOutPwr, OutSigPwr, OutSigPwrMean, OutSigPwrTrig, Ps1, Ps2,
             SGain, SInPwr, SOutSigPwr, SPs1, SPs2, SPump, Status, STemp, Temp,
             TempMean, TempTrig

     SYSTEM: copyright, ethmode, get-snmp-mgr, help, host-config, ip-config,
             logout, neighbor-in, neighbor-out, ntp, ntp-ip, sys-info, time,
             timeout, timezone

MAINTENANCE: hide-trap, show-trap
```

The following example shows the list of available commands when logged on with the master password.

```
edfa > help
         STATUS: Alarm, Gain, GainMean, GainTrig, InPwr, InPwrMean, InPwrTrig,
                 OptOutPwr, OutSigPwr, OutSigPwrMean, OutSigPwrTrig, Ps1, Ps2,
                 SGain, SInPwr, SOutSigPwr, SPs1  SPs2, SPump, Status, STemp, Temp,
                 TempMean, TempTrig

          SETUP: ResetMeanTrig, SetGainMean, SetGainTrig, SetInPwrMean,
                 SetInPwrTrig, SetOutSigPwrMean, SetOutSigPwrTrig, SetTempMean,
                 SetTempTrig

         SYSTEM: add-snmp-com, add-snmp-mgr, copyright, del-snmp-com, del-snmp-mgr,
                 ethmode, get-snmp-com, get-snmp-mgr, help, host-config, ip-config,
                 logout, neighbor-in, neighbor-out, ntp, ntp-ip, ping,
                 set-master-pwd, set-time, set-user-pwd, sys-info, time, timeout,
                 timezone

    MAINTENANCE: boot-bank, hide-trap, reboot, show-trap, sw-download
```

hide-trap

To hide the trap message, use the **hide-trap** command.

hide-trap

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Changes configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples The following example shows how to hide the trap message.

```
edfa > hide-trap
```

Related Commands

Command	Description
show-trap	Displays the trap message.

host-config

To display or modify the current host name, use the **host-config** command.

host-config [*hostname*]

Syntax Description

hostname	Specifies the host name. *hostname* can have a maximum of 15 characters. Use only alphanumeric characters, hyphens, dots, and underscores.

Defaults

Displays the current host name

Command Types

Changes configuration

Command Modes

Master password protected. User password allows access to the current host name, but does not allow modifications.

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples

The following example shows how to modify the current host name.

```
edfa > host-config ADM-EAST
ADM-EAST >
```

inpwr

To display the measured optical input power, use the **inpwr** command.

inpwr

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The value for optical input power is displayed in decibels per milliwatt (dBm).

Examples

The following example shows how to display the optical input power.

```
edfa > inpwr
-46.03 (dBm)
```

Related Commands

Command	Description
inpwrmean	Displays the optical input alarm mean level.
inpwrtrig	Displays the optical input alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setinpwrmean	Sets the optical input alarm mean level.
setinpwrtrig	Sets the optical input alarm trigger level.

inpwrmean

To display the optical input alarm mean level, use the **inpwrmean** command.

inpwrmean

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The value for optical input alarm mean level is displayed in decibels per milliwatt (dBm).

Examples

The following example shows how to display the optical input alarm mean level.

```
edfa > inpwrmean
-38.00 (dBm)
```

Related Commands

Command	Description
inpwr	Displays the measured optical input power.
inpwrtrig	Displays the optical input alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setinpwrmean	Sets the optical input alarm mean level.
setinpwrtrig	Sets the optical input alarm trigger level.

inpwrtrig

To display the optical input alarm trigger level, use the **inpwrtrig** command.

inpwrtrig

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The value for optical input alarm trigger level is displayed in dBm

Examples

The following example shows how to display the optical input alarm trigger level.

```
edfa > inpwrtrig
1.00 (dBm)
```

Related Commands

Command	Description
inpwr	Displays the measured optical input power.
inpwrmean	Displays the optical input alarm mean level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setinpwrmean	Sets the optical input alarm mean level.
setinpwrtrig	Sets the optical input alarm trigger level.

ip-config

To display or modify the IP address, IP subnet mask and IP default gateway, use the **ip-config** command.

ip-config [*ip-addr* [*ip-subnet-mask* [*def-gateway-ip*]]]

Syntax Description

ip-addr	Specifies the IP address.
ip-subnet-mask	Specifies the IP subnet mask.
def-gateway-ip	Specifies the IP address of the default gateway.

Defaults

If no values are entered, the command displays the current IP address, IP subnet mask, and default IP gateway.

If a value is entered for *ip-addr*, but not for *ip-subnet-mask*, the default IP subnet mask is 255.255.255.0.

If a value is entered for *ip-addr*, but not for *def-gateway-ip*, the default IP gateway is xx.yy.zz.1, where xx.yy.zz are obtained by binary AND of first three bytes of *ip-addr* and *ip-subnet-mask*.

Command Types

Changes configuration

Command Modes

User password protected for display; master password protected for modification.

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples

The following example shows how to display the IP address, IP subnet mask, and default IP gateway.

```
edfa > ip-config
10.1.2.221      255.255.255.0   10.1.2.1
```

The following example shows how to modify the IP address, IP subnet mask, and default IP gateway.

```
edfa > ip-config 192.168.0.10 255.255.255.240 192.168.0.1
```

logout

To log out of the system, use the **logout** command.

logout

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

neighbor-in

To display or modify the neighboring equipment details for optical input, use the **neighbor-in** command.

neighbor-in [[**host** *link-host*] [**ip** *link-ip*] [**port** *link-port*]] | [**disable**]

Syntax Description

host *link-host*	Specifies the host name for input neighbor. The maximum length is 32 characters.
ip *link-ip*	Specifies the IP address for input neighbor.
port *link-port*	Specifies the name for the port on the remote host providing the input optical signal. The maximum length is 32 characters. **Note** If the **host** or **ip** keywords are not present, the **port** keyword is not allowed.
disable	Deletes the input neighbor information. **Note** The **disable** option is not allowed with any other options.

Defaults

If no values are entered, the command displays the current input neighbor details.

Command Types

Changes configuration

Command Modes

User password protected for read. Master password protected for write.

Command History

Release	Modification
EDFA 2.0	This command was introduced.

Usage Guidelines

In the absence of all arguments, the configured input neighbor network element (NE) information is shown.

To include space characters in the **host** or **port**, use double quotes (for example, **neighbor-in host "DWDM phoenix 10"**). Excluding the **disable** keyword, whenever a keyword is present, the keyword value must be given. Either **host** or **ip** are required, while **port** is optional. The **disable** keyword deletes the neighbor NE information.

Examples

The following example shows how to configure the input neighbor equipment information.

```
edfa > neighbor-in host box1 ip 192.168.0.4 port box1-port
edfa > neighbor-in host box1
edfa > neighbor-in ip 192.168.0.4
edfa > neighbor-in host box1 port box1-port
edfa > neighbor-in host box1 ip 192.168.0.4
edfa > neighbor-in ip 192.168.0.4 port box1-port
edfa > neighbor-in disable
edfa > neighbor-in
               HOST: source1
               PORT: out-2
         IP ADDRESS: 10.1.5.41
```

The following example shows how to issue the **neighbor-in** command with all the parameters.

```
edfa > neighbor-in source1 ip 10.1.5.41 port out-2
edfa > neighbor-in
           HOST: source1
           PORT: out-2
     IP ADDRESS: 10.1.5.41
```

Related Commands

Command	Description
neighbor-out	Displays and modifies the neighboring equipment information for optical output.

neighbor-out

To display or modify the neighboring equipment details for optical output, use the **neighbor-out** command.

neighbor-out [[**host** *link-host*] **[ip** *link-ip*] **[port** *link-port*]] | **[disable]**

Syntax Description

host *link-host*	Specifies the host name for the output neighbor. The maximum length is 32 characters.
ip *link-ip*	Specifies the IP address for the output neighbor.
port *link-port*	Specifies the name for the port on the remote host receiving the output optical signal. The maximum length is 32 characters. **Note** If the **host** or **ip** keywords are not present, the **port** keyword is not allowed.
disable	Deletes the output neighbor information. **Note** The **disable** option is not allowed with any other options.

Defaults

If no values are entered, the command displays the current output neighbor details.

Command Types

Changes configuration

Command Modes

User password protected for read. Master password protected for write.

Command History

Release	Modification
EDFA 2.0	This command was introduced.

Usage Guidelines

In the absence of all arguments, the configured output neighbor network element (NE) information is shown.

To include space characters in the **host** or **port**, use double quotes (for example, **neighbor-out host "DWDM phoenix 10"**). Excluding the **disable** keyword, whenever a keyword is present, the keyword value must be given. Either **host** or **ip** are required while **port** is optional. The **disable** keyword deletes the neighbor NE information.

Examples

The following example shows how to configure the output neighbor equipment information.

```
edfa > neighbor-out host box1 ip 192.168.0.4 port box1-port
edfa > neighbor-out host box1
edfa > neighbor-out ip 192.168.0.4
edfa > neighbor-out host box1 port box1-port
edfa > neighbor-out host box1 ip 192.168.0.4
edfa > neighbor-out ip 192.168.0.4 port box1-port
edfa > neighbor-out disable
edfa > neighbor-out
               HOST: dest1
               PORT: in-2
         IP ADDRESS: 10.1.71.41
```

The following example shows how to issue the **neighbor** in command with all the parameters.

```
edfa > neighbor-out dest1 ip 10.1.7.31 port in-1
edfa > neighbor-out
           HOST: dest1
           PORT: in-1
     IP ADDRESS: 10.1.5.41
```

Related Commands

Command	Description
neighbor-in	Displays and modifies the neighboring equipment information for optical input.

ntp

To modify or display the NTP (Network Time Protocol) status for the system, use the **ntp** command.

ntp [*status*]

Syntax Description

status	Specifies **on** to enable the NTP or **off** to disable the NTP.

Defaults

Displays the current configuration of the NTP (that is, **on** or **off**), as well as the current IP addresses of the primary and secondary NTP servers

Command Types

Changes configuration

Command Modes

User password protected for display; master password protected for modification.

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

When the NTP is on, the status (up or down) of the NTP servers is displayed if no argument is provided for the command.

Examples

The following example shows how to enable the NTP for the system.

```
edfa > ntp on
```

The following example shows how to display the current configuration of the NTP.

```
edfa > ntp
ON, 209.128.68.149:UP, 209.128.68.147:DOWN
```

Related Commands

Command	Description
ntp-ip	Modifies the IP addresses of the NTP server.

ntp-ip

To modify or display the IP addresses of the NTP (Network Time Protocol) server, use the **ntp-ip** command.

ntp-ip [*ip-addr1* [*ip-addr2*]]

Syntax Description

ip-addr1	Specifies the IP address of the primary NTP server.
ip-addr2	Specifies the IP address of the secondary NTP server.

Defaults

Displays the current IP addresses of the primary and secondary NTP servers.

If only one value is entered, that value is applied to the IP address of the primary NTP server.

Command Types

Changes configuration

Command Modes

User password protected for display; master password protected for modification.

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples

The following example shows how to modify the IP address of the primary NTP server.

```
edfa > ntp-ip 209.128.68.149 209.128.68.147
```

The following example shows how to display the current IP addresses of the primary and secondary NTP servers.

```
edfa > ntp-ip
209.128.68.149, 209.128.68.147
```

Related Commands

Command	Description
ntp	Enables or disables the NTP for the system.

optoutpwr

To display the optical output power, use the **optoutpwr** command.

optoutpwr

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines The value for optical output power is displayed in decibels per milliwatt (dBm).

Examples The following example shows how to display the optical output power.

```
edfa > optoutpwr
-28.53 (dBm)
```

outsigpwr

To display the calculated output signal power, use the **outsigpwr** command.

outsigpwr

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The value for calculated output signal power is displayed in decibels per milliwatt (dBm).

Examples

The following example shows how to display the calculated output signal power.

```
edfa > outsigpwr
-28.53 (dBm)
```

Related Commands

Command	Description
outsigpwrmean	Displays the output signal alarm mean level.
outsigpwrtrig	Displays the output signal alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setoutsigpwrmean	Sets the output signal alarm mean level.
setoutsigpwrtrig	Sets the output signal alarm trigger level.

outsigpwrmean

To display the output signal alarm mean level, use the **outsigpwrmean** command.

outsigpwrmean

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines The value for output signal alarm mean level is displayed in decibels per milliwatt (dBm).

Examples The following example shows how to display the output signal alarm mean level.

```
edfa > outsigpwrmean
2.00 (dBm)
```

Related Commands

Command	Description
outsigpwr	Displays the calculated output signal power.
outsigpwrtrig	Displays the output signal alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setoutsigpwrmean	Sets the output signal alarm mean level.
setoutsigpwrtrig	Sets the output signal alarm trigger level.

outsigpwrtrig

To display the output signal alarm trigger level, use the **outsigpwrtrig** command.

outsigpwrtrig

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The value for output signal alarm trigger level is displayed in decibels per milliwatt (dBm).

Examples

The following example shows how to display the output signal alarm trigger level.

```
edfa > outsigpwrtrig
20.00 (dBm)
```

Related Commands

Command	Description
outsigpwr	Displays the calculated output signal power.
outsigpwrmean	Displays the output signal alarm mean level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setoutsigpwrmean	Sets the output signal alarm mean level.
setoutsigpwrtrig	Sets the output signal alarm trigger level.

ping

To ping an IP address, use the **ping** command.

ping *ip-address* [*count*]

Syntax Description.

ip-address	Specifies the IP address of the host to ping.
count	Specifies the number of ping packets to be sent. The range is 1 to 20.

Defaults

The default count is 5.

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

If no value is entered for the count, the system defaults to **5**. The system accepts a maximum count of **20**.

If the **ping** command is issued from a Telnet session, Ctrl-c stops the ping. If the **ping** command is issued from a serial port, Ctrl-c does not stop the ping.

Examples

The following example shows how to ping an IP address.

```
edfa > ping 192.168.0.1
PING 192.168.0.1 (192.168.0.1): 56 data bytes

--- 192.168.0.1 ping statistics ---
5 packets transmitted, 0 packets received, 100% packet loss
```

ps1

To display the voltage of power supply 1, use the **ps1** command.

ps1

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples The following example shows how to display the voltage of power supply 1.

```
edfa > ps1
-49.51 (vDC)
```

ps2

To display the voltage of power supply 2, use the **ps2** command.

ps2

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples The following example shows how to display the voltage of power supply 2.

```
edfa > ps2
-49.43 (vDC)
```

reboot

To reboot the software on the Cisco ONS 15501, use the **reboot** command.

reboot

Syntax Description This command has no arguments or keywords.

Defaults The system reboots using the image for planned boot bank.

Command Types Does not change configuration

Command Modes Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

resetmeantrig

To reset the alarm mean and trigger levels for signal gain, optical input power, output signal power, and internal case temperature to the manufacturer's default settings, use the **resetmeantrig** command.

resetmeantrig

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The manufacturer's default setting can be found in Table 1-2 on page 1-2.

Related Commands

Command	Description
gainmean	Displays the configured signal gain and alarm mean level.
gaintrig	Displays the gain alarm trigger level.
inpwrmean	Displays the optical input alarm mean level.
inpwrtrig	Displays the optical input alarm trigger level.
outsigpwrmean	Displays the output signal alarm mean level.
outsigpwrtrig	Displays the output signal alarm trigger level.
setgainmean	Sets the signal gain and alarm mean level.
setgaintrig	Sets the gain alarm trigger level.
setoutsigpwrmean	Sets the output signal alarm mean level.
setoutsigpwrtrig	Sets the output signal alarm trigger level.
setinpwrtrig	Sets the optical input alarm trigger level.
settempmean	Sets the internal case temperature alarm mean level.
settemptrig	Sets the internal case temperature alarm trigger level.
tempmean	Displays the internal case temperature alarm mean level.
temptrig	Displays the internal case temperature alarm trigger level.

restore

To restore the system and network settings of the control module, including all passwords, to the manufacturer's default settings, use the **restore** command.

restore

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Changes configuration

Command Modes

No password is required.

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

This command can be used only from a serial port, not in a Telnet session.

Once connected to the serial port, the user must press the **Enter** key within 15 seconds after the password prompt appears following a system reboot.

The command resets the user password to **edfa**.

The command does not reset any of the module settings; use the **resetmeantrig** command for that purpose.

We recommend rebooting the system after using this command; the default settings are not activated until the system is rebooted.

The **restore** command does not appear in the **help** command output, because the **restore** command is only a valid command during the first 15 seconds after a reboot.

setgainmean

To modify the signal gain and alarm mean, use the **setgainmean** command.

setgainmean *mean*

Syntax Description

mean	Specifies the desired signal gain and alarm mean.

Defaults

17.5 dB

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The signal gain and alarm mean are measured in decibels (dB). The system accepts a minimum value of 7 dB and a maximum value of 17.5 dB. If a value entered falls outside of this acceptable range, the command is ignored and has no effect.

Examples

The following example shows how to modify the signal gain and alarm mean.

```
edfa > setgainmean 17.00
```

Related Commands

Command	Description
gain	Displays the measured optical signal gain.
gainmean	Displays the configured signal gain and alarm mean level.
gaintrig	Displays the gain alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setgaintrig	Sets the gain alarm trigger level.

setgaintrig

To modify the signal gain alarm trigger level, use the **setgaintrig** command.

setgaintrig *trigger*

Syntax Description

trigger	Specifies the desired signal gain and alarm trigger.

Defaults

1.00 dB

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The signal gain alarm trigger level is measured in decibels (dB). See Table 1-2 on page 1-2 for the minimum and maximum values. If a value entered falls outside of this acceptable range, the command is ignored and has no effect.

Examples

The following example shows how to modify the gain alarm trigger level.

```
edfa > setgaintrig 2.00
```

Related Commands

Command	Description
gain	Displays the measured optical signal gain.
gainmean	Displays the configured signal gain and alarm mean level.
gaintrig	Displays the gain alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setgainmean	Sets the signal gain and alarm mean level.

setinpwrmean

To set the optical input alarm mean level, use the **setinpwrmean** command.

setinpwrmean *mean*

Syntax Description

mean	Specifies the desired optical input alarm mean level.

Defaults

-20.00 dBm

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The optical input alarm mean is measured in decibels per milliwatt (dBm). See Table 1-2 on page 1-2 for the minimum and maximum values. If a value entered falls outside of this acceptable range, the command is ignored and has no effect.

Examples

The following example shows how to set the optical input alarm mean level.

```
edfa > setinpwrmean -28.00
```

Related Commands

Command	Description
inpwr	Displays the measured optical input power.
inpwrmean	Displays the optical input alarm mean level.
inpwrtrig	Displays the optical input alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setinpwrtrig	Sets the optical input alarm trigger level.

setinpwrtrig

To set the optical input alarm trigger level, use the **setinpwrtrig** command.

setinpwrtrig *trigger*

Syntax Description

trigger	Specifies the desired optical input alarm trigger level.

Defaults

10.00 dBm

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The optical input alarm trigger is measured in decibels (dB). See Table 1-2 on page 1-2 for the minimum and maximum values. If a value entered falls outside of this acceptable range, the command is ignored and has no effect.

Examples

The following example shows how to set the optical input alarm trigger level.

```
edfa > setinpwrtrig 2.00
```

Related Commands

Command	Description
inpwr	Displays the measured optical input power.
inpwrmean	Displays the optical input alarm mean level.
inpwrtrig	Displays the optical input alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setinpwrmean	Sets the optical input alarm mean level.

set-master-pwd

To modify the master password for the system, use the **set-master-pwd** command.

set-master-pwd

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

This command prompts the user for the old password, and then prompts twice for the new password. The new password entered for both prompts must match. The default master password is **edfa1**.

Examples

The following example shows how to modify the master password for the system.

```
edfa > set-master-pwd
Old Master Password:
New Password:
New Password:
```

Related Commands

Command	Description
set-user-pwd	Sets a new user password for the system.

setoutsigpwrmean

To set the output signal alarm mean level, use the **setoutsigpwrmean** command.

setoutsigpwrmean *mean*

Syntax Description

mean	Specifies the desired output signal alarm mean level.

Defaults

2.00 dBm

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The output signal alarm mean is measured in decibels per milliwatt (dBm). See Table 1-2 on page 1-2 for the minimum and maximum values. If a value entered falls outside of this acceptable range, the command is ignored and has no effect.

Examples

The following example shows how to set the output signal alarm mean level.

```
edfa > setoutsigpwrmean 1.00
```

Related Commands

Command	Description
outsigpwr	Displays the calculated output signal power.
outsigpwrmean	Displays the output signal alarm mean level.
outsigpwrtrig	Displays the output signal alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setoutsigpwrtrig	Sets the output signal alarm trigger level.

setoutsigpwrtrig

To set the output signal alarm trigger level, use the **setoutsigpwrtrig** command.

setoutsigpwrtrig *trigger*

Syntax Description

trigger	Specifies the desired output signal alarm trigger level.

Defaults

20.00 dBm

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The output signal alarm trigger is measured in decibels (dB). See Table 1-2 on page 1-2 for the minimum and maximum values. If a value entered falls outside of this acceptable range, the command is ignored and has no effect.

Examples

The following example shows how to set the output signal alarm trigger level.

```
edfa > setoutsigpwrtrig 18.00
```

Related Commands

Command	Description
outsigpwr	Displays the calculated output signal power.
outsigpwrmean	Displays the output signal alarm mean level.
outsigpwrtrig	Displays the output signal alarm trigger level.
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
setoutsigpwrmean	Sets the output signal alarm mean level.

settempmean

To modify the internal case temperature alarm mean level, use the **settempmean** command.

settempmean *mean*

Syntax Description

mean	Specifies the desired internal case temperature alarm mean level.

Defaults

30°C

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The internal case temperature mean is measured in degrees Celsius. See Table 1-2 on page 1-2 for the minimum and maximum values. If the value falls outside the acceptable range, the command is ignored and has no effect.

Examples

The following example shows how to modify the internal case temperature alarm mean level.

```
edfa > settempmean 29.00
```

Related Commands

Command	Description
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
settemptrig	Sets the internal case temperature alarm trigger level.
temp	Displays the internal case temperature level.
tempmean	Displays the internal case temperature alarm mean level.
temptrig	Displays the internal case temperature alarm trigger level.

settemptrig

To set the internal case temperature alarm trigger level, use the **settemptrig** command.

settemptrig *trigger*

Syntax Description

trigger	Specifies the desired internal case temperature alarm trigger level.

Defaults

30°C

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The internal case temperature trigger is measured in degrees Celsius. See Table 1-2 on page 1-2. for the minimum and maximum values. If a value entered falls outside of this acceptable range, the command is ignored and has no effect.

Examples

The following example shows how to set the internal case temperature alarm trigger level.

```
edfa > settemptrig 29.00
```

Related Commands

Command	Description
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
settempmean	Sets the internal case temperature alarm mean level.
temp	Displays the internal case temperature level.
tempmean	Displays the internal case temperature alarm mean level.
temptrig	Displays the internal case temperature alarm trigger level.

set-time

To display or modify the time of the system, use the **set-time** command.

set-time *time*

Syntax Description

time	Specifies the desired time of the system. The time must be entered in the same format as this example: `Fri Aug 24 20:50:31 2001 PST` PST is the time zone. See Appendix D, "Time Zone Codes," for a list of time zones and correlating abbreviations.

Defaults

The default time zone is GMT, Greenwich Mean Time.

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The day of the week must be specified as **mon**, **tue**, **wed**, **thu**, **fri**, **sat**, or **sun**. The system accepts entries with a capitalized first character, such as **Mon**, or entries entirely in lowercase, such as **mon**.

The month must be specified as **jan**, **feb**, **mar**, **apr**, **may**, **jun**, **jul**, **aug**, **sep**, **oct**, **nov**, or **dec**. The system accepts entries with a capitalized first character, such as **Jan**, or entries entirely in lowercase, such as **jan**.

The day, hour, minute and second can all be specified by a one- or two-digit number. For example, the system accepts 1 and 01 as the same value.

The year must be a four-digit number, such as 2002.

See Appendix D, "Time Zone Codes," for a list of time zones and correlating abbreviations. The system accepts entries entirely in uppercase, such as PST, or entirely in lowercase, such as pst.

Examples

The following example shows how to display the time of the system.

```
edfa > time
Time zone is set to PST
Thu Jan 01 00:00:00 1970 PST
```

The following example shows how to modify the time of the system.

```
edfa > set-time fri feb 8 1:2:30 2002 pst
Time zone is set to PST
Fri Feb 08 01:02:30 2002 PST
```

Related Commands

Command	Description
time	Displays the time of the system.
timezone	Displays or modifies the time zone of the system.

set-user-pwd

To modify the user password for the system, use the **set-user-pwd** command.

set-user-pwd

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

This command prompts the user for the old password, and then prompts twice for the new password. The new password entered for both prompts must match. The default user password is **edfa**.

Examples

The following example shows how to set the time of the system.

```
edfa > set-user-pwd
Old Master Password:
New Password:
New Password:
```

Related Commands

Command	Description
set-master-pwd	Sets a new master password for the system.

sgain

To display the state of the gain error monitor, use the **sgain** command.

sgain

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 4.0	This command was introduced.

Usage Guidelines Display values for this command are NORMAL and OUT-OF-RANGE.

Examples The following example shows how to display the state of the gain error monitor.

```
edfa > sgain
NORMAL
```

show-trap

To display the trap message, use the **show-trap** command.

show-trap

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples The following example shows how to display the trap message.

```
edfa > show-trap
```

Related Commands

Command	Description
hide-trap	Hides the trap message.

sinpwr

To display the state of the optical input level alarm monitor, use the **sinpwr** command.

sinpwr

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 4.0	This command was introduced.

Usage Guidelines Display values for this command are NORMAL and OUT-OF-RANGE.

Examples The following example shows how to display the state of the optical input level alarm monitor.

```
edfa > sinpwr
NORMAL
```

soutsigpwr

To display the state of the signal output power monitor, use the **soutsigpwr** command.

soutsigpwr

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 4.0	This command was introduced.

Usage Guidelines Display values for this command are NORMAL and OUT-OF-RANGE.

Examples The following example shows how to display the state of the signal output power monitor.

```
edfa > soutsigpwr
NORMAL
```

sps1

To display the status of the power supply 1 alarm monitor, use the **sps1** command.

sps1

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 4.0	This command was introduced.

Usage Guidelines Display values for this command are NORMAL and OUT-OF-RANGE.

Examples The following example shows how to display the status of the power supply 1 alarm monitor.

```
edfa > sps1
NORMAL
```

sps2

To display the status of the power supply 2 alarm monitor, use the **sps2** command.

sps2

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 4.0	This command was introduced.

Usage Guidelines

Display values for this command are NORMAL and OUT-OF-RANGE.

Examples

The following example shows how to display the status of the power supply 2 alarm monitor.

```
edfa > sps2
NORMAL
```

spump

To display the state of the laser pump, use the **spump** command.

spump

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 4.0	This command was introduced.

Usage Guidelines Display values for this command are GOOD and BAD.

Examples The following example shows how to display the state of the laser pump.

```
edfa > spump
GOOD
```

status

To display the measured, alarm mean and alarm trigger values for input power, internal case temperature, optical gain and output signal power, as well as the measured values for optical output power, use the status command.

status

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples

The following example shows how to display the status of the system.

```
edfa > status
================================================================================
                             Status      Measured          Mean      Trigger

   Input Optical Power        NORMAL  -15.84 (dBm)  -10.00 (dBm)  15.00 (dBm)
          Optical Gain        NORMAL     6.99 (dB)     7.00 (dB)    0.50 (dB)
  Optical Output Power                 -8.72 (dBm)
   Output Signal Power        NORMAL   -8.77 (dBm)   -6.00 (dBm)  18.00 (dBm)
        Power Supply 1  OUT-OF-RANGE   -3.48 (vDC)
        Power Supply 2        NORMAL  -49.70 (vDC)
            Pump Laser          GOOD
           Temperature        NORMAL     29.53 (C)     25.10 (C)    29.90 (C)
================================================================================
```

stemp

To display the state of the case temperature monitor, use the **stemp** command.

stemp

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 4.0	This command was introduced.

Usage Guidelines Display values for this command are NORMAL and OUT-OF-RANGE.

Examples The following example shows how to display the state of the case temperature monitor.

```
edfa > stemp
NORMAL
```

sw-download

To download an image via FTP or TFTP and burn it to a specified Flash bank, use the **sw-download** command.

sw-download ftp *server-ip username password path filename flashbank* [**passive**]

sw-download tftp *server-ip filepath flashbank*

sw-download terminate

sw-download

Defaults

ftp	Specifies an FTP download.
server-ip	Specifies the IP address of the FTP or TFTP server that contains the image.
username	Specifies the username to log in to the FTP server.
password	Specifies the password of the user on the FTP server.
path	Specifies the path of the directory that contains the image on the FTP server.
filename	Specifies the name of the image file.
flashbank	Specifies the Flash bank where the image is to be transferred. It should be designated as **1**, **2**, or **3**.
passive	Specifies the string for FTP across a firewall. This is not required for FTP.
tftp	Specifies a TFTP download.
filepath	Specifies the fully qualified filename for the TFTP transfer.
terminate	Ends the software transfer in progress.

None

Command Types

Changes configuration

Command Modes

Master password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

Use the **terminate** keyword to end the current download. For FTP failures across firewalls, try using the **passive** option. When burning a new image, the Flash bank specified cannot be the current Flash bank.

Examples

The following example shows how to download an image using FTP and burn the image to a specified Flash bank.

```
edfa > sw-download ftp 209.128.68.145 opruser oprpassword /home/load/bin EdfaImg.0.2 2
```

The following example shows how to download an image using TFTP and burn the image to a specified Flash bank.

```
edfa > sw-download tftp 209.128.68.145 EdfaImg.0.2 2
```

sys-info

To display basic information about the system, including CLEI (Common Language Equipment Identifier) code, model number, serial number, MAC address, firmware version, and firmware build date, use the **sys-info** command.

sys-info

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

This command retrieves information about the system. This include the manufacturer's name, firmware version, amplifier model number, serial number, Ethernet MAC address, and firmware update date.

Examples

The following example shows how to display basic system information.

```
edfa > sys-info
        CLEI: WMM8T00BRA
        Amplifier model number: ONS15501
        Serial number: MOR0643001G
        MAC Address: 00044DFFCC75
        Firmware version: 2.9
        Hardware Revision: 515150
        Software build date: Thu Jan 2 17:15:07 PST 2003
        System Up Time : 89839 seconds
        Software in various Banks:      1)ons15501-sw.2.0
                                        2)ons15501-sw.2.0
                                        3)ons15501-sw.2.0
         Active bank : 1         Planned bank : 1
```

temp

To display the internal case temperature, use the **temp** command.

temp

Syntax Description This command has no arguments or keywords.

Defaults None

Command Types Does not change configuration

Command Modes User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples The following example shows how to display the internal case temperature.

```
edfa > temp
85.28 (C)
```

Related Commands

Command	Description
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
settempmean	Sets the internal case temperature alarm mean level.
settemptrig	Sets the internal case temperature alarm trigger level.
tempmean	Displays the internal case temperature alarm mean level.
temptrig	Displays the internal case temperature alarm trigger level.

tempmean

To display the internal case temperature alarm mean level, use the **tempmean** command.

tempmean

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples

The following example shows how to display the internal case temperature alarm mean level.

```
edfa > tempmean
29.00 (C)
```

Related Commands

Command	Description
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
settempmean	Sets the internal case temperature alarm mean level.
settemptrig	Sets the internal case temperature alarm trigger level.
temp	Displays the internal case temperature level.
temptrig	Displays the internal case temperature alarm trigger level.

temptrig

To display the internal case temperature alarm trigger level, use the **temptrig** command.

temptrig

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples

The following example shows how to display the internal case temperature alarm trigger level.

```
edfa > temptrig
29.00 (C)
```

Related Commands

Command	Description
resetmeantrig	Resets the signal gain and alarm mean level, gain alarm trigger level, optical input alarm mean level, optical input alarm trigger level, output signal alarm mean level, output signal alarm trigger level, internal case temperature alarm mean level, and internal case temperature alarm trigger level to the manufacturer's default settings.
settempmean	Sets the internal case temperature alarm mean level.
settemptrig	Sets the internal case temperature alarm trigger level.
temp	Displays the internal case temperature level.
tempmean	Displays the internal case temperature alarm mean level.

time

To display the time of the system, use the **time** command.

time

Syntax Description

This command has no arguments or keywords.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

The time is displayed in the same format as this example.

```
Fri Aug 24 10:50:31 2001 PST
```

PST is the time zone. See Appendix D, "Time Zone Codes," for a list of time zones and correlating abbreviations.

Examples

The following example shows how to display the time of the system.

```
edfa > time
Thu Dec 13 19:29:02 2001 GMT
```

Related Commands

Command	Description
set-time	Sets the time of the system.
timezone	Displays or modifies the time zone of the system.

timeout

To display or modify the timeout interval, use the **timeout** command.

timeout [*seconds*]

Syntax Description

seconds	Specifies the number of seconds for the timeout interval.

Defaults

600 secs

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

If there is no activity from the user for a given amount of time (the timeout period), the system automatically logs the user off. The value for the timeout period is displayed in seconds. The default setting is 600 seconds. Any modification to this setting applies only to the user session in progress; once the user logs off, the setting automatically resets to the default value.

Examples

The following example shows how to modify the timeout period setting.

```
edfa > timeout 500
```

The following example shows how to view the timeout period setting.

```
edfa > timeout
Timeout period is 500 seconds
```

timezone

To display or modify the time zone of the system, use the **timezone** command.

timzone [*zone*]

Syntax Description

zone	Specifies the time zone at which to set the system.

Defaults

None

Command Types

Does not change configuration

Command Modes

User password protected

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Usage Guidelines

See Appendix D, "Time Zone Codes," for a list of time zones and correlating abbreviations.

Examples

The following example shows how to display the time zone of the system.

```
edfa > timezone
GMT
```

The following example shows how to modify the time zone of the system.

```
edfa > timezone PST
```

Related Commands

Command	Description
set-time	Sets the time of the system.
time	Displays the time of the system.

Troubleshooting

This chapter discusses basic fault investigation and diagnostic (troubleshooting) procedures for the Cisco ONS 15501.

This chapter includes the following sections:

- Basic Diagnostic Procedures, page 5-1
- Isolating the Problem, page 5-2
- Password Recovery, page 5-3
- Technical Support, page 5-4

Basic Diagnostic Procedures

When a problem occurs over the network, use the following basic diagnostic procedures to determine if the Cisco ONS 15501 is the source of the problem:

- Verify the power connection.
- Verify the Ethernet connection.
- Verify the alarm connection.

Verifying the Power Connection

To verify the power connection, follow these steps:

Step 1 Make sure that power is securely connected to the unit and that external DC power is being applied.

Step 2 Check for LED lamp activity on the front panel. Disregard the color or number of LEDs illuminated at this time. Verify only that one or more is on, indicating that the chassis is receiving power.

Step 3 Check the following areas for possible problems if no LEDs are on:

- Verify that the power connection to the chassis is firmly made.
- Verify that the circuit power switch(es) are in the ON position.
- Verify that the external source DC power circuit breaker(s) are on.
- Verify that the external power wires are delivering power correctly.

Verifying the Ethernet Connection

To verify the Ethernet connection, follow these steps:

Step 1 Make sure that the RJ-45 connector is in good working condition and plug it into the LAN port.

Step 2 Check for LED activity on the LAN port. The left LED is green when an Ethernet connection is established. The right LED flickers yellow when a signal is being transmitted to the Ethernet.

Step 3 Check the following areas for possible problems if no LEDs are on:

- Verify that the RJ-45 connection to the chassis is firmly made.
- Verify that the RJ-45 connector is in good working condition.
- Verify that the external Ethernet source is on and delivering a signal.

Verifying the Alarm Connection

To verify the alarm connection, connect an ohmmeter to the Alarm Out port, through an RJ-45 connector.

If the ohmmeter shows a reading of any kind, a connection is present. A very high resistance reading indicates that there are no alarm conditions; a low resistance reading indicates that alarm conditions do exist. See Appendix C, “Connector Pinouts.”

Isolating the Problem

The key to troubleshooting the Cisco ONS 15501 is to isolate the problem to a specific component.

When troubleshooting, consider the following components of the Cisco ONS 15501:

- Power supply—Includes the power input wiring and associated switches and fuses.
- Cooling system—Includes the fan, which should go on when power is supplied. The air intake vents and exhaust vents must have adequate ventilation.
- Front panel indicators—Includes the LEDs on the front panel, which help to identify a failure.
- Connecting cables—Includes all of the interface cables that connect the equipment to any transmission circuit or external device.

Reading the Front Panel LEDs

The front panel LEDs provide the activity or alarm status of the interfaces or internal circuitry to which they correspond. If an LED is connected to an active circuit and registers an alarm condition or is not on, a problem may exist. Table 5-1 lists the front panel LEDs and what the conditions indicate.

Table 5-1 Cisco ONS 15501 Front Panel LEDs

LED	Status	Description
Power	Green	Power is on.
Fail	Red	Component failure.
LOS[1]	Yellow	No signal is detected.

1. Loss of Signal

If all LEDs on the front panel are off:

- Check that primary and user-optional external power is available and that the DC power wiring is properly and firmly connected to the appropriate screw terminals.
- Check that the external DC supply power switch is turned to the on position.

If the Power LED blinks green, one of the two power supplies has failed or is not installed.

If the Power LED is green but the unit has failed and no other LEDs are on, then the internal power regulating circuit may have failed. Contact the Cisco Technical Assistance Center (TAC) immediately for assistance.

If the Fail LED is red, then a major trouble condition exists in the Cisco ONS 15501 hardware. Contact the Cisco Technical Assistance Center (TAC) immediately for assistance.

Warning **Infra-red laser energy may be present on the cable connected to the receiving (Input) connector, at the transmitting (Output) optical fiber connector, or the monitoring (Optical Monitor) connector. To avoid potential damage to the eyes, do not look directly into this connector or cable. When an optical cable is not attached, place the supplied protective cap over the connector and the optical fiber cable.**

If the LOS (loss of signal) LED is yellow, then the input optical signal has disappeared or has fallen below the detection level.

- Check to see that the input optical cable is securely seated in its connector.
- Connect an optical power meter on an optical spectrum analyzer to the Output Monitor optical connector and check for proper level of the outgoing signal.
- Check with the distant transmitting end to determine if the signal is leaving that site at the proper level.
- Check that the input power mean and trigger values are configured correctly for the actual desired input signal.

Password Recovery

If you have forgotten your passwords, you must power cycle the system and use the **restore** command to reset the passwords to the defaults. The **restore** command can only be entered from a session on the serial port, not from a Telnet session.

Caution Be sure not to lose the passwords. Powercycling the system disrupts data flow.

To recover the system passwords, follow these steps

Step 1 Power cycle the system.

Step 2 From a HyperTerminal session on the console port, press the Enter key within 15 seconds after the password prompt appears.

Step 3 At the “edfa >” prompt, type the **restore** command and press the Enter key.

Step 4 Answer **yes** to command prompts and press the Enter key.

The default user password is *edfa* and the default master password is *edfa1*. For security reasons, you should change both passwords as soon as possible. Log in with master privileges and use the **set-user-pwd** and **set-master-pwd** commands to change the passwords.

Technical Support

If the problem exists after you review the Cisco ONS 15501 status and attempt to reprovision the amplifier, contact the Cisco Technical Assistance Center (TAC). (See the Preface for contact information.)

Cisco ONS 15501 Alarms

This appendix describes the alarms defined for the Cisco ONS 15540:

- Ambient Temperature

  `[Temperature out of range]`

  Explanation The temperature measured by the thermal sensor shows a value outside the operational limits.

  Recommended Action Change environment so that the chassis cools down.

- Electrical Power

  `[Power Supply voltage level out of range]`

  Explanation The measured power supply levels are not within range.

  Recommended Action Ensure proper voltage levels for both the electrical inputs.

- Input Signal Power

  `[Input Signal level out of range]`

  Explanation The measured input signal power is not within range.

  Recommended Action The device might be operating outside the configured input optical limits. Change the mean and trigger values appropriately, or check the equipment and link providing optical input to the unit.

- Output Signal Power

  `[Output Signal level out of range]`

  Explanation The measured output signal power is not within range.

  Recommended Action The device may be operating outside of specified limits or the mean and trigger are not properly defined. Change the mean and trigger values appropriately, vary the optical input, or change the configured gain so that the output signal power is in the operational range.

- Controller communication failure

  `[Communication with embedded controller failed]`

  Explanation The communication with the embedded controller has failed.

  Recommended Action This denotes internal monitoring failure. The unit needs servicing if this alarm appears frequently.

- Software Upgrade Initiated

  `[Software download started]`

  Explanation A TFTP or FTP request has been launched.

  Recommended Action None.

- Software Upgrade Failed

  `[Software download failed]`

  Explanation A TFTP or FTP request that was launched has failed.

  Recommended Action Fix the reported problem (network issues, bad user ID or password, remote server not configured or incorrect, filename or file path incorrect) and relaunch the software download with correct parameters.

- Software Upgrade Completed

  `[Software download completed]`

  Explanation A TFTP or FTP request that was launched has completed.

  Recommended Action None.

- Software Reboot Initiated

  `[Software Reboot issued]`

  Explanation Reboot has been requested on the unit

  Recommended Action None

- Software Rolled Back

  `[Active and planned Software images are different]`

  Explanation The unit has booted from a bank that is not the programmed bank. This is possibly because the image from programmed bank was bad or because the boot loader was explicitly asked to boot from another bank (using the console during boot-up) or unit was frequently power-cycled.

  Recommended Action If the image is bad, reprogram a good image on corrupted bank.

- Configuration Changed

  `[Configurable value modified]`

  Explanation A writeable attribute has been modified through one of the management interfaces exposed by the system (for example, CLI or SNMP).

  Recommended Action None

- Unacceptable Gain

  `[Measure signal gain is out of acceptable range]`

  Explanation The equipment is unable to achieve the planned level for gain.

  Recommended Action Ensure that the optical input and environmental factors are within operational range. If the alarm is still present, the unit might need servicing.

- Laser Pump Bad

  `[One or more of the laser pump(s) bad]`

  Explanation The measured parameters for the laser show that a laser pump has gone bad.

  Recommended Action Ensure that the optical input and environmental factors are within operational range. If the alarm is still present, the unit needs servicing.

- EEPROM bad

  `[EEPROM access showed up errors]`

  Explanation The writes and reads from EEPROM have problems.

  Recommended Action If this problem recurs, it denotes a fault with the monitoring interface and may require servicing.

Technical Specifications

This appendix describes the technical specifications for the Cisco ONS 15501. This appendix includes the following sections:

- Cisco ONS 15501 Optical Specifications, page B-1
- Cisco ONS 15501 Electrical Specifications, page B-1
- Cisco ONS 15501 Mechanical Specifications, page B-2
- Cisco ONS 15501 DC Input Power Requirements, page B-2

Cisco ONS 15501 Optical Specifications

Table 1-1 on page 1-2 lists the optical specifications of the Cisco ONS 15501.

Cisco ONS 15501 Electrical Specifications

The Cisco ONS 15501 power supply meets the electrical specifications listed in Table B-1.

Table B-1 Cisco ONS 15501 Electrical Specifications

Description	Specification
Input voltage	–48 VDC
Power consumption	15W maximum; 8W typical
Minimum power supply voltage	–40.5 VDC
Maximum power supply voltage	–57 VDC

Cisco ONS 15501 Mechanical Specifications

Table B-2 lists the mechanical specifications of the Cisco ONS 15501.

Table B-2 Cisco ONS 15501 Mechanical Specifications

Description	Specification
Dimensions (H x W x D)	1.7 in. x 19.0 in. x 10.1 in. (44.45 mm x 482.6 mm x 259 mm)
Weight	6.8 lbs
Ambient operating temperature	0 to 50°C (32 to 122°F)
Storage temperature	–40 to 85°C (–40 to 185°F)
Humidity operation	Up to 95 percent, noncondensing
Humidity storage	Up to 95 percent, noncondensing
Connector type	SC/UPC

Cisco ONS 15501 DC Input Power Requirements

Table B-3 lists the DC input power requirements of the Cisco ONS 15501.

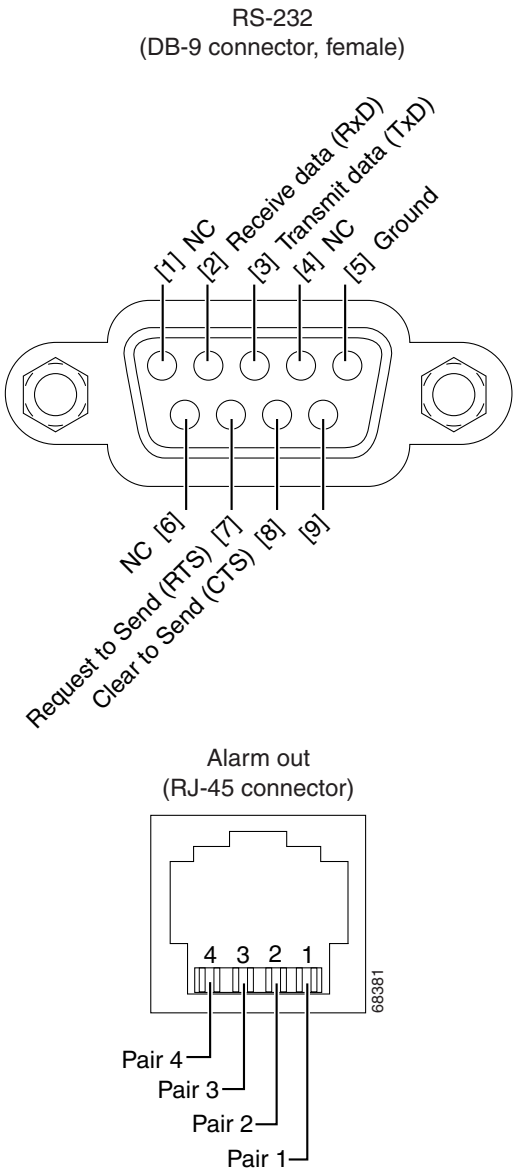
Table B-3 DC Input Power Supply Specifications

Description	Specification
Power consumption	15W maximum; 8W typical
Input power cable	18 AWG wire
Power source voltage range	–40.5 VDC to –57.0 VDC

Connector Pinouts

Figure C-1 shows the pin configuration of the RS-232 DB-9 type connector and the Alarm Out RJ-45 connector.

Figure C-1 RS-232 and RJ-45 Connector Pinouts



Pair 1 (pins 1—2): Shorted if LOS exists

Pair 2 (pins 3—4): Shorted if fault exists

Pair 3 (pins 5—6): Shorted if either power supply fails

Pair 4 (pins 7—8): Uncommitted (always shorted)

Time Zone Codes

Table D-1 lists time zones and their correlating abbreviations. Use the abbreviations when setting the time of your system. (See the **set-time** command for more information.)

Table D-1 Time Zone Codes

Code	Time Zone
GMT	Greenwich Mean
UT	Universal (Coordinated)
WET	Western European
BST	British Summer
WAT	West Africa
AT	Azores
AST	Atlantic Standard
ADT	Atlantic Daylight
EST	Eastern Standard
EDT	Eastern Daylight
CST	Central Standard
CDT	Central Daylight
MST	Mountain Standard
MDT	Mountain Daylight
PST	Pacific Standard
PDT	Pacific Daylight
YST	Yukon Standard
TDT	Yukon Daylight
HST	Hawaii Standard
HDT	Hawaii Daylight
CAT	Central Alaska
AHST	Alaska-Hawaii Standard
NT	Nome

Table D-1 Time Zone Codes (continued)

Code	Time Zone
IDLW	International Date Line West
CET	Central European
MET	Middle European
MEWT	Middle European Winter
MEST	Middle European Summer
MESZ	Middle European Summer
SWT	Swedish Winter
SST	Swedish Summer
FWT	French winter
FST	French Summer
EET	Eastern Europe, USSR Zone 1
BT	Baghdad, USSR Zone 2
ZP4	USSR Zone 3
ZP5	USSR Zone 4
ZP6	USSR Zone 5
WAST	West Australian Standard
WADT	West Australian Daylight
CCT	China Coast, USSR Zone 7
JST	Japan Standard, USSR Zone 8
EAST	Eastern Australian Standard
EADT	Eastern Australian Daylight
GST	Guam Standard, USSR Zone 9
NZT	New Zealand
NZST	New Zealand Standard
NZDT	New Zealand Daylight
IDLE	International Date Line East

Translated Safety Warnings

This appendix contains the translations of the following safety warnings, which are included in this guide:

- Wrist Strap Warning, page E-1
- Restricted Area Warning, page E-2
- Qualified Personnel Warning, page E-3
- DC Protection, page E-4
- Disconnect Device Warning, page E-5
- Laser Radiation Warning, page E-6

Wrist Strap Warning

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.**

Waarschuwing **Draag tijdens deze procedure aardingspolsbanden om te vermijden dat de kaart beschadigd wordt door elektrostatische ontlading. Raak het achterbord niet rechtstreeks aan met uw hand of met een metalen werktuig, omdat u anders een elektrische schok zou kunnen oplopen.**

Varoitus **Käytä tämän toimenpiteen aikana maadoitettuja rannesuojia estääksesi kortin vaurioitumisen sähköstaattisen purkauksen vuoksi. Älä kosketa taustalevyä suoraan kädelläsi tai metallisella työkalulla sähköiskuvaaran takia.**

Attention **Lors de cette procédure, toujours porter des bracelets antistatiques pour éviter que des décharges électriques n'endommagent la carte. Pour éviter l'électrocution, ne pas toucher le fond de panier directement avec la main ni avec un outil métallique.**

Warnung **Zur Vermeidung einer Beschädigung der Karte durch elektrostatische Entladung während dieses Verfahrens ein Erdungsband am Handgelenk tragen. Bei Berührung der Rückwand mit der Hand oder einem metallenen Werkzeug besteht Elektroschockgefahr.**

Avvertenza **Durante questa procedura, indossare bracciali antistatici per evitare danni alla scheda causati da un'eventuale scarica elettrostatica. Non toccare direttamente il pannello delle connessioni, né con le mani né con un qualsiasi utensile metallico, perché esiste il pericolo di folgorazione.**

Advarsel **Bruk jordingsarmbånd under prosedyren for å unngå ESD-skader på kortet. Unngå direkte berøring av bakplanet med hånden eller metallverktøy, slik at di ikke får elektrisk støt.**

Aviso **Durante este procedimento e para evitar danos ESD causados à placa, use fitas de ligação à terra para os pulsos. Para evitar o risco de choque eléctrico, não toque directamente na parte posterior com a mão ou com qualquer ferramenta metálica.**

¡Advertencia! **Usartiras conectadas a tierra en las muñecas durante este procedimiento para evitar daños en la tarjeta causados por descargas electrostáticas. No tocar el plano posterior con las manos ni con ninguna herramienta metálica, ya que podría producir un choque eléctrico.**

Varning! **Använd jordade armbandsremmar under denna procedur för att förhindra elektrostatisk skada på kortet. Rör inte vid baksidan med handen eller metallverktyg då detta kan orsaka elektrisk stöt.**

Restricted Area Warning

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

Waarschuwing **Dit toestel is bedoeld voor installatie op plaatsen met beperkte toegang. Een plaats met beperkte toegang is een plaats waar toegang slechts door servicepersoneel verkregen kan worden door middel van een speciaal instrument, een slot en sleutel, of een ander veiligheidsmiddel, en welke beheerd wordt door de overheidsinstantie die verantwoordelijk is voor de locatie.**

Varoitus **Tämä laite on tarkoitettu asennettavaksi paikkaan, johon pääsy on rajoitettua. Paikka, johon pääsy on rajoitettua, tarkoittaa paikkaa, johon vain huoltohenkilöstö pääsee jonkin erikoistyökalun, lukkoon sopivan avaimen tai jonkin muun turvalaitteen avulla ja joka on paikasta vastuussa olevien toimivaltaisten henkilöiden valvoma.**

Attention **Cet appareil est à installer dans des zones d'accès réservé. Ces dernières sont des zones auxquelles seul le personnel de service peut accéder en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité. L'accès aux zones de sécurité est sous le contrôle de l'autorité responsable de l'emplacement.**

Warnung **Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Ein Bereich mit beschränktem Zutritt ist ein Bereich, zu dem nur Wartungspersonal mit einem Spezialwerkzeugs, Schloß und Schlüssel oder anderer Sicherheitsvorkehrungen Zugang hat, und der von dem für die Anlage zuständigen Gremium kontrolliert wird.**

Avvertenza **Questa unità deve essere installata in un'area ad accesso limitato. Un'area ad accesso limitato è un'area accessibile solo a personale di assistenza tramite un'attrezzo speciale, lucchetto, o altri dispositivi di sicurezza, ed è controllata dall'autorità responsabile della zona.**

Advarsel **Denne enheten er laget for installasjon i områder med begrenset adgang. Et område med begrenset adgang gir kun adgang til servicepersonale som bruker et spesielt verktøy, lås og nøkkel, eller en annen sikkerhetsanordning, og det kontrolleres av den autoriteten som er ansvarlig for området.**

Aviso **Esta unidade foi concebida para instalação em áreas de acesso restrito. Uma área de acesso restrito é uma área à qual apenas tem acesso o pessoal de serviço autorizado, que possua uma ferramenta, chave e fechadura especial, ou qualquer outra forma de segurança. Esta área é controlada pela autoridade responsável pelo local.**

¡Advertencia! **Esta unidad ha sido diseñada para instalarse en áreas de acceso restringido. Área de acceso restringido significa un área a la que solamente tiene acceso el personal de servicio mediante la utilización de una herramienta especial, cerradura con llave, o algún otro medio de seguridad, y que está bajo el control de la autoridad responsable del local.**

Varning! **Denna enhet är avsedd för installation i områden med begränsat tillträde. Ett område med begränsat tillträde får endast tillträdas av servicepersonal med ett speciellt verktyg, lås och nyckel, eller annan säkerhetsanordning, och kontrolleras av den auktoritet som ansvarar för området.**

Qualified Personnel Warning

Warning **Only trained and qualified personnel should be allowed to install or replace this equipment.**

Waarschuwing **Installatie en reparaties mogen uitsluitend door getraind en bevoegd personeel uitgevoerd worden.**

Varoitus **Ainoastaan koulutettu ja pätevä henkilökunta saa asentaa tai vaihtaa tämän laitteen.**

Avertissement **Tout installation ou remplacement de l'appareil doit être réalisé par du personnel qualifié et compétent.**

Achtung **Gerät nur von geschultem, qualifiziertem Personal installieren oder auswechseln lassen.**

Avvertenza **Solo personale addestrato e qualificato deve essere autorizzato ad installare o sostituire questo apparecchio.**

Advarsel **Kun kvalifisert personell med riktig opplæring bør montere eller bytte ut dette utstyret.**

Aviso **Este equipamento deverá ser instalado ou substituído apenas por pessoal devidamente treinado e qualificado.**

¡Atención! **Estos equipos deben ser instalados y reemplazados exclusivamente por personal técnico adecuadamente preparado y capacitado.**

Varning **Denna utrustning ska endast installeras och bytas ut av utbildad och kvalificerad personal.**

DC Protection

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a Listed and Certified fuse or circuit breaker 25A, minimum 60VDC, is used on all current-carrying conductors.**

Waarschuwing **Dit product moet worden beveiligd tegen kortsluiting (overstroom) door de installatie van het gebouw. Zorg dat er een goedgekeurde zekering of stroomonderbreker (25 A, minimaal 60 V gelijkstroom) op alle stroomdragende geleiders staat.**

Varoitus **Tämä laite käyttää rakennuksen oikosulkusuojausta (ylivirtasuojausta). Varmista, että kaikissa virtajohtimissa käytetään hyväksyttyjä sulakkeita tai katkaisijoita (25 A, vähintään 60 V tasavirtaa).**

Attention **La protection de ce produit contre les courts-circuits (surtensions) doit être assurée par la configuration électrique du bâtiment. Vérifiez que tous les conducteurs de courant sont équipés d'un fusible ou d'un disjoncteur de 25 A et d'un minimum de 60 V cc, normalisé et homologué.**

Warnung **Dieses Produkt erfordert Gebäude-Absicherung gegen Kurzschlüsse (Überstrom). Achten Sie darauf, daß auf allen stromführenden Leitern eine anerkannte, zugelassene Sicherung oder ein Stromkreisunterbrecher 25A, Minimum 60VDC, verwendet wird.**

Avvertenza **Questo prodotto fa affidamento sulla protezione dell'edificio contro i cortocircuiti. Accertarsi che un fusibile o interruttore di circuito omologato da 25 A, 60 V c.c. minimo, venga utilizzato su tutti i conduttori sotto tensione.**

Advarsel **Dette produktet er avhengig av bygningens installasjon for beskyttelse mot kortslutning (overspenning). Påse at en oppført og godkjent sikring eller strømbryter, på 25 A, minimum 60 volt likestrøm, brukes på alle strømførende ledere.**

Aviso **Este produto depende da instalação existente no edifício para a protecção contra curto-circuito (sobrecarga). Certifique-se de que um fusível ou disjuntor listado e certificado de 25 A, mínimo 60 VDC, seja utilizado em todos os condutores de transporte de corrente.**

Advertencia **Este producto cuenta con la instalación del edificio para la protección de cortocircuitos (sobrecorriente). Asegúrese de usar un fusible listado y certificado o cortacircuitos 25A, mínimo 60 V cc, en todos los conductores de corriente.**

Varning! **Denna produkt förlitar sig på byggnadens installation för skydd mot kortslutning (överström). Se till att en registrerad och certifierad säkring eller ett överspänningsskydd på 25 A, minst 60 V likström, används på alla strömförande ledare.**

Disconnect Device Warning

Warning **A readily accessible disconnect device must be incorporated in the building's installation wiring.**

Waarschuwing **Er moet in de installatiebedrading van het gebouw een gemakkelijk toegankelijke ontkoppelingsvoorziening aangebracht worden.**

Varoitus **Rakennuksen asennusjohdotukseen on asennettava helposti käytettävissä oleva katkaisin.**

Attention **L'installation électrique de l'immeuble doit inclure un dispositif de déconnexion facilement accessible.**

Warnung **Eine leicht zugängliche Trennvorrichtung muss in der Verdrahtung des Gebäudes eingebaut sein.**

Avvertenza **Il quadro dell'impianto elettrico dell'edificio deve essere provvisto di un dispositivo di sezionamento facilmente accessibile.**

Advarsel **Bygningens installerte ledningsnett skal inneholde en frakoblingsenhet som er lett tilgjengelig.**

Aviso **Um dispositivo de desconexão de fácil acesso deve ser incorporado a fiação do edifício.**

¡Advertencia! **En el cableado del edificio se debe incorporar un dispositivo de desconexión que se encuentre accesible fácilmente.**

Varning! **En lättillgänglig strömbrytare måste installeras i byggnadens ledningssystem.**

Laser Radiation Warning

Warning	Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.
Waarschuwing	Losgekoppelde of losgeraakte glasvezels of aansluitingen kunnen onzichtbare laserstraling produceren. Kijk niet rechtstreeks in de straling en gebruik geen optische instrumenten rond deze glasvezels of aansluitingen.
Varoitus	Irrotetuista kuiduista tai liittimistä voi tulla näkymätöntä lasersäteilyä. Älä tuijota säteitä tai katso niitä suoraan optisilla välineillä.
Attention	Les fibres ou connecteurs débranchés risquent d'émettre des rayonnements laser invisibles à l'œil. Ne regardez jamais directement les faisceaux laser à l'œil nu, ni d'ailleurs avec des instruments optiques.
Warnung	Unterbrochene Fasern oder Steckerverbindungenkönnen unsichtbare Laserstrahlung abgeben.. Blicken Sie weder mit bloßem Auge noch mit optischen Instrumenten direkt in Laserstrahlen.
Avvertenza	Le fibre ottiche ed i relativi connettori possono emettere radiazioni laser. I fasci di luce non devono mai essere osservati direttamente o attraverso strumenti ottici.
Advarsel	Det kan forekomme usynlig laserstråling fra fiber eller kontakter som er frakoblet. Stirr ikke direkte inn i strålene eller se på dem direkte gjennom et optisk instrument.
Aviso	Radiação laser invisível pode ser emitida de conectores ou fibras desconectadas. Não olhe diretamente para os feixes ou com instrumentos ópticos.
¡Advertencia!	Es posible que las fibras desconectadas emitan radiación láser invisible. No fije la vista en los rayos ni examine éstos con instrumentos ópticos.
Varning!	Osynlig laserstrålning kan avges från frånkopplade fibrer eller kontaktdon. Rikta inte blicken in i strålar och titta aldrig direkt på dem med hjälp av optiska instrument.

INDEX

A

add-snmp-com command **4-2**
add-snmp-mgr command **4-3**
alarm command **4-4**
alarm connections
  troubleshooting **5-2**
alarm contacts
  setting **2-7**
alarm out connector
  description (table) **1-9**
alarms
  description **1-9, 5 to 7**
  displaying gain mean levels **4-11**
  displaying gain trigger levels **4-12**
  displaying input mean levels **4-20**
  displaying input trigger levels **4-21**
  displaying lists of **4-4**
  internal case temperature mean **4-65**
    modifying **4-47**
  internal case temperature trigger **4-66**
    modifying **4-48**
  mean and trigger levels
    displaying **4-59**
  optical input mean **4-42**
  optical input trigger **4-43**
  output signal mean **4-45**
  output signal power mean **4-32**
  output signal power trigger **4-33**
  output signal trigger **4-46**
  resetting to defaults **4-38**
  signal gain mean **4-40**
  signal gain trigger **4-41**
  types **3-4**
attenuation
  ring topologies and **1-6**
automatic gain control
  adding wavelengths and **1-7**
  dropping wavelengths and **1-7**
  network design features **1-3**

B

BER problems
  preventing **1-7**
  transient suppression **1-4**
bit error rate problems. See BER problems
boot-bank command **4-5**
boot banks
  displaying or modifying **4-5**
boot modes
  displaying or modifying **4-9**

C

CLEI codes
  displaying **4-63**
commands
  displaying list of **4-15**
  displaying syntax **4-15**
  installation **2-7**
  introductory **2-7**
  operational **2-7**
common language equipment identifier codes. See CLEI codes

configuring
basic system **3-2**
SNMP **3-4**
Telnet **3-3**
console port
configuring **3-2**
connector
description (table) **1-9**

D

DC input power
connecting **2-4 to 2-5**
grounding the chassis **2-5**
specifications (table) **B-2**
troubleshooting **5-1**
DC power input terminals
description (table) **1-9**
defaults
resetting alarms to **4-38**
resetting system and network settings **4-39**
del-smnp-mgr command **4-8**
del-snmp-com **4-7**

E

electrical specifications
table **B-1**
Ethernet
displaying or modifying boot modes **4-9**
Ethernet connection
troubleshooting **5-2**
ethmode command **4-9**

F

firmware
displaying build dates **4-63**
displaying update dates **4-63**
displaying versions **4-63**
Flash banks
downloading and burning images **4-61**
frame ground attachment
description (table) **1-9**
front panel
features (table) **1-8**
figure **1-8**
FTP
burning images to Flash banks **4-61**
downloading images **4-61**

G

gain
displaying **4-10**
mean levels **4-11**
trigger levels **4-12**
gain command **4-10**
gain flatness
network design features **1-3**
gainmean command **4-11**
gaintrig command **4-12**
get-snmp-com command **4-13**
get-snmp-mgr command **4-14**
grounding the chassis **2-5**

H

help command **4-15**
hide-trap command **4-17**
host-config command **4-18**
host name
displaying or modifying **4-18**

I

input
  mean levels **4-20**
  trigger levels **4-21**
input connector
  description (table) **1-8**
input power
  displaying **4-19**
inpwr command **4-19**
inpwrmean command **4-20**
inpwrtrig command **4-21**
installation checklist
  description **2-2**
internal case temperature mean
  displaying **4-65**
internal case temperature trigger
  displaying **4-66**
IP addresses
  displaying or modifying **4-22**
  pinging **4-34**
ip-config command **4-22**
IP default gateways
  displaying or modifying **4-22**
IP subnet masks
  displaying or modifying **4-22**

L

LAN connector
  description (table) **1-9**
LEDs
  description **1-9**
  description (table)
  front panel (table) **5-3**
  troubleshooting **5-2**
light emitting diodes. See LEDs.
local area network connector. See LAN connector.
local serial communication
  equipment checklist (table) **3-1**
  set up **3-2**
logout
  timeout interval **4-68**
logout command **4-23**

M

MAC addresses
  displaying **4-63**
mean levels
  displaying **4-59**
mechanical specifications
  table **B-2**
Media Access Control address See MAC address
model numbers
  displaying **4-63**

N

neighbor-in command **4-24**
neighbor-out command **4-26**
network design features
  automatic gain control **1-3**
  gain flatness **1-3**
  network management
    console ports **1-5**
    SNMP **1-5**
  noise figure **1-5**
  output power **1-5**
  transient suppression **1-4**
  variable gain **1-4**
network management
  console ports **1-5**
  SNMP **1-5**
network time protocol See NTP

noise figure
  network design features **1-5**
NTP
  modifying or displaying status **4-28**
ntp command **4-28**
NTP IP addresses
  modifying or displaying **4-29**
ntp-ip command **4-29**

O

optical input
  mean levels **4-20**
  trigger levels **4-21**
optical input mean
  modifying **4-42**
optical input power
  displaying **4-19**
optical input trigger
  modifying **4-43**
optical output power
  displaying **4-30**
optical power management
  ring topologies and **1-7**
optical signal-to-noise ratio. See OSNR.
optical specifications
  table **1-2**
optoutpwr command **4-30**
OSNR
  cascaded EDFAs and (table) **1-4**
  noise figure **1-5**
output connector
  description (table) **1-8**
output monitor connector
  description (table) **1-8**
output power
  displaying **4-30**
  network design features **1-5**
output signal mean
  modifying **4-45**
output signal power
  displaying **4-31**
output signal power mean level
  displaying **4-32**
output signal power trigger
  displaying **4-33**
output signal trigger
  modifying **4-46**
outsigpwr command **4-31**
outsigpwrmean command **4-32**
outsigpwrtrig command **4-33**

P

passwords
  modifying master **4-44**
  modifying user **4-51**
  recovery **5-3**
  setting **3-2**
ping command **4-34**
point-to-point topologies **1-5**
power connecting. See DC input power connecting
power supply
  voltage **4-35, 4-36**
ps1 command **4-35**
ps2 command **4-36**

R

reboot
  software **4-37**
reboot command **4-37**
remote communication
  set up **3-3**
resetmeantrig command **4-38**

restore command **4-39**
ring topologies **1-6**

S

serial numbers
  displaying **4-63**
setgainmean command **4-40**
setgaintrig command **4-41**
setinpwrmean command **4-42**
setinpwrtrig command **4-43**
set-master-pwd command **4-44**
setoutsigpwrmean command **4-45**
setoutsigpwrtrig command **4-46**
settempmean command **4-47**
settemptrig command **4-48**
set-time command **4-49**
set-user-pwd command **4-51**
sgain command **4-52**
show-trap command **4-52**
signal gain mean
  modifying **4-40**
signal gain trigger
  modifying **4-41**
simple network management protocol. See SNMP.
sinpwr command **4-54**
site log
  creating **2-1**
SNMP
  adding community strings **4-2**
  adding or modifying an SNMP manager entry **4-3**
  configuring **3-4**
  deleting community strings **4-7**
  deleting SNMP manager entries **4-8**
  displaying community strings **4-13**
  displaying SNMP manager entries **4-14**
software
  burning images to Flash banks **4-61**
  downloading images via FTP or TFTP **4-61**
  reboot **4-37**
soutsigpwr command **4-55**
span loss **1-7**
specifications
  DC input power (table) **B-2**
  electrical (table) **B-1**
  mechanical (table) **B-2**
  optical (table) **1-2**
sps1 command **4-56**
sps2 command **4-57**
spump command **4-58**
status command **4-59**
stemp command **4-60**
sw-download command **4-61**
sys-info command **4-63**
system information
  displaying **4-63**

T

Telnet
  configuring **3-3**
temp command **4-64**
temperature
  internal case temperature
    displaying **4-64**
  internal case temperature mean
    displaying **4-65**
    modifying **4-47**
  internal case temperature trigger
    displaying **4-66**
    modifying **4-48**
tempmean command **4-65**
temptrig command **4-66**

TFTP
burning images to Flash banks **4-61**
downloading images **4-61**
time
displaying **4-67**
displaying or modifying **4-49**
time command **4-67**
timeout command **4-68**
timeout interval
displaying or modifying **4-68**
timezone
displaying or modifying **4-69**
timezone command **4-69**
time zones
codes (table) **D-1**
tools
required **2-2**
transient suppression
network design features **1-4**
traps
displaying trap messages **4-52**
hiding trap messages **4-17**
trigger levels
displaying **4-59**
troubleshooting
alarm connections **5-2**
basic diagnostic procedures **5-1**
DC input power **5-1**
Ethernet connection **5-2**
LEDs **5-2**
password recovery **5-3**

V

variable gain
network design features **1-4**
variable optical attenuation. See VOA.
VOA **1-4**