CISCO SYSTEMS

Cisco ONS 15501 User Guide

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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	Technical Specifications	Lists the technical specifications for the Cisco ONS 15501.
Appendix B	Connector Pinouts	Illustrates the pin configuration of the RS-232 DB-9 type connector and the Alarm Out RJ-45 connector.
Appendix C	Time Zone Codes	Lists time zones and their correlating abbreviations, which are used when setting the time of the system.
Appendix D	Translated Safety Warnings	Lists the warnings in this guide and translates them into different languages.

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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.**

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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.

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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.

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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

The following sections explain how to obtain documentation from Cisco Systems.

World Wide Web

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

http://www.cisco.com

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

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Inquiries to Cisco TAC are categorized according to the urgency of the issue:

*   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.

Which Cisco TAC resource you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

Cisco TAC Web Site

The Cisco TAC Web Site allows you 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 Web Site, go to the following URL:

http://www.cisco.com/tac

All customers, partners, and resellers who have a valid Cisco services contract have complete access to the technical support resources on the Cisco TAC Web Site. The Cisco TAC Web Site requires 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 the following URL to register:

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

If you cannot resolve your technical issues by using the Cisco TAC Web Site, and you are a Cisco.com registered user, you can open a case online by using the TAC Case Open tool at the following URL:

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

If you have Internet access, it is recommended that you open P3 and P4 cases through the Cisco TAC Web Site.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses issues that are classified as priority level 1 or priority level 2; 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 will automatically open a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to the following 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). In addition, please have available your service agreement number and your product serial number.

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 1-2
- Cisco ONS 15501 Applications, page 1-5
- Cisco ONS 15501 Front Panel, page 1-7

Product Description

The Cisco ONS 15501 contains an 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. For other technical specifications, see Appendix A, "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	17 dB - 7 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 17-13 dB; <2.0 dB for 7-13 dB.

Key Features

The Cisco ONS 15501 has the following key features:

- Constant flat gain of 17dB 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 0 to -29 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 1-2, assuming a flat input to the first Cisco ONS 15501.

Table 1-2   Relative OSNR in Cascading EDFAs

Number of Cascaded EDFAs	Number of Wavelengths	Worst Case OSNR at 17 dB Gain[1] at Gain Minimum	OSNR, 23 dB Gain[2]
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. 0 dBm total input power.

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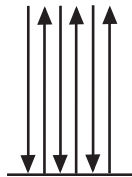
In general, EDFAs in a ring topology should be placed so they maintain the power level at the receiver, as well as the OSNR, of each channel. In this case, EDFAs serving as postamplifiers are located at nodes 2 and 4.

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 band (bands A and B) and the pass-through band (bands C and D) are attenuated equally. As a result, the power level of the pass-through band is much lower than that of the add band. This significantly degrades the OSNR of the pass-through band, 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 band than for the pass-through band. 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 1-3 explains the front panel features.

Figure 1-2   Cisco ONS 15501 Front Panel

DC connectors shown
with cover removed
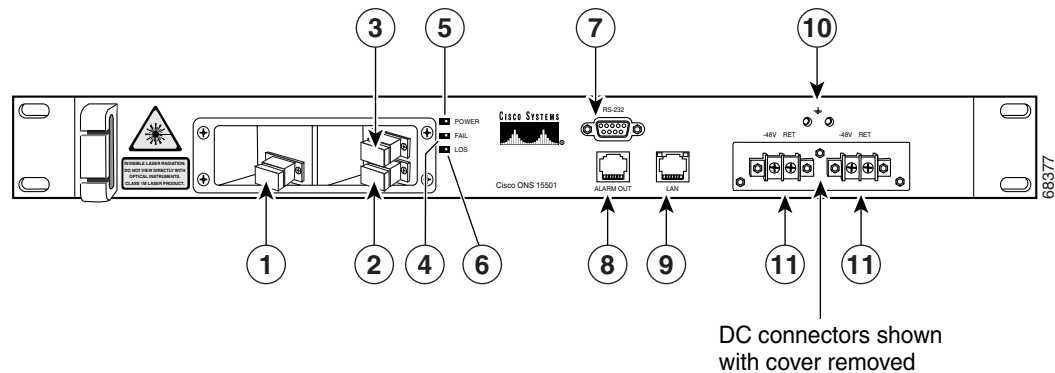
Table 1-3   Cisco ONS 15501 Front Panel Features

Feature	Description
1. 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.)
2. 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.)
3. 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.)
4. Fail (red LED)	Indicates a major failure, such as the pump laser, power supply, or the temperature level.
5. Power (green LED)	Indicates the unit is receiving normal operating power.
6. LOS (loss of signal) (yellow LED)	Indicates a loss of input signal when the input signal falls below the LOS threshold.
7. 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 B, "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.
8. Alarm out (connector)	Provides four pairs of dry contacts for an optional external alarm-monitoring system. Normally has open contacts and uses an RJ-45 type connector. (See Appendix B, "Connector Pinouts.")
9. 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.
10. Frame ground attachment	Provides tapped-screw mounting holes for attaching a frame ground lug and wiring.
11. 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: An internal power supply is within tolerance (the Cisco ONS 15501 is powered normally).
    - Off: An internal power supply is not present or is out 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.

C H A P T E R

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.

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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 (8 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		

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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
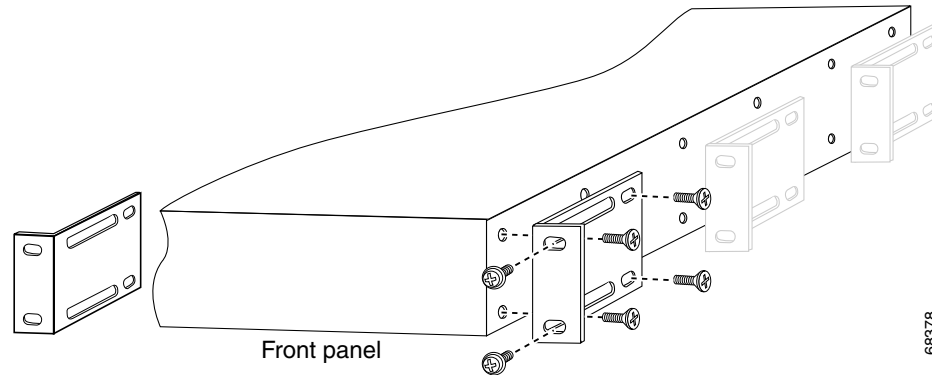
Front panel

⚠ **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.**

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**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

DC connectors shown with cover removed
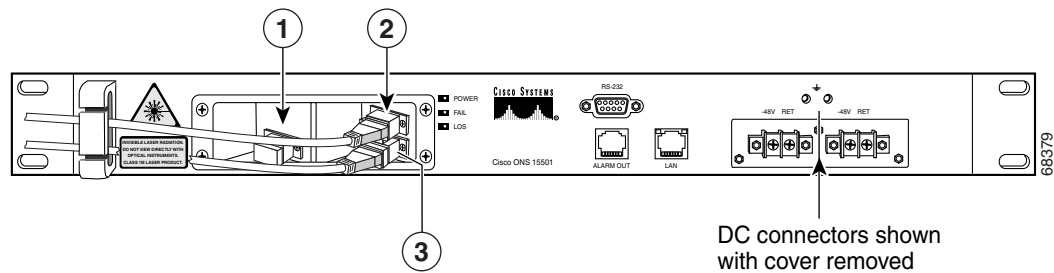
1	Output monitor	3	Output connector
2	Input connector		

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 necesary, 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.

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⚠ **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.

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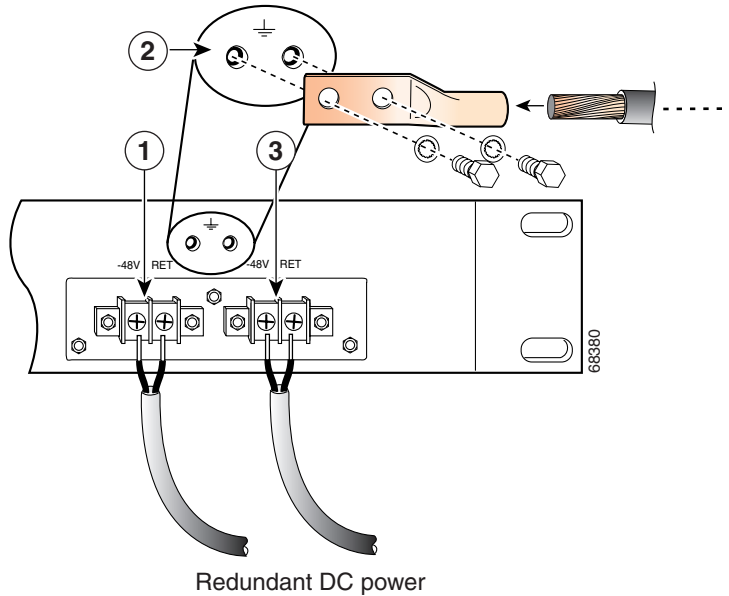
Redundant DC power

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 B, "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.

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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 1-8.

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, firmware build date, and firmware update 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 and output attenuation

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C H A P T E R 3

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 B, "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   Connect the DB-9 end of the RS-232 data cable to the COM port on the PC or laptop.

Step 2   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 1-7.)

Step 3   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 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 user password **edfa**, or the default master password **edfa1**.

Step 2   Enter **host-config** *hostname* to set the host name. The maximum allowed length for *hostname* is 16 characters.

Step 3   Enter **ip-config** *ip-addr ip-subnet-mask def-gateway-ip* to set the IP address, subnetmask, 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 C, "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 user 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 **ftp-burn** *server-IP username password path filename flashbank* to FTP the image from the FTP server and burn it to the specified Flash bank. Make sure that the FTP 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.

Step 4   Once the **ftp-burn** 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

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 using ping 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

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.

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 1-7 for additional information.) 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 power supply or power supply out of range
- Alarm 2—Failure in the pump laser bias or pump laser temperature (overheating)
- Alarm 3—Loss of input signal or input signal power below threshold

Note   The default state of the alarm contacts is Normally Open. Depending on which fault condition occurs, specific alarm contacts close and cause the corresponding Cisco ONS 15501 LEDs to turn on. (See the "Cisco ONS 15501 LED Alarm Definitions" section on page 1-8 for additional information.)

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-

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*

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 22.

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 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 in the system.
get-snmp-com	Displays an SNMP community string in the system.

add-snmp-mgr

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

> **add-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. The Cisco ONS 15501 accepts a maximum of 10 IP managers.

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

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

Related Commands	Command	Description
	del-snmp-mgr	Deletes an SNMP manager entry on the system.
	get-snmp-mgr	Displays an SNMP manager entry on the system.

alarm

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

alarm

Syntax Description   This command has no other 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 a list of alarms in the system.

```
edfa > alarm
Alarm: Temperature - Unacceptable
Alarm: Equipment -
Alarm: Input Signal - Low
```

boot-bank

To display the active and planned boot bank or 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 has been 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
```

del-snmp-com

To delete an SNMP community string on 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 on 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 on the system.

del-snmp-mgr

To delete an SNMP manager entry on 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 on 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 100 Mbps; **2** for half-duplex 100 Mbps; **3** for full-duplex 10 Mbps; or **4** for half-duplex 10 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 **3** for full-duplex 10 Mbps.

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

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 other 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 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 other 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 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 other 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 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   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 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 on the system.

get-snmp-mgr

To display the SNMP (Simple Network Management Protocol) manager entries on the system, use the **get-snmp-mgr** command.

get-snmp-mgr [*manager-ip*]

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

Use this command to display SNMP manager configuration information for a single entry or for all entries on the system.

Examples

The following example shows how to display the IP values, community strings and gateways for a given IP entry.

```
edfa > get-snmp-mgr 10.1.2.71
  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.
del-snmp-mgr	Deletes an SNMP manager entry.

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.

Examples

The following example shows how to access a list of available user commands.

```
edfa > help
     STATUS: Gain, GainMean, GainTrig, InPwr, InPwrMean, InPwrTrig, OptOutPwr,
             OutAttn, OutSigPwr, OutSigPwrMean, OutSigPwrTrig, Temp, TempMean,
             TempTrig, alarm, ps1, ps2, status

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

     SYSTEM: add-snmp-com, add-snmp-mgr, del-snmp-com, del-snmp-mgr,
             get-snmp-com, get-snmp-mgr, help, host-config, ip-config, logout,
             ntp, ntp-ip, set-master-pwd, set-time, set-user-pwd, sys-info,
             time, timeout

MAINTENANCE: boot-bank, ftp-burn, hide-trap, reboot, show-trap
```

The following example shows how to display the syntax for an individual command.

```
edfa > help help
USAGE: help [ <command> ]
If there is a command specified, the corresponding help for that command will be printed.
Without any command specified, a list of all commands will be shown.
```

hide-trap

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

hide-trap

Syntax Description   This command has no other 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. |

Defaults

Displays the current host name

Command Types

Changes configuration

Command Modes

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

Command History

Release	Modification
EDFA 1.0	This command was introduced.

Examples

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

```
edfa > host-config
edfa
```

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 other 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 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 other 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 dBm.

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

```
edfa > inpwrmean
-48.00 (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 other 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 IP default 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 default gateway is 0.0.0.1.

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 display the IP address, IP subnet mask and IP default gateway.

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

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

ntp

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

ntp [*status*]

Syntax Description

status	Specified as **on** to enable the NTP, or as **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

Command History

Release	Modification
EDFA 1.0	This command was introduced.

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, 209.128.68.147
```

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

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 other 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 dBm.

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

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

outattn

To display the measured output attenuation, use the **outattn** command.

outattn

Syntax Description   This command has no other 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 attenuation is displayed in dB.

Examples   The following example shows how to display the measured output attenuation.

```
edfa > outattn
0.00 (dB)
```

outsigpwr

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

outsigpwr

Syntax Description   This command has no other 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 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 other 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 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 other 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 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.

Defaults

None

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 will default to **5**. The system will accept a maximum count of **20**.

If the ping is issued from a Telnet session, control-c will stop the ping. If the ping is issued from a serial port, control-c will 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 number one, use the **ps1** command.

ps1

Syntax Description   This command has no other 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 number one.

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

ps2

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

> **ps2**

Syntax Description   This command has no other 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 number two.

```
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 other arguments or keywords.

Defaults   The system reboots using the same Flash image as previously used.

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 other 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 for signal gain and alarm mean level is 17.50 dB.

The manufacturer's default setting for gain alarm trigger level is 1.00 dB.

The manufacturer's default setting for optical input alarm mean level is -29.00 dBm.

The manufacturer's default setting for optical input alarm trigger level is 1.00 dBm.

The manufacturer's default setting for output signal alarm mean level is 2.00 dBm.

The manufacturer's default setting for output signal alarm trigger level is 20.00 dBm.

The manufacturer's default setting for internal case temperature alarm mean level is 30°C.

The manufacturer's default setting for internal case temperature alarm trigger level is 30°C.

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.

Command	Description
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 other 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.

The command resets the user password to **edfa**, and the master password to **edfa1**.

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

The user is recommended to reboot the system after utilizing this command; the default settings are not activated until the system is rebooted.

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 is measured in 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 will be ignored and have 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 dB. The system accepts a minimum value of 1 dB and a maximum value of 17.5 dB. If a value entered falls outside of this acceptable range, the command will be ignored and have 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.

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 dBm. The system accepts a minimum value of -40 dBm and a maximum value of 0 dBm. If a value entered falls outside of this acceptable range, the command will be ignored and have 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 dB. The system accepts a minimum value of 1 dB and a maximum value of 20 dB. If a value entered falls outside of this acceptable range, the command will be ignored and have 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 other 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 dBm. The system accepts a minimum value of 0 dBm and a maximum value of 40 dBm. If a value entered falls outside of this acceptable range, the command will be ignored and have 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 dB. The system accepts a minimum value of 0.5 dB and a maximum value of 40 dB. If a value entered falls outside of this acceptable range, the command will be ignored and have 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 Celcius. The system accepts a minimum value of 10°C and a maximum value of 90°C. If a value entered falls outside of this acceptable range, the command will be ignored and have 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 Celcius. The system accepts a minimum value of 0.5°C and a maximum value of 50°C. If a value entered falls outside of this acceptable range, the command will be ignored and have 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 C, "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 will accept entries with a capitalized first character, such as Mon, or entries entirely in lower case, such as mon.

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

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

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

See Appendix C, "Time Zone Codes," for a list of time zones and correlating abbreviations. The system will accept entries entirely in upper case, such as PST, or entirely in lower case, such as pst.

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

```
edfa > set-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 timezone 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 other 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 User Password:
New Password:
New Password:
```

Related Commands

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

show-trap

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

show-trap

Syntax Description   This command has no other 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
show-trap	Hides the trap message.

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 and output attenuation, use the **status** command.

status

Syntax Description   This command has no other 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
==================================================================
                            measured        mean        trigger

            Input Power       -46.03       -28.00          2.00
   Optical Output Power       -28.53
            Temperature        85.61        29.00         29.00
           Optical Gain        17.50        17.00          2.00
      Output Attenuation        0.00
     Output Signal Power      -28.53         1.00         18.00
==================================================================
```

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 *mode server-ip* [*username password path*] *filename flashbank* [*passive*]

Syntax Description

mode	Specifies the desired mode. It should be designated as **ftp** or **tftp**.
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. This is not required for tftp.
password	Specifies the password of the user. This is not required for tftp.
path	Specifies the path of the directory that contains the image. This is not required for tftp.
filename	Specifies the name of the image file.
flashbank	Specifies the Flash bank where the image is to be burned. It should be designated as **1**, **2**, or **3**. When burning a new image, the Flash bank specified cannot be the current Flash bank.
passive	Specifies the string for ftp across a firewall. This is not required for ftp.

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 download an image via ftp and burn it 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 via tftp and burn it to a specified Flash bank.

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

sys-info

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

sys-info

Syntax Description   This command has no other 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 introducedintroduced.

Examples   The following example shows how to display basic system information.

```
edfa > sys-info
        CLEI: unassigned
        Amplifier model number: ONS15520
        Serial number: kim420
        MAC Address: 00016447101F
        Firmware version: 0.7
        Firmware build date: Thu Nov 29 11:15:59 PST 2001
        Firmware update date: to be implemented-1
         Software in various Banks:     1)linux.bin.233
                                        2)/linux.bin.90.cisco
                                        3)/linux.bin.90.cisco
```

temp

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

temp

Syntax Description   This command has no other 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 other 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 other 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 other 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 C, "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 timezone 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 seconds

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 timezone 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 C, "Time Zone Codes," for a list of time zones and correlating abbreviations.

Examples

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

```
edfa > timezone
GMT
```

The following example shows how to modify the timezone 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.

■ timezone

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 5-3

Basic Diagnostic Procedures

When a problem occurs over the network, use the following three 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.

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.

To verify the Ethernet connection, follow these steps:

Step 1   Make sure that the RJ-45 connector is in good working condition; then 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.

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 B, "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 shows the Cisco ONS 15501 front panel.

Table 5-1   Cisco ONS 15501 Front Panel LEDs

LED	Status	Description
Power	Green	Power is on.
Fail	Red	Component failure.
LOS	Yellow	Signal is detected.

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.

Password Recovery

If you have forgotten your passwords, 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.

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.)

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 A-1
- Cisco ONS 15501 Electrical Specifications, page A-1
- Cisco ONS 15501 Mechanical Specifications, page A-2
- Cisco ONS 15501 DC Input Power Requirements, page A-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 A-1.

Table A-1 Cisco ONS 15501 Electrical Specifications

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

Cisco ONS 15501 Mechanical Specifications

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

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

Table A-3   DC Input Power Supply Specifications

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

Connector Pinouts

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

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

RS-232
(DB-9 connector, female)

[1] NC
[2] Receive data (RxD)
[3] Transmit data (TxD)
[4] NC
[5] Ground

NC [6]
Request to Send (RTS) [7]
Clear to Send (CTS) [8]
[9]

Alarm out
(RJ-45 connector)

4 3 2 1

68381

Pair 4
Pair 3
Pair 2
Pair 1
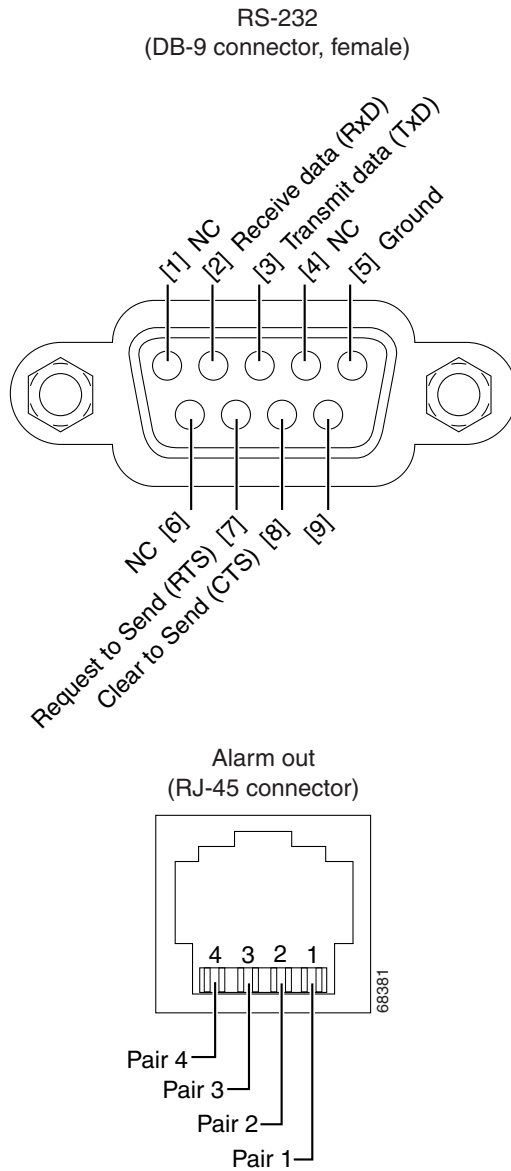
Pair 1: Loss of input power supply or power supply out of range

Pair 2: Failure in the pump laser bias or pump laser temperature

Pair 3: Loss of input signal or input signal power below threshold

Pair 4: Undefined

Time Zone Codes

Table C-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 C-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 C-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 D-1
- Restricted Area Warning, page D-2
- Qualified Personnel Warning, page D-3
- DC Protection, page D-4
- Disconnect Device Warning, page D-5
- Laser Radiation Warning, page D-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 laser-straling produceren. Kijk niet rechtstreeks in de straling en gebruik geen optische in-strumenten 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 in-visibles 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.**

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June 24, 2004

June 24, 2004

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