Prisma II
High Density EDFA Modules
Installation Guide

For Your Safety

Explanation of Warning and Caution Icons

Avoid personal injury and product damage! Do not proceed beyond any symbol until you fully understand the indicated conditions.

The following warning and caution icons alert you to important information about the safe operation of this product:

⚠ **You may find this symbol in the document that accompanies this product. This symbol indicates important operating or maintenance instructions.**

⚡ **You may find this symbol affixed to the product. This symbol indicates a live terminal where a dangerous voltage may be present; the tip of the flash points to the terminal device.**

⏚ **You may find this symbol affixed to the product. This symbol indicates a protective ground terminal.**

⏛ **You may find this symbol affixed to the product. This symbol indicates a chassis terminal (normally used for equipotential bonding).**

♨ **You may find this symbol affixed to the product. This symbol warns of a potentially hot surface.**

☀ **You may find this symbol affixed to the product and in this document. This symbol indicates an infrared laser that transmits intensity-modulated light and emits invisible laser radiation or an LED that transmits intensity-modulated light.**

Important

Please read this entire guide. If this guide provides installation or operation instructions, give particular attention to all safety statements included in this guide.

Notices

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Contents

Important Safety Instructions

Read and Retain Instructions

Carefully read all safety and operating instructions before operating this equipment, and retain them for future reference.

Follow Instructions and Heed Warnings

Follow all operating and use instructions. Pay attention to all warnings and cautions in the operating instructions, as well as those that are affixed to this equipment.

Terminology

The terms defined below are used in this document. The definitions given are based on those found in safety standards.

Service Personnel - The term *service personnel* applies to trained and qualified individuals who are allowed to install, replace, or service electrical equipment. The service personnel are expected to use their experience and technical skills to avoid possible injury to themselves and others due to hazards that exist in service and restricted access areas.

User and Operator - The terms *user* and *operator* apply to persons other than service personnel.

Ground(ing) and Earth(ing) - The terms *ground(ing)* and *earth(ing)* are synonymous. This document uses ground(ing) for clarity, but it can be interpreted as having the same meaning as earth(ing).

Electric Shock Hazard

This equipment meets applicable safety standards.

> ⚠ **WARNING:**
>
> **To reduce risk of electric shock, perform only the instructions that are included in the operating instructions. Refer all servicing to qualified service personnel only.**

Electric shock can cause personal injury or even death. Avoid direct contact with dangerous voltages at all times. The protective ground connection, where provided, is essential to safe operation and must be verified before connecting the power supply.

Know the following safety warnings and guidelines:

■ Dangerous Voltages

  – Only qualified service personnel are allowed to perform equipment installation or replacement.

  – Only qualified service personnel are allowed to remove chassis covers and access any of the components inside the chassis.

■ Grounding

  – Do not violate the protective grounding by using an extension cable, power cable, or autotransformer without a protective ground conductor.

  – Take care to maintain the protective grounding of this equipment during service or repair and to re-establish the protective grounding before putting this equipment back into operation.

Installation Site

When selecting the installation site, comply with the following:

■ **Protective Ground** - The protective ground lead of the building's electrical installation should comply with national and local requirements.

■ **Environmental Condition** – The installation site should be dry, clean, and ventilated. Do not use this equipment where it could be at risk of contact with water. Ensure that this equipment is operated in an environment that meets the requirements as stated in this equipment's technical specifications, which may be found on this equipment's data sheet.

Installation Requirements

⚠ **WARNING:**

Allow only qualified service personnel to install this equipment. The installation must conform to all local codes and regulations.

Equipment Placement

⚠ **WARNING:**

Avoid personal injury and damage to this equipment. An unstable mounting surface may cause this equipment to fall.

To protect against equipment damage or injury to personnel, comply with the following:

■ Install this equipment in a restricted access location.

■ Do not install near any heat sources such as radiators, heat registers, stoves, or other equipment (including amplifiers) that produce heat.

■ Place this equipment close enough to a mains AC outlet to accommodate the length of this equipment's power cord.

■ Route all power cords so that people cannot walk on, place objects on, or lean objects against them. This may pinch or damage the power cords. Pay particular attention to power cords at plugs, outlets, and the points where the power cords exit this equipment.

■ Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with this equipment.

■ Make sure the mounting surface or rack is stable and can support the size and weight of this equipment.

■ The mounting surface or rack should be appropriately anchored according to manufacturer's specifications. Ensure this equipment is securely fastened to the mounting surface or rack where necessary to protect against damage due to any disturbance and subsequent fall.

Ventilation

This equipment has openings for ventilation to protect it from overheating. To ensure equipment reliability and safe operation, do not block or cover any of the ventilation openings. Install the equipment in accordance with the manufacturer's instructions.

Rack Mounting Safety Precautions

Mechanical Loading

Make sure that the rack is placed on a stable surface. If the rack has stabilizing devices, install these stabilizing devices before mounting any equipment in the rack.

⚠ **WARNING:**

Avoid personal injury and damage to this equipment. Mounting this equipment in the rack should be such that a hazardous condition is not caused due to uneven mechanical loading.

Reduced Airflow

When mounting this equipment in the rack, do not obstruct the cooling airflow through the rack. Be sure to mount the blanking plates to cover unused rack space. Additional components such as combiners and net strips should be mounted at the back of the rack, so that the free airflow is not restricted.

> ⚠️ **CAUTION:**
>
> **Installation of this equipment in a rack should be such that the amount of airflow required for safe operation of this equipment is not compromised.**

Elevated Operating Ambient Temperature

Only install this equipment in a humidity- and temperature-controlled environment that meets the requirements given in this equipment's technical specifications.

> ⚠️ **CAUTION:**
>
> **If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install this equipment in an environment compatible with the manufacturer's maximum rated ambient temperature.**

Handling Precautions

When moving a cart that contains this equipment, check for any of the following possible hazards:

> ⚠️ **WARNING:**
>
> **Avoid personal injury and damage to this equipment! Move any equipment and cart combination with care. Quick stops, excessive force, and uneven surfaces may cause this equipment and cart to overturn.**

- Use caution when moving this equipment/cart combination to avoid injury from tip-over.

- If the cart does not move easily, this condition may indicate obstructions or cables that may need to be disconnected before moving this equipment to another location.

- Avoid quick stops and starts when moving the cart.

- Check for uneven floor surfaces such as cracks or cables and cords.

Grounding

This section provides instructions for verifying that the equipment is properly grounded.

Safety Plugs (USA Only)

This equipment may be equipped with either a 3-terminal (grounding-type) safety plug or a 2-terminal (polarized) safety plug. The wide blade or the third terminal is provided for safety. Do not defeat the safety purpose of the grounding-type or polarized safety plug.

To properly ground this equipment, follow these safety guidelines:

- **Grounding-Type Plug** - For a 3-terminal plug (one terminal on this plug is a protective grounding pin), insert the plug into a grounded mains, 3-terminal outlet.

  Note: This plug fits only one way. If this plug cannot be fully inserted into the outlet, contact an electrician to replace the obsolete 3-terminal outlet.

- **Polarized Plug** - For a 2-terminal plug (a polarized plug with one wide blade and one narrow blade), insert the plug into a polarized mains, 2-terminal outlet in which one socket is wider than the other.

  Note: If this plug cannot be fully inserted into the outlet, try reversing the plug. If the plug still fails to fit, contact an electrician to replace the obsolete 2-terminal outlet.

Grounding Terminal

If this equipment is equipped with an external grounding terminal, attach one end of an 18-gauge wire (or larger) to the grounding terminal; then, attach the other end of the wire to a ground, such as a grounded equipment rack.

Safety Plugs (European Union)

- **Class I Mains Powered Equipment** – Provided with a 3-terminal AC inlet and requires connection to a 3-terminal mains supply outlet via a 3-terminal power cord for proper connection to the protective ground.

  Note: The equipotential bonding terminal provided on some equipment is not designed to function as a protective ground connection.

- **Class II Mains Powered Equipment** – Provided with a 2-terminal AC inlet that may be connected by a 2-terminal power cord to the mains supply outlet. No connection to the protective ground is required as this class of equipment is provided with double or reinforced and/or supplementary insulation in addition to the basic insulation provided in Class I equipment.

  Note: Class II equipment, which is subject to EN 50083-1, is provided with a chassis mounted equipotential bonding terminal. See the section titled **Equipotential Bonding** for connection instructions.

Equipotential Bonding

If this equipment is equipped with an external chassis terminal marked with the IEC 60417-5020 chassis icon (⊥), the installer should refer to CENELEC standard EN 50083-1 or IEC standard IEC 60728-11 for correct equipotential bonding connection instructions.

AC Power

Important: If this equipment is a Class I equipment, it must be grounded.

■ If this equipment plugs into an outlet, the outlet must be near this equipment, and must be easily accessible.

■ Connect this equipment only to the power sources that are identified on the equipment-rating label normally located close to the power inlet connector(s).

■ This equipment may have two power sources. Be sure to disconnect all power sources before working on this equipment.

■ If this equipment **does not** have a main power switch, the power cord connector serves as the disconnect device.

■ Always pull on the plug or the connector to disconnect a cable. Never pull on the cable itself.

■ Unplug this equipment when unused for long periods of time.

Connection to -48 V DC/-60 V DC Power Sources

If this equipment is DC-powered, refer to the specific installation instructions in this manual or in companion manuals in this series for information on connecting this equipment to nominal -48 V DC/-60 V DC power sources.

Circuit Overload

Know the effects of circuit overloading before connecting this equipment to the power supply.

⚠ **CAUTION:**

Consider the connection of this equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Refer to the information on the equipment-rating label when addressing this concern.

General Servicing Precautions

> ⚠️ **WARNING:**
>
> **Avoid electric shock! Opening or removing this equipment's cover may expose you to dangerous voltages.**

> ⚠️ **CAUTION:**
>
> **These servicing precautions are for the guidance of qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.**

Be aware of the following general precautions and guidelines:

- **Servicing** - Servicing is required when this equipment has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into this equipment, this equipment has been exposed to rain or moisture, does not operate normally, or has been dropped.

- **Wristwatch and Jewelry** - For personal safety and to avoid damage of this equipment during service and repair, do not wear electrically conducting objects such as a wristwatch or jewelry.

- **Lightning** - Do not work on this equipment, or connect or disconnect cables, during periods of lightning.

- **Labels** - Do not remove any warning labels. Replace damaged or illegible warning labels with new ones.

- **Covers** - Do not open the cover of this equipment and attempt service unless instructed to do so in the instructions. Refer all servicing to qualified service personnel only.

- **Moisture** - Do not allow moisture to enter this equipment.

- **Cleaning** - Use a damp cloth for cleaning.

- **Safety Checks** - After service, assemble this equipment and perform safety checks to ensure it is safe to use before putting it back into operation.

Electrostatic Discharge

Electrostatic discharge (ESD) results from the static electricity buildup on the human body and other objects. This static discharge can degrade components and cause failures.

Take the following precautions against electrostatic discharge:

■ Use an anti-static bench mat and a wrist strap or ankle strap designed to safely ground ESD potentials through a resistive element.

■ Keep components in their anti-static packaging until installed.

■ Avoid touching electronic components when installing a module.

Fuse Replacement

To replace a fuse, comply with the following:

■ Disconnect the power before changing fuses.

■ Identify and clear the condition that caused the original fuse failure.

■ Always use a fuse of the correct type and rating. The correct type and rating are indicated on this equipment.

Batteries

This product may contain batteries. Special instructions apply regarding the safe use and disposal of batteries:

Safety

■ Insert batteries correctly. There may be a risk of explosion if the batteries are incorrectly inserted.

■ Do not attempt to recharge 'disposable' or 'non-reusable' batteries.

■ Please follow instructions provided for charging 'rechargeable' batteries.

■ Replace batteries with the same or equivalent type recommended by manufacturer.

■ Do not expose batteries to temperatures above 100°C (212°F).

Disposal

■ The batteries may contain substances that could be harmful to the environment

■ Recycle or dispose of batteries in accordance with the battery manufacturer's instructions and local/national disposal and recycling regulations.

■ The batteries may contain perchlorate, a known hazardous substance, so special handling and disposal of this product might be necessary. For more information about perchlorate and best management practices for perchlorate-containing substance, see www.dtsc.ca.gov/hazardouswaste/perchlorate.

Modifications

This equipment has been designed and tested to comply with applicable safety, laser safety, and EMC regulations, codes, and standards to ensure safe operation in its intended environment. Refer to this equipment's data sheet for details about regulatory compliance approvals.

Do not make modifications to this equipment. Any changes or modifications could void the user's authority to operate this equipment.

Modifications have the potential to degrade the level of protection built into this equipment, putting people and property at risk of injury or damage. Those persons making any modifications expose themselves to the penalties arising from proven non-compliance with regulatory requirements and to civil litigation for compensation in respect of consequential damages or injury.

Accessories

Use only attachments or accessories specified by the manufacturer.

Electromagnetic Compatibility Regulatory Requirements

This equipment meets applicable electromagnetic compatibility (EMC) regulatory requirements. Refer to this equipment's data sheet for details about regulatory compliance approvals. EMC performance is dependent upon the use of correctly shielded cables of good quality for all external connections, except the power source, when installing this equipment.

■ Ensure compliance with cable/connector specifications and associated installation instructions where given elsewhere in this manual.

Otherwise, comply with the following good practices:

■ Multi-conductor cables should be of single-braided, shielded type and have conductive connector bodies and backshells with cable clamps that are conductively bonded to the backshell and capable of making 360° connection to the cable shielding. Exceptions from this general rule will be clearly stated in the connector description for the excepted connector in question.

■ Ethernet cables should be of single-shielded or double-shielded type.

■ Coaxial cables should be of the double-braided shielded type.

EMC Compliance Statements

Where this equipment is subject to USA FCC and/or Industry Canada rules, the following statements apply:

FCC Statement for Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

Industry Canada - Industrie Canadiene Statement

This apparatus complies with Canadian ICES-003.
Cet appareil est confome à la norme NMB-003 du Canada.

CENELEC/CISPR Statement with Respect to Class A Information Technology Equipment

This is a Class A equipment. In a domestic environment this equipment may cause radio interference in which case the user may be required to take adequate measures.

Laser Safety

Introduction

This equipment contains an infrared laser that transmits intensity-modulated light and emits invisible radiation.

Warning: Radiation

⚠ **WARNING:**

- **Avoid personal injury! Use of controls, adjustments, or procedures other than those specified herein may result in hazardous radiation exposure.**

- **Avoid personal injury! The laser light source on this equipment (if a transmitter) or the fiber cables connected to this equipment emit invisible laser radiation. Avoid direct exposure to the laser light source.**

- **Avoid personal injury! Viewing the laser output (if a transmitter) or fiber cable with optical instruments (such as eye loupes, magnifiers, or microscopes) may pose an eye hazard.**

- Do not apply power to this equipment if the fiber is unmated or unterminated.

- Do not stare into an unmated fiber or at any mirror-like surface that could reflect light emitted from an unterminated fiber.

- Do not view an activated fiber with optical instruments such as eye loupes, magnifiers, or microscopes.

- Use safety-approved optical fiber cable to maintain compliance with applicable laser safety requirements.

Warning: Fiber Optic Cables

⚠ **WARNING:**

Avoid personal injury! Qualified service personnel may only perform the procedures in this manual. Wear safety glasses and use extreme caution when handling fiber optic cables, particularly during splicing or terminating operations. The thin glass fiber core at the center of the cable is fragile when exposed by the removal of cladding and buffer material. It easily fragments into glass splinters. Using tweezers, place splinters immediately in a sealed waste container and dispose of them safely in accordance with local regulations.

Safe Operation for Software Controlling Optical Transmission Equipment

If this manual discusses software, the software described is used to monitor and/or control ours and other vendors' electrical and optical equipment designed to transmit video, voice, or data signals. Certain safety precautions must be observed when operating equipment of this nature.

For equipment specific safety requirements, refer to the appropriate section of the equipment documentation.

For safe operation of this software, refer to the following warnings.

⚠️ **WARNING:**

- **Ensure that all optical connections are complete or terminated before using this equipment to remotely control a laser device. An optical or laser device can pose a hazard to remotely located personnel when operated without their knowledge.**

- **Allow only personnel trained in laser safety to operate this software. Otherwise, injuries to personnel may occur.**

- **Restrict access of this software to authorized personnel only.**

- **Install this software in equipment that is located in a restricted access area.**

Laser Power and Warning Labels

Warning Labels

The following labels are located on this product.

Laser Warning Label *

CAUTION: CLASS 3R
INVISIBLE LASER
RADIATION
WHEN OPEN AVOID
EXPOSURE TO BEAM

Test Point: -20dB

Laser Classification Label

INVISIBLE LASER
RADIATION DO NOT
VIEW DIRECTLY WITH
OPTICAL INSTRUMENTS.
CLASS 1M
LASER PRODUCT

* Located on host module (part number 4008281) only.

Product and Laser Information Label

CISCO.

5030 Sugarloaf Parkway
Lawrenceville, GA 30044-2869

Part Number: 4037222
Model: P2-HD-EDFA-22-SA
Manufactured: January, 2011
Manufacturing Site: SC
Assembled in: USA

This device complies with part 15 of the FCC rules. Operation
is subject to the following two conditions: (1) This device may
not cause harmful interference, and (2) This device must accept
any interference received, including interference that may cause
undesired operation.

INVISIBLE LASER RADIATION
DO NOT VIEW DIRECTLY
WITH OPTICAL INSTRUMENTS.
CLASS 1M LASER PRODUCT
PER IEC 60825-1 EDITION 1.2 2001
200mW MAXIMUM OUTPUT AT 1550nm

ATTENTION
Observe precautions for
handling electrostatic
sensitive devices

This product complies with 21 CFR 1040.10 except for deviations
pursuant to Laser Notice No. 50 dated July 26, 2001

Location of Labels on Equipment

The following illustrations display the location of warning labels on this equipment.

Laser Classification Label

Laser Warning Label
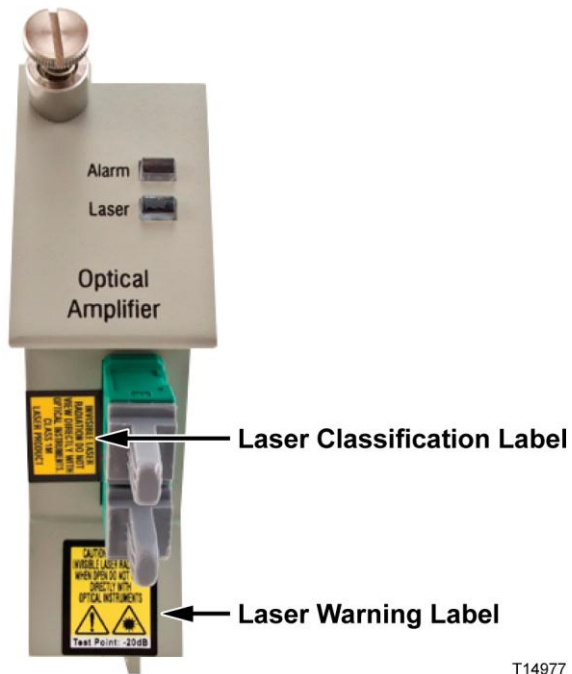
T14977

Product and Laser Information Label

T14978

1

Module Introduction

Overview

This chapter describes the Prisma® II High Density (HD) Erbium Doped Fiber Amplifier (EDFA) modules.

Purpose

This guide provides information about the HD EDFA modules. This chapter describes the front and back panels, and provides a setup summary for the modules.

Who Should Use This Document

This document is intended for authorized service personnel who have experience working with similar equipment. The service personnel should have appropriate background and knowledge to complete the procedures described in this document.

Qualified Personnel

Only appropriately qualified and skilled personnel should attempt to install, operate, maintain, and service this product.

⚠️ **WARNING:**

Only appropriately qualified and skilled personnel should attempt to install, operate, maintain, and service this product. Otherwise, personal injury or equipment damage may occur.

Scope

This guide discusses the following topics.

- Description of the HD EDFA modules

- Installation procedures

- Operation using the Intelligent Communications Interface Module (ICIM)

- Operation using the Local Craft Interface (LCI)

- Maintenance and troubleshooting

Document Version

This is the second release of this guide (Rev B).

In This Chapter

High Density EDFA Description

Prisma II HD EDFAs are plug-in modules for the Prisma II and Prisma II XD platforms. These modules are part of the Prisma II optical network, an advanced transmission system designed to optimize network architectures and increase reliability, scalability, and cost-effectiveness.

The HD EDFA installs into a Prisma II XD chassis directly, or into a standard Prisma II chassis by means of a host module that accepts up to two Prisma II high-density application modules.

HD EDFA modules are used for the amplification of broadcast signals, which are carried by a single optical channel anywhere between 1530 nm and 1565 nm. Gain-Flattened EDFAs are used for the amplification of multiple optical channels carrying narrowcast signals. For uniformity of performance, gain-flattened EDFAs need to be gain flattened in the designated operating wavelength range between 1536 nm and 1562 nm.

The following table lists the types and models of High Density EDFA modules available.

Type	Model
High Density (HD) EDFA	P2-HD-EDFA-17-SA
	P2-HD-EDFA-20-SA
	P2-HD-EDFA-22-SA
High Density Gain-Flattened (HD-GF) EDFA	P2-HD-EDFA-GF-17L-SA
	P2-HD-EDFA-GF-17H-SA
	P2-HD-EDFA-GF-20L-SA
	P2-HD-EDFA-GF-20H-SA
High Density Variable Gain-Flattened (HD-VGF) EDFA	P2-HD-EDFA-VGF-17-SA
	P2-HD-EDFA-VGF-20-SA
	P2-HD-EDFA-VGF-21-SA

High Density EDFA Features

The high density EDFA has the following features.

- Front panel green light emitting diode (LED) to indicate operating status

- Front panel red LED to indicate alarm status

- SC/APC connectors

- Plug-and-play capability

- Compatible with ICIM, LCI software, and ROSA® software

- Blind-mate DC power connection

High Density EDFA Operation

EDFA modules are single-wide, single output devices. The EDFA is monitored and controlled via LCI or ICIM.

High Density EDFA Optical Output

The optical output connectors are SC.

Laser Warning
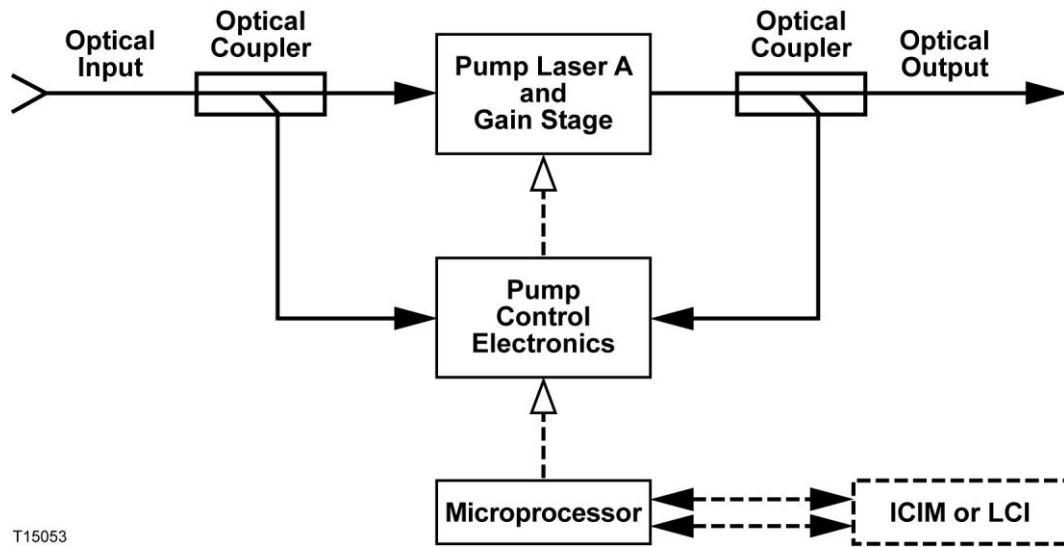
⚠ **WARNING:**

Avoid damage to your eyes! Do not look into any optical connector while the system is active. Even if the unit is off, there may still be hazardous optical levels present.

High Density EDFA Block Diagram

Optical Input — Optical Coupler — Pump Laser A and Gain Stage — Optical Coupler — Optical Output

Pump Control Electronics

Microprocessor — ICIM or LCI

T15053

High Density EDFA Front and Back Panel

High Density EDFA Illustration
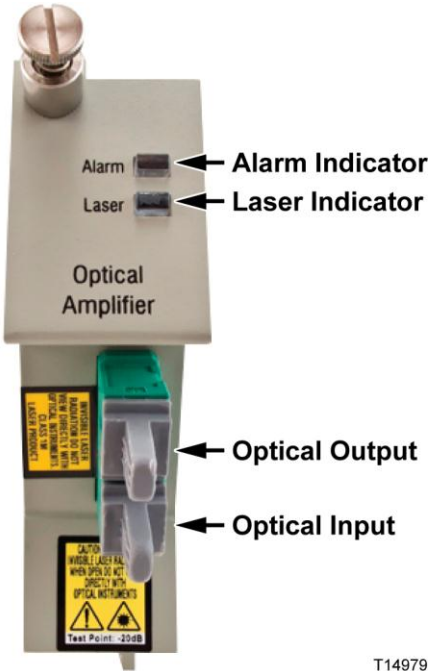
T14979

High Density EDFA Front Panel Features

Part	Function
Alarm Indicator	Illuminates or blinks when an alarm condition occurs.
Laser Indicator	Illuminates when laser is active.
Optical Output	Connects the output signal to the optical cable.
Optical Input	For optical input signal.

Back Panel Connectors

Blind-mate connectors make it easy to install this module. The push-on connector on the back of the module mates with the back plane bus connector inside the chassis. This 55-pin connector provides the following facilities.

- Electrical power input connection

- Alarm communications connections

- Status-monitoring communications

- Communications and control connections

The ESD guide pin near the bottom of the back panel serves as both a guide pin and an ESD ground connection. The length of the pin ensures that ground is the first electrical connection made as the module is inserted, and the last connection to be broken as the module is removed.

High Density EDFA Power and Gain Setup

The procedure for setting up the HD EDFA power and gain varies depending on which mode you operate the module. This section describes both procedures.

Power and Gain Terminology

The following table explains common terminology used in this section.

Term	Abbreviation	Definition
Constant Power Mode		In constant power mode, the total output power from the amplifier is set via the LCI or ICIM. Once set, any change to the input signal within the specification window results in no change to the output power. **Note:** In this mode, the composite gain, gain per wavelength, and output power per wavelength may not stay constant.
Constant Gain Mode		In constant gain mode, the gain of the optical amplifier is set via the LCI or ICIM. Once the gain is set, the amplifier automatically adjusts to any change to the composite input power or to an individual wavelength being dropped or added. This adjustment results in a corresponding change to the composite output power. **Note:** In this mode, constant composite output power is not maintained, but constant gain per wavelength, constant composite gain, and constant output power per wavelength are maintained.
Constant Power Flat Mode		Constant power flat mode is only available with variable gain-flattened EDFAs. In this mode, operation is similar to constant power mode except that the internal variable optical attenuator (VOA) is engaged. As a result, the output of the EDFA maintains channel flatness against changes in input power as long as the composite gain is within the specified gain range for the model. **Note:** In constant power flat mode, gain and power per wavelength are not maintained, but WDM channel flatness is maintained.
Input Power per Wavelength	PIN/λ	Amount of power present at a particular wavelength at the input to the amplifier.

Term	Abbreviation	Definition
Composite Input Power	PIN/C	Sum of the power present in all individual wavelengths at the input to the amplifier.
Output Power per Wavelength	POUT/λ	Amount of power present at a particular wavelength at the output to the amplifier.
Composite Output Power	POUT/C	Sum of the power present in all individual wavelengths at the output of the amplifier.
Composite Gain	GC	Amount of gain derived from the composite input power to the amplifier and the composite output power from the amplifier.

High Density (HD) EDFA Setup

HD EDFAs are optimized for single optical channel application to achieve best performance for analog video signals. For single channel operation, the operating wavelength range is from 1530 nm to 1565 nm. Constant power operation mode is usually desired for the application. Constant gain mode is available as an option.

Constant Power Mode (Default)

Constant power mode is the default operating mode for HD EDFAs.

HD EDFAs also have an attenuation feature with a 3 dB attenuation range. For example, for the 17 dBm amplifier, an attenuation of 1 dB, 2 dB, or 3 dB can be set to achieve the output power of 16 dBm, 15 dBm, or 14 dBm, respectively. See the following table.

Model	Composite Output Power (POUT/C)
P2-HD-EDFA-17-SA	**Default:** 17 dBm **Optional:** 16 dBm, 15 dBm, 14 dBm
P2-HD-EDFA-20-SA	**Default:** 20 dBm **Optional:** 19 dBm, 18 dBm, 17 dBm
P2-HD-EDFA-22-SA	**Default:** 22 dBm **Optional:** 21 dBm, 20 dBm, 19 dBm

Constant Gain Mode (Optional)

HD EDFAs can optionally be operated in constant gain mode. The mode is set through the LCI or ICIM. The following table shows the operating conditions in constant gain mode and an example of input and output ranges for a 16 channel system.

Note: The models listed below are not optimized for multi-channel applications that require good channel flatness. Channel flatness is not guaranteed.

Model	Set gain (GC)	Composite Input PIN/C ($1\lambda \rightarrow 16\lambda$)	Composite Output (POUT/C) ($1\lambda \rightarrow 16\lambda$)
P2-HD-EDFA-17-SA	10 dB	-5 dBm $\rightarrow$ 7 dBm	5 dBm $\rightarrow$ 17 dBm
	11 dB	-6 dBm $\rightarrow$ 6 dBm	5 dBm $\rightarrow$ 17 dBm
	12 dB	-7 dBm $\rightarrow$ 5 dBm	5 dBm $\rightarrow$ 17 dBm
	13 dB	-8 dBm $\rightarrow$ 4 dBm	5 dBm $\rightarrow$ 17 dBm
	14 dB	-9 dBm $\rightarrow$ 3 dBm	5 dBm $\rightarrow$ 17 dBm
P2-HD-EDFA-20-SA	13 dB	-5 dBm $\rightarrow$ 7 dBm	8 dBm $\rightarrow$ 20 dBm
	14 dB	-6 dBm $\rightarrow$ 6 dBm	8 dBm $\rightarrow$ 20 dBm
	15 dB	-7 dBm $\rightarrow$ 5 dBm	8 dBm $\rightarrow$ 20 dBm
	16 dB	-8 dBm $\rightarrow$ 4 dBm	8 dBm $\rightarrow$ 20 dBm
	17 dB	-9 dBm $\rightarrow$ 3 dBm	8 dBm $\rightarrow$ 20 dBm
P2-HD-EDFA-22-SA	15 dB	-5 dBm $\rightarrow$ 7 dBm	10 dBm $\rightarrow$ 22 dBm
	16 dB	-6 dBm $\rightarrow$ 6 dBm	10 dBm $\rightarrow$ 22 dBm
	17 dB	-7 dBm $\rightarrow$ 5 dBm	10 dBm $\rightarrow$ 22 dBm
	18 dB	-8 dBm $\rightarrow$ 4 dBm	10 dBm $\rightarrow$ 22 dBm
	19 dB	-9 dBm $\rightarrow$ 3 dBm	10 dBm $\rightarrow$ 22 dBm

At a set gain condition, the HD EDFA maintains the gain as long as the output power is below the power limit.

For example, for the model P2-HD-EDFA-17-SA:

■ If the set gain is 12 dB when input power is in the range from -7 dBm to 5 dBm, the output power will be in the range from 5 dBm to 17 dBm.

■ If the input is larger than 5 dBm, the output power cannot go beyond 17 dBm to maintain the 12 dB gain. Instead, it will be operated at 17 dBm output.

■ If the input goes below the specified range, the HD EDFA still tries to maintain the set gain.

■ If the composite input power goes too low, the monitoring accuracy will degrade, resulting in poor output power stability.

High Density Gain-Flattened (HD-GF) EDFA Setup

Gain-Flattened EDFAs are optimized for multiple optical channel application to achieve uniform performance over the operation band digital video or data signals. The designed bandwidth is about 26 nm from 1536 nm to 1562 nm, which can accommodate a maximum 32 optical channels (ITU20 - ITU51) at 100 GHz spacing. Constant gain operation mode is usually desired for the application because of the possibility that optical channels can be added or dropped. Constant power mode is available as an option.

Constant Gain Mode (Default)

Four models of gain-flattened EDFAs are available to suit applications that require different output power and gain. Each of the gain-flattened EDFA models has a default gain setting. The gain-flattened EDFAs can be operated at other gain values within the default gain range of ± 2 dB. However, EDFAs operated at the default gain condition can achieve the most uniform performance for all optical channels across the band.

The following information is required to select a gain-flattened EDFA for a multi-channel system:

■ Maximum number of optical channels for the designed system: N =

■ Input power per channel: PIN/λ =

■ Required output power per channel: $POUT/\lambda$ =

■ Required gain: $G = POUT/\lambda$ / PIN/λ =

With the above information, use the following table to select an appropriate EDFA.

Maximum Channel Number	Required Output Per Channel	Required Gain	EDFA Model
32	2 dBm	5 dB - 9 dB	P2-HD-EDFA-GF-17L-SA
		10 dB - 14 dB	P2-HD-EDFA-GF-17H-SA
	5 dBm	8 dB - 12 dB	P2-HD-EDFA-GF-20L-SA
		13 dB - 17 dB	P2-HD-EDFA-GF-20H-SA
24	3.2 dBm	5 dB - 9 dB	P2-HD-EDFA-GF-17L-SA
		10 dB - 14 dB	P2-HD-EDFA-GF-17H-SA
	6.2 dBm	8 dB - 12 dB	P2-HD-EDFA-GF-20L-SA
		13 dB - 17 dB	P2-HD-EDFA-GF-20H-SA
16	5 dBm	5 dB - 9 dB	P2-HD-EDFA-GF-17L-SA
		10 dB - 14 dB	P2-HD-EDFA-GF-17H-SA

Maximum Channel Number	Required Output Per Channel	Required Gain	EDFA Model
	8 dBm	8 dB - 12 dB	P2-HD-EDFA-GF-20L-SA
		13 dB - 17 dB	P2-HD-EDFA-GF-20H-SA
8	8 dBm	5 dB - 9 dB	P2-HD-EDFA-GF-17L-SA
		10 dB - 14 dB	P2-HD-EDFA-GF-17H-SA
	11 dBm	8 dB - 12 dB	P2-HD-EDFA-GF-20L-SA
		13 dB - 17 dB	P2-HD-EDFA-GF-20H-SA

At a set gain condition, the EDFA maintains the gain as long as the output power is below the power limit.

For example, for the model P2-HD-EDFA-17L-SA:

- If the set gain is 7 dB when input power is in the range from -5 dBm to 10 dBm, the output power will be in the range from 2 dBm to 17 dBm.

- If the input is larger than 10 dBm, the output power cannot go beyond 17 dBm to maintain the 7 dB gain. Instead, it will be operated at 17 dBm output.

- If the input goes below the specified range, the EDFA still tries to maintain the set gain.

- If the composite input power goes too low, the monitoring accuracy will degrade, resulting in poor output power stability.

The following tables list the input and output power ranges in a few of the most common systems: 8 wavelength, 16 wavelength, 24 wavelength, and 32 wavelength. Systems with other wavelengths can also be calculated.

8 Wavelength System

An 8 wavelength system is designed to have a maximum capacity of eight optical channels. The actual number of optical channels at the deployment can be eight or less.

Model	Set Gain (GC)	Composite Input (PIN/C) (1λ ® 8λ)	Composite Output (POUT/C) (1λ ® 8λ)
P2-HD-EDFA-GF-17L-SA	5 dB	3 dBm → 12 dBm	8 dBm → 17 dBm
	6 dB	2 dBm → 11 dBm	8 dBm → 17 dBm
	7 dB *	**1 dBm → 10 dBm**	**8 dBm → 17 dBm**
	8 dB	0 dBm → 9 dBm	8 dBm → 17 dBm
	9 dB	-1 dBm → 8 dBm	8 dBm → 17 dBm

Model	Set Gain (GC)	Composite Input (PIN/C) (1λ ® 8λ)	Composite Output (POUT/C) (1λ ® 8λ)
P2-HD-EDFA-GF-17H-SA	10 dB	-2 dBm → 7 dBm	8 dBm → 17 dBm
	11 dB	-3 dBm → 6 dBm	8 dBm → 17 dBm
	12 dB *	**-4 dBm → 5 dBm**	**8 dBm → 17 dBm**
	13 dB	-5 dBm → 4 dBm	8 dBm → 17 dBm
	14 dB	-6 dBm → 3 dBm	8 dBm → 17 dBm
P2-HD-EDFA-GF-20L-SA	8 dB	3 dBm → 12 dBm	11 dBm → 20 dBm
	9 dB	2 dBm → 11 dBm	11 dBm → 20 dBm
	10 dB *	**1 dBm → 10 dBm**	**11 dBm → 20 dBm**
	11 dB	0 dBm → 9 dBm	11 dBm → 20 dBm
	12 dB	-1 dBm → 8 dBm	11 dBm → 20 dBm
P2-HD-EDFA-GF-20H-SA	13 dB	-2 dBm → 7 dBm	11 dBm → 20 dBm
	14 dB	-3 dBm → 6 dBm	11 dBm → 20 dBm
	15 dB *	**-4 dBm → 5 dBm**	**11 dBm → 20 dBm**
	16 dB	-5 dBm → 4 dBm	11 dBm → 20 dBm
	17 dB	-6 dBm → 3 dBm	11 dBm → 20 dBm

* Default gain setting

16 Wavelength System

A 16 wavelength system is designed to have a maximum capacity of 16 optical channels. The actual number of optical channels at the deployment can be 16 or less.

Model	Set Gain (GC)	Composite Input (PIN/C) (1λ ® 16λ)	Composite Output (POUT/C) (1λ ® 16λ)
P2-HD-EDFA-GF-17L-SA	5 dB	0 dBm → 12 dBm	5 dBm → 17 dBm
	6 dB	-1 dBm → 11 dBm	5 dBm → 17 dBm
	7 dB *	**-2 dBm → 10 dBm**	**5 dBm → 17 dBm**
	8 dB	-3 dBm → 9 dBm	5 dBm → 17 dBm
	9 dB	-4 dBm → 8 dBm	5 dBm → 17 dBm
P2-HD-EDFA-GF-17H-SA	10 dB	-5 dBm → 7 dBm	5 dBm → 17 dBm
	11 dB	-6 dBm → 6 dBm	5 dBm → 17 dBm
	12 dB *	**-7 dBm → 5 dBm**	**5 dBm → 17 dBm**
	13 dB	-8 dBm → 4 dBm	5 dBm → 17 dBm
	14 dB	-9 dBm → 3 dBm	5 dBm → 17 dBm

Model	Set Gain (GC)	Composite Input (PIN/C) (1λ ® 16λ)	Composite Output (POUT/C) (1λ ® 16λ)
P2-HD-EDFA-GF-20L-SA	8 dB	0 dBm → 12 dBm	8 dBm → 20 dBm
	9 dB	-1 dBm → 11 dBm	8 dBm → 20 dBm
	10 dB *	**-2 dBm → 10 dBm**	**8 dBm → 20 dBm**
	11 dB	-3 dBm → 9 dBm	8dBm → 20 dBm
	12 dB	-4 dBm → 8 dBm	8 dBm → 20 dBm
P2-HD-EDFA-GF-20H-SA	13 dB	-5 dBm → 7 dBm	8 dBm → 20 dBm
	14 dB	-6 dBm → 6 dBm	8 dBm → 20 dBm
	15 dB *	**-7 dBm → 5 dBm**	**8 dBm → 20 dBm**
	16 dB	-8 dBm → 4 dBm	8dBm → 20 dBm
	17 dB	-9 dBm → 3 dBm	8 dBm → 20 dBm

* Default gain setting

24 Wavelength System

A 24 wavelength system is designed to have a maximum capacity of 24 optical channels. The actual number of optical channels at the deployment can be 24 or less.

Model	Set Gain (Gc)	Composite Input (PIN/C) (1λ ® 24λ)	Composite Output (POUT/C) (1λ ® 24λ)
P2-HD-EDFA-GF-17L-SA	5 dB	-1.8 dBm → 12 dBm	3.2 dBm →17 dBm
	6 dB		3.2 dBm → 17 dBm
	7 dB *	-2.8 dBm → 11 dBm	**3.2 dBm → 17 dBm**
	8 dB	**-3.8 dBm → 10 dBm**	3.2 dBm → 17 dBm
	9 dB	-4.8 dBm → 9 dBm	3.2 dBm → 17 dBm
		-5.8 dBm → 8 dBm	
P2-HD-EDFA-GF-17H-SA	10 dB	-6.8 dBm → 7 dBm	3.2 dBm →17 dBm
	11 dB	-7.8 dBm → 6 dBm	3.2 dBm→17 dBm
	12 dB *	**-8.8 dBm → 5 dBm**	**3.2 dBm → 17 dBm**
	13 dB	-9.8 dBm →4 dBm	3.2 dBm → 17 dBm
	14 dB	-10.8 dBm →3 dBm	3.2 dBm → 17 dBm

Model	Set Gain (Gc)	Composite Input (PIN/C) (1λ ® 24λ)	Composite Output (POUT/C) (1λ ® 24λ)
P2-HD-EDFA-GF-20L-SA	8 dB 9 dB **10 dB *** 11 dB 12 dB	-1.8 dBm → 12 dBm -2.8 dBm → 11 dBm **-3.8 dBm → 10 dBm** -4.8 dBm → 9 dBm -5.8 dBm → 8 dBm	6.2 dBm →20 dBm 6.2 dBm → 20 dBm **6.2 dBm → 20 dBm** 6.2 dBm → 20 dBm 6.2 dBm → 20 dBm
P2-HD-EDFA-GF-20H-SA	13 dB 14 dB **15 dB *** 16 dB 17 dB	-6.8 dBm → 7 dBm -7.8 dBm → 6 dBm **-8.8 dBm → 5 dBm** -9.8 dBm → 4 dBm -10.8 dBm → 3 dBm	6.2 dBm → 20 dBm 6.2 dBm → 20 dBm **6.2 dBm → 20 dBm** 6.2 dBm→ 20 dBm 6.2 dBm → 20 dBm

* Default gain setting

32 Wavelength System

A 32 wavelength system is designed to have a maximum capacity of 32 optical channels. The actual number of optical channels at the deployment can be 32 or less.

Model	Set Gain (Gc)	Composite Input (PIN/C) (1λ ® 32λ)	Composite Output (POUT/C) (1λ ® 32λ)
P2-HD-EDFA-GF-17L-SA	5 dB 6 dB **7 dB *** 8 dB 9 dB	-3 dBm → 12 dBm -4 dBm → 11 dBm **-5 dBm → 10 dBm** -6 dBm → 9 dBm -7 dBm → 8 dBm	2 dBm → 17 dBm 2 dBm → 17 dBm **2 dBm → 17 dBm** 2 dBm → 17 dBm 2 dBm → 17 dBm
P2-HD-EDFA-GF-17H-SA	10 dB 11 dB **12 dB *** 13 dB 14 dB	-8 dBm → 7 dBm -9 dBm → 6 dBm **-10 dBm → 5 dBm** -11 dBm → 4 dBm -12 dBm → 3 dBm	2 dBm →17 dBm 2 dBm →17 dBm **2 dBm → 17 dBm** 2 dBm → 17 dBm 2 dBm → 17 dBm

Model	Set Gain (Gc)	Composite Input (PIN/C) (1λ ⊛ 32λ)	Composite Output (POUT/C) (1λ ⊛ 32λ)
P2-HD-EDFA-GF-20L-SA	8 dB	-3 dBm → 12 dBm	5 dBm → 20 dBm
	9 dB	-4 dBm → 11 dBm	5 dBm → 20 dBm
	10 dB *	**-5 dBm → 10 dBm**	**5 dBm → 20 dBm**
	11 dB	-6 dBm → 9 dBm	5 dBm → 20 dBm
	12 dB	-7 dBm → 8 dBm	5 dBm → 20 dBm
P2-HD-EDFA-GF-20H-SA	13 dB	-8 dBm → 7 dBm	5 dBm → 20 dBm
	14 dB	-9 dBm → 6 dBm	5 dBm → 20 dBm
	15 dB *	**-10 dBm → 5 dBm**	**5 dBm → 20 dBm**
	16 dB	-11 dBm → 4 dBm	5 dBm → 20 dBm
	17 dB	-12 dBm → 3 dBm	5 dBm → 20 dBm

* Default gain setting

Constant Power Mode (Optional)

Gain-Flattened EDFAs can optionally be operated in Constant Power mode.

By default, the output power is the nominal output power for the gain-flattened EDFA, which is equal to the composite output power at fully loaded condition in the Constant Gain mode.

Model	Composite Output Power (POUT/C)	Note
P2-HD-EDFA-GF-17L-SA	**Default:** 17 dBm **Optional:** 16 dBm, 15 dBm, 14 dBm	PIN/C >5 dBm
P2-HD-EDFA-GF-17H-SA	**Default:** 17 dBm **Optional:** 16 dBm, 15 dBm, 14 dBm	PIN/C >0 dBm
P2-HD-EDFA-GF-20L-SA	**Default:** 20 dBm **Optional:** 19 dBm, 18 dBm, 17 dBm	PIN/C >5 dBm
P2-HD-EDFA-GF-20H-SA	**Default:** 20 dBm **Optional:** 19 dBm, 18 dBm, 17 dBm	PIN/C >0 dBm

Note: The attenuator feature is available for gain-flattened EDFAs when they are set to Constant Power mode. The attenuation range is 3 dB.

High Density EDFA 40WL Description

Variable Gain-Flattened EDFAs can be operated in full C-band, which accommodates at least 40 optical channels at 100 GHz spacing. The variable gain feature is achieved by using a mid-stage variable attenuator to balance the gain across the entire operating bandwidth when the amplifier is set to a gain value in the specified range. Constant Gain mode operation is required for this application because of the possibility of optical channels being added or dropped. Constant Power mode and constant power flat mode are available as options.

Constant Gain Mode (Default)

Constant Gain mode is the default operating mode for variable gain-flattened EDFAs. The gain of the EDFAs can be set to the values shown in the following table in 1 dB steps.

Model	Operating Gain Range	Nominal Output Power
P2-HD-EDFA-VGF-17-SA	5 dB – 17 dB, 1.0 dB steps	17 dBm
P2-HD-EDFA-VGF-20-SA	8 dB – 20 dB, 1.0 dB steps	20 dBm
P2-HD-EDFA-VGF-21-SA	5 dB – 15 dB, 1.0 dB steps	21 dBm

Once the gain is set, the EDFA operation maintains channel flatness regardless of the number of channels present. However, the composite output power cannot exceed the specified power for each model.

Constant Power Mode (Optional)

Variable Gain-Flattened EDFAs can optionally be operated in Constant Power mode. By default, the output power is the nominal output power for the gain-flattened EDFA, which is equal to the composite output power at fully loaded condition in the Constant Gain mode. The output power can be set to other values between 5 dBm and the nominal output power in 0.5 dB steps, as shown in the following table.

Model	Composite Output Power (POUT/C)	Note
P2-HD-EDFA-VGF-17-SA	5 dBm – 17 dBm, 0.5 dB steps	PIN/C >0 dBm
P2-HD-EDFA-VGF-20-SA	5 dBm – 20 dBm, 0.5 dB steps	PIN/C >0 dBm
P2-HD-EDFA-VGF-21-SA	5 dBm – 21 dBm, 0.5 dB steps	PIN/C >0 dBm

Constant Power Flat Mode (Optional)

Variable Gain-Flattened EDFAs can optionally be operated in Constant Power Flat mode. By default, the output power is the nominal output power for the gain-flattened EDFA, which is equal to the composite output power at fully loaded condition in the Constant Gain mode. The output power can be set to other values between 5 dBm and the nominal output power in 0.5 dB steps, as shown in the following table.

Model	Composite Output Power (POUT/C)	Note
P2-HD-EDFA-VGF-17-SA	5 dBm – 17 dBm, 0.5 dB step	PIN/C >0 dBm
P2-HD-EDFA-VGF-20-SA	5 dBm – 20 dBm, 0.5 dB step	PIN/C >0 dBm
P2-HD-EDFA-VGF-21-SA	5 dBm – 21 dBm, 0.5 dB step	PIN/C >0 dBm

This mode of operation maintains gain flatness as long as the gain is within the specified range for the model.

Host Module

A host module is required to mount the application module in a standard Prisma II Chassis. The host module doubles the density of the Prisma II Chassis by providing two high density module slots for each current Prisma II slot. Its simple design allows for efficient routing of RF and electrical signal between the chassis back plane and each high density module.

Host Module Features

The host module has the following features:

- Provides upper and lower slots for two high density modules

- Incorporates a passive design for high reliability

- Provides for RF and DC routing between the chassis back plane and each high density module

Host Module Illustration

Front View

Back View
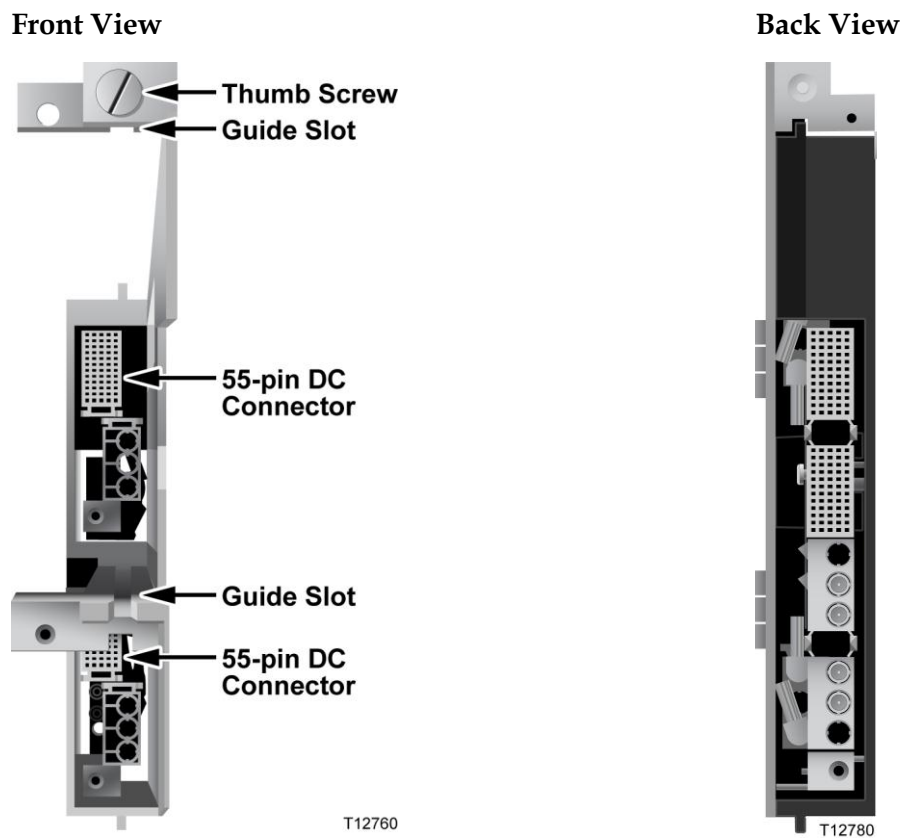
Side View
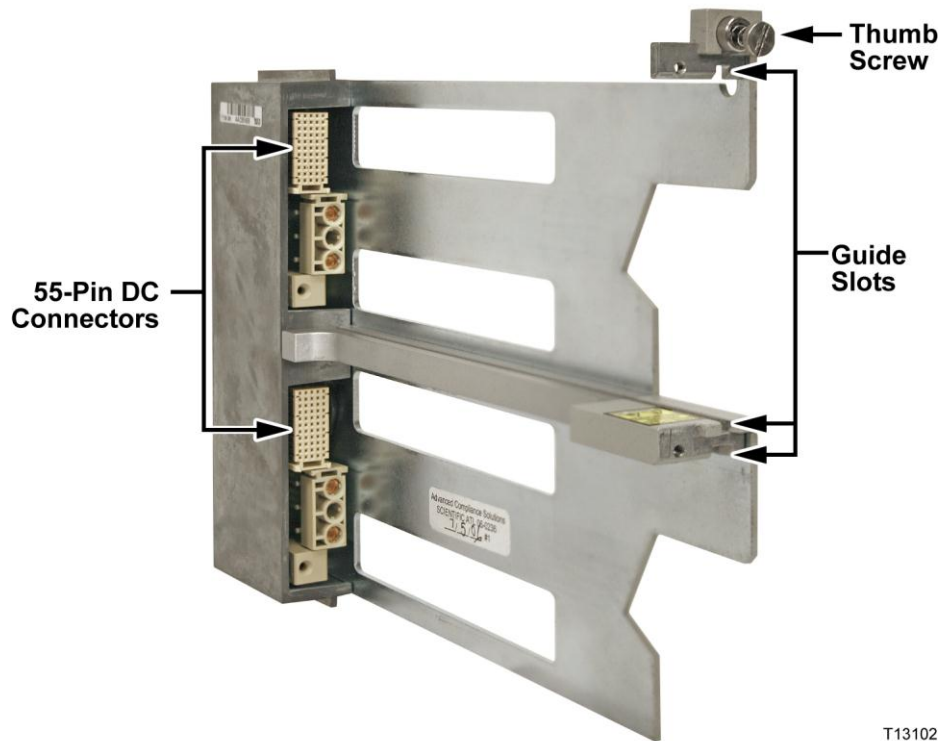
T13102

Host Module Back Panel Connectors

Blind-mate connectors make it easy to install the host module. The push-on connector on the back of the module mates with the back plane bus connector inside the chassis. This 110-pin connector provides the following facilities:

- RF signal input connection

- Electrical power input connection

- Alarm communications connections

- Status-monitoring connections

- Communications and control connections

Module Configuration

The module is shipped from the factory with operational parameters set to factory defaults. However, you will probably choose to configure the operating parameters so that they are best suited for your application.

Configuration and Monitoring Methods

The module may be controlled and monitored using any of the following methods.

- Prisma II ICIM Front Panel

  When a standard Intelligent Communications Interface Module 2 (ICIM2) is used, its front-panel LCD and keypad interface can be used to configure and monitor this and other Prisma II modules in the ICIM domain. For instructions on operating this module using this ICIM, refer to *Operation using ICIM* (on page 43).

- LCI Software

  LCI software running on a locally connected PC may be used to configure operating parameters of Prisma II modules. For instructions on operating this module using LCI software, refer to *Operation using LCI* (on page 67).

- CLI Commands

  If an ICIM2 or ICIM2-XD is installed, CLI commands enable communication between the ICIM and the operator over Telnet to allow for remote module setup and monitoring. For details, see the appropriate documentation for your Prisma II system release.

- ICIM Web Interface

  The ICIM Web Interface offers a user-friendly alternative to CLI commands for remote module setup and monitoring using an ICIM2 or ICIM2-XD. Users navigate a series of HTML pages through a standard web browser to view and, where permitted, adjust module parameters. For additional information, see the appropriate documentation for your Prisma II system release.

Configuration Summary

You can use any of the methods listed above to perform the following configuration tasks:

- Enable or disable EDFA operation

- Enable or disable the "Optical Input low" alarm

- Configure the module as master or slave

- Return to the factory default settings (except LCI)

For detailed information on configuring this module, refer to *Operation using ICIM* (on page 43) or *Operation using LCI* (on page 67).

2

Module Installation

Introduction

This chapter contains instructions for installing the module and describes the site requirements, equipment, and tools needed for module installation.

In This Chapter

Preparing for Installation

Before you begin, make sure that the module is in good condition and that you have the tools and equipment listed here.

Equipment and Tools Needed

Before you begin, make sure that the module is in good condition. You need the following equipment and tools to install these modules.

You need . . .	To . . .
a Prisma II or Prisma II XD Chassis with power supply	provide housing, power, and input/output connections to the module.
3/8-in. flat-blade screwdriver	secure the module in the chassis.
optical cables with connectors	carry optical input and output signals.
optical cleaning materials	clean optical connectors.
optical power meter	verify optical input and output levels.
spectrum analyzer (for transmitter)	verify proper RF input.

Unpacking and Inspecting the Module

As you unpack the module, inspect it for shipping damage. Inspect the rear connectors for bent pins.

If you find any damage, contact Customer Service. Refer to Customer Support Information for information on contacting Customer Service.

Site Requirements

Before you begin, make certain that your installation site meets the requirements discussed in this section.

Access Requirements

Ensure that only authorized personnel have access to this equipment. Otherwise, personal injury or equipment damage may occur.

> ⚠ **WARNING:**
>
> **Use this product in locations that restrict access to all persons who are not authorized. Otherwise, personal injury or equipment damage may occur.**

Equipment Rack

To install this module, your site must be equipped with an Electronics Industry Association (EIA) equipment rack that properly houses the chassis with proper spacing for air circulation. For instructions on installing the chassis in the rack, refer to the guide that was shipped with the chassis.

Operating Environment

> ⚠ **CAUTION:**
>
> **Avoid damage to this product! Operating this product outside the specified operating temperature limits voids the warranty.**

Follow these recommendations to maintain an acceptable operating temperature of the equipment.

- Temperature at the air inlet must be between -40°C and 65°C (-40°F and 149°F).

- Keep cooling vents clear and free of obstructions.

- Provide ventilation as needed using air-deflecting baffles, forced-air ventilation, or air outlets above enclosures, either alone or in combination.

Power Requirements

All Prisma II application modules receive their electrical power from the chassis. The modules may be installed with the chassis under power.

Space Requirements

This is a single-width, half-height module. Actual space requirements depend on whether the module is installed in a Prisma II standard or a Prisma II XD chassis.

Prisma II Standard Chassis Installation

When installed in a Prisma II standard chassis, the module is placed in a host module and then inserted into the chassis in slots 5 through 16.

- If the module occupies the upper host module position, its slot number is the same (5 through 16) as that of the host module.

- If the module occupies the lower host module position, its slot number is 16 plus the host module slot number, or 21 through 32.

Slots 1 through 4 are usually reserved for the power supplies. If an ICIM is installed, it occupies slots 15 and 16. If an ICIM is not installed, any other module (or host module) can occupy these slots.

Slots 2 and 4 are reserved for an internal power supply, if installed. If an internal power supply is not installed here, any other module (or host module) can occupy these slots.

Prisma II XD Chassis Installation

When installed in a Prisma II XD Chassis, the module is inserted directly into an available application module slot on the chassis front panel. The application module slots are numbered 1 through 16.

The chassis power supplies and ICIM are installed in dedicated slots on the chassis back panel, so slots 1 through 16 are available for application modules no matter how the chassis is configured.

Prisma II Standard Chassis Style

The Prisma II standard chassis may be configured as front-access or rear-access depending on the system you have purchased. Power, RF input or output, and other connectors may be located on either the front or rear of the chassis. Connections to the chassis serve the same function and are made in the same manner regardless of the location of the connectors or chassis configuration.

Rear-Access Chassis - Front Panel Illustration

The following illustration shows the front of the rear-access Prisma II standard chassis with two power supplies, 10 full-height modules, and the ICIM installed.
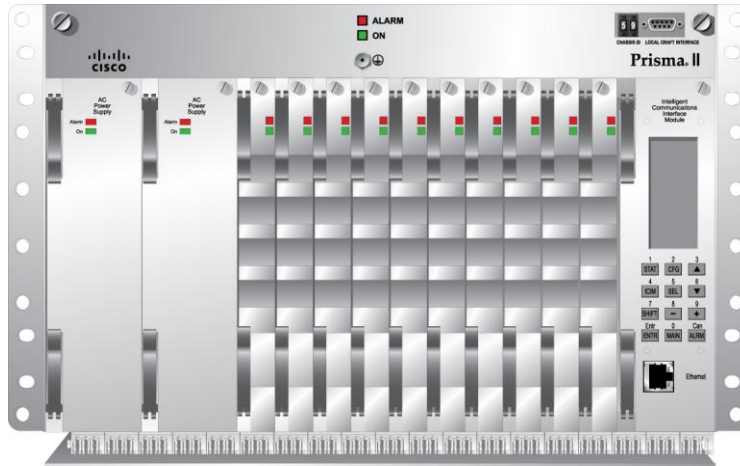
T14534

Front-Access Chassis - Front Panel Illustration

The following illustration shows the front of the front-access Prisma II standard chassis with two power supplies, 10 full-height modules, and the ICIM installed.

The power inlets, RF input/output, and RF ports are located on the recessed bottom of the connector interface panel on the front-access version of the chassis.
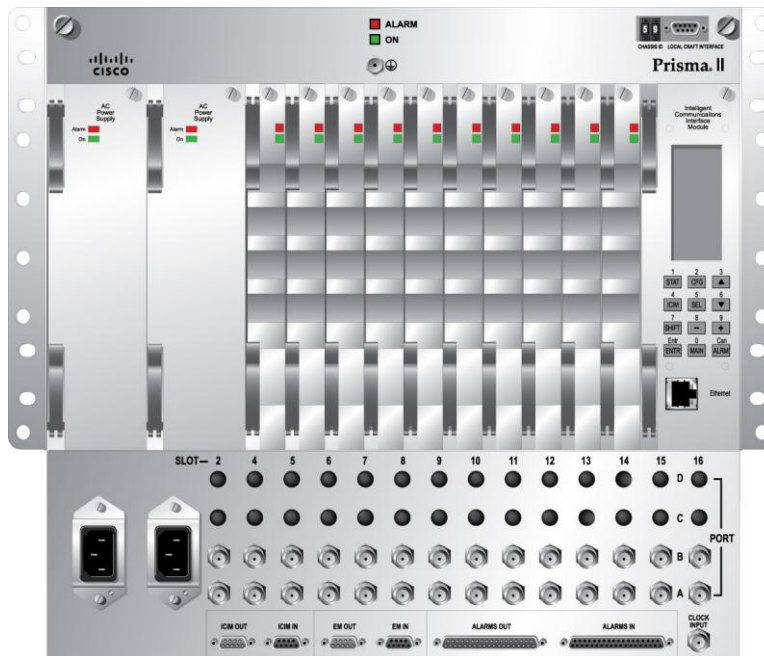
T14535

Prisma II XD Chassis Style

The Prisma II XD chassis back panel serves as both a connector panel and a receptacle for AC power supply modules and the ICIM2-XD, when installed.
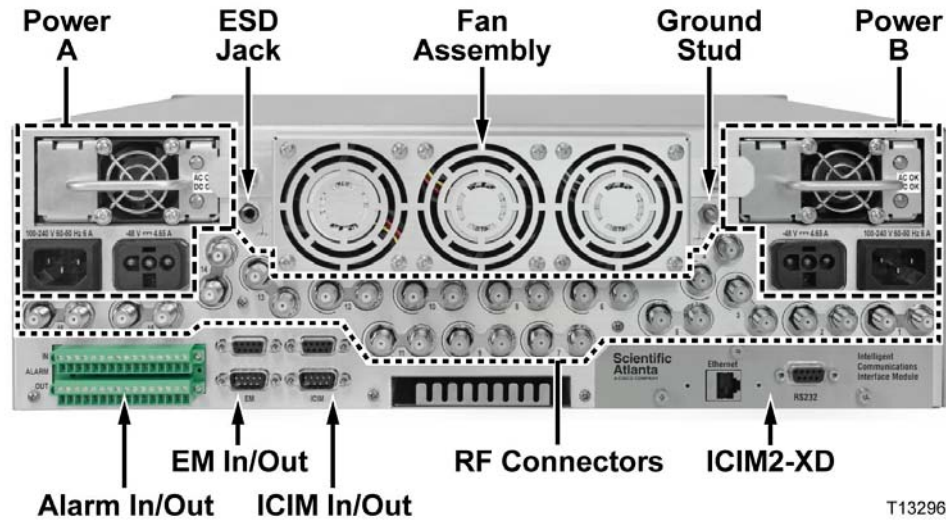
The RF connectors are arranged in pairs, and each pair is numbered to identify its corresponding module slot. The Port A connector in each pair is identified by a black retaining nut and a black circle in the panel artwork, while the Port B connector is unmarked. The Port A and Port B connectors correspond to the upper and lower connectors, respectively, on the chassis midplane.

Connecting the RF Cables to the Chassis

To Connect RF Cables for Each Module

Complete the appropriate procedure below to connect RF cables for the module.

Note: These procedures assume that the chassis is mounted in a rack.

Standard Prisma II Chassis

1   Attach a 75-ohm RF cable to the appropriate RF source.

2   At the front/rear of the chassis, locate the RF ports.
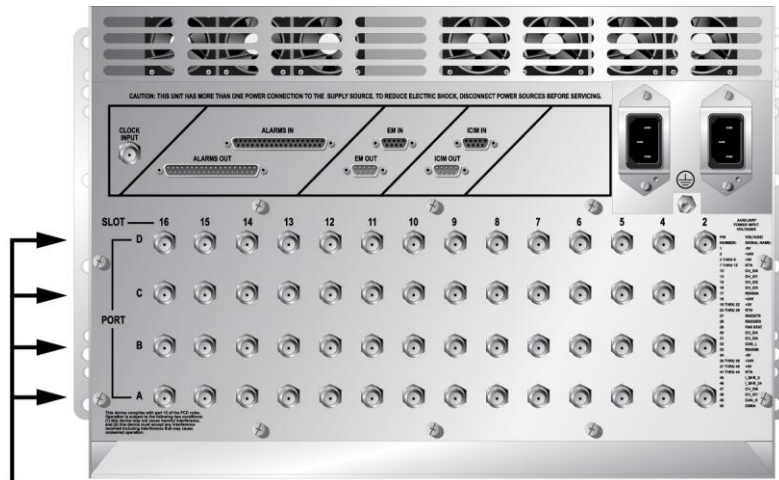
RF Ports   T12770

Note: RF ports are located on the front of the front access chassis.

3   Attach the other end of the RF cable to Port A connector (RF IN) of the corresponding slot where the module is to be installed. This is the RF input connection.
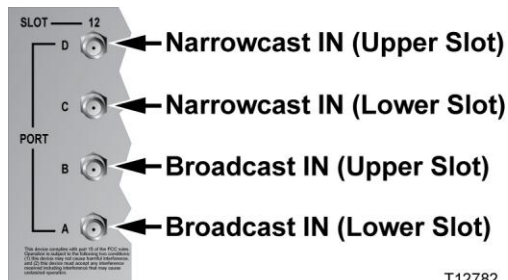
T12782

4   If F-connectors are installed, use a 7/16-in. open-end wrench to secure both cables to the connectors at the chassis.

Prisma II XD Chassis

1   Attach a 75-ohm RF cable to the appropriate RF source.

2   Locate the RF ports at the back of the chassis.
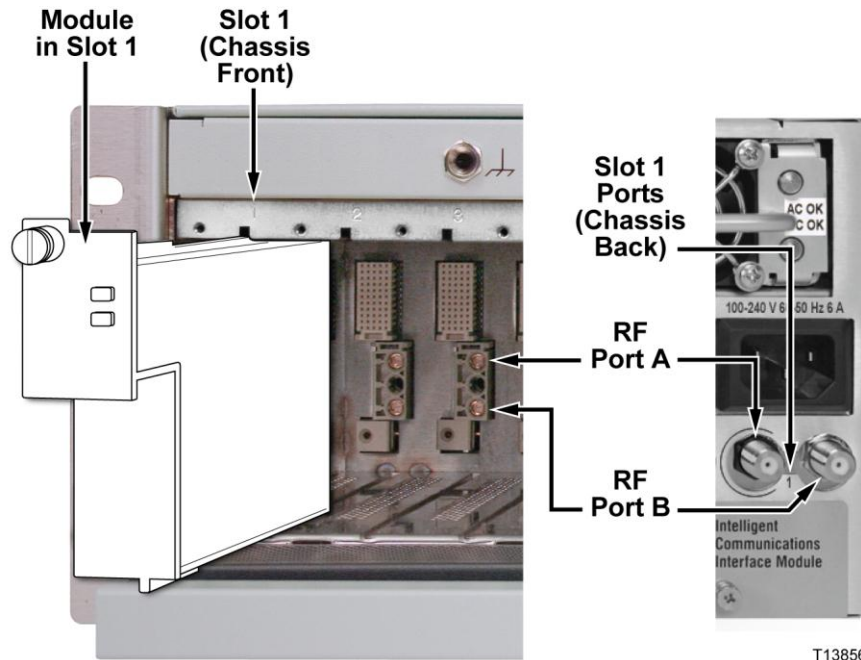
3   Attach the other end of the RF cable to Port A connector (RF IN) of the corresponding slot where the module is to be installed. This is the RF input connection.

4   If F-connectors are installed, use a 7/16-in. open-end wrench to secure both cables to the connectors at the chassis.

Installing the Module in the Chassis

To Install the EDFA in the Host Module

Note: All Prisma II high-density application modules must be installed in a host module before they can be mounted in a standard Prisma II Chassis.

Complete the following steps to install the application modules in the host module.

1 Align the ridges on the top and bottom of the module with the guide slots located on the host module and the chassis. Be careful to keep the module level as you slide it into the host to avoid bending the pins on the host back plane.

2 Gently slide the module into the host module until you feel the power and communications connections on the back of the module join connectors on the host module. Use the thumbscrew on the top of the module to lock it in place.
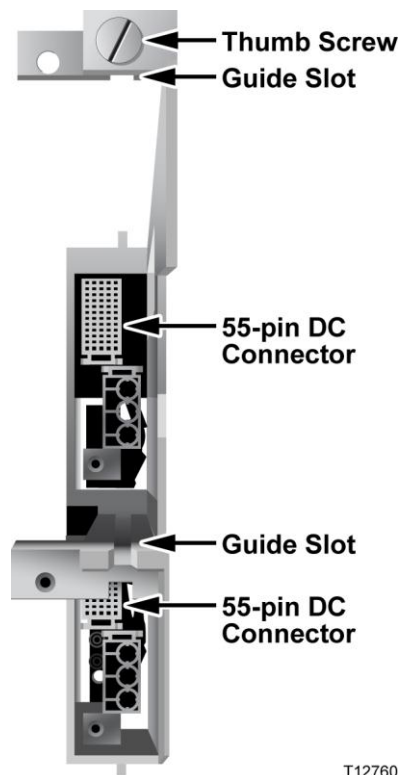
Host Module Empty   **Host Module Populated**

To Install the Host Module in the Chassis

Note: This procedure assumes that the chassis is mounted in a rack.

1   Locate the fiber guides at the bottom of the chassis and the module guide slots inside the chassis as shown in the following illustration.

Fiber Guides   Module Guide Slots   T14532
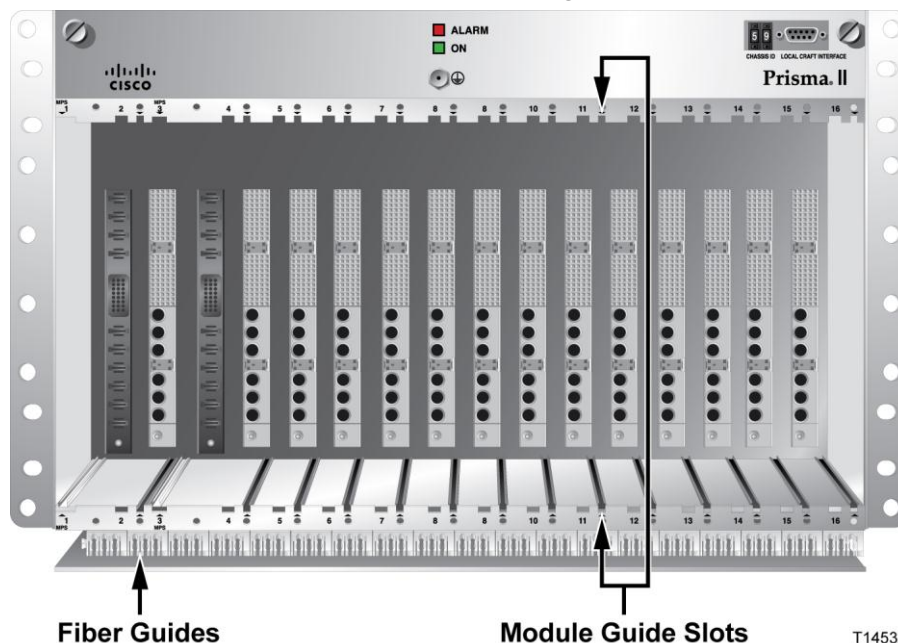
2   Align the ridges on the top and bottom of the host module with the guide slots on the chassis. Be careful to keep the host module level as you slide it into the chassis to avoid bending the pins on the back plane bus.

3   Gently slide the host module into the chassis until you feel the connections on the back of the host module join connectors on the back plane bus.

Note: Do not force or bang the host module into the chassis. If properly aligned, the host module should slide in with minimal force.
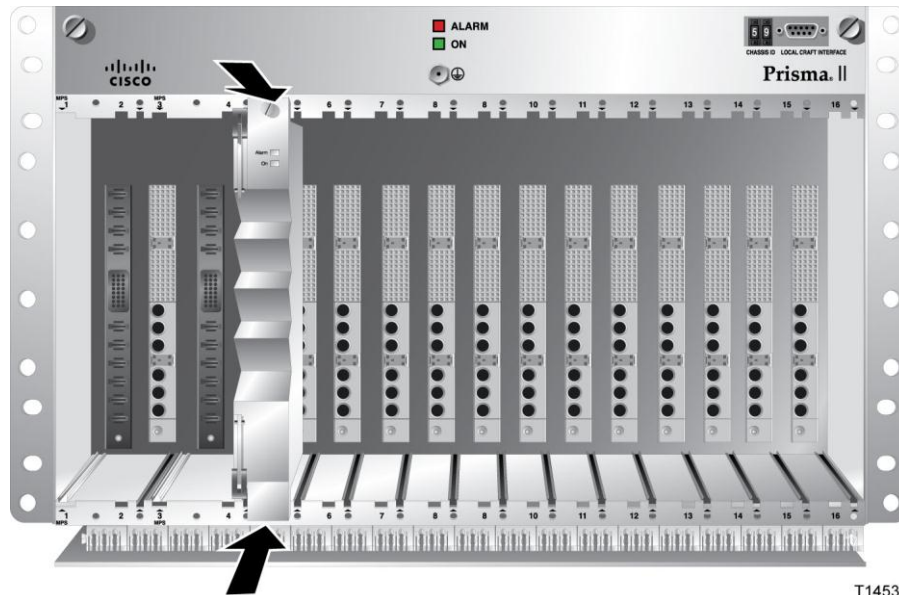
T14537

4 Hand-tighten the screw at the top of the host module to ensure that the first few threads engage smoothly. Use a 3/8-in. flat-blade screwdriver to secure the mounting screw. **Do not over-tighten**. The maximum torque value is 5 in-lb.

5 Fill any unused chassis slots with module blanks to help ensure proper cooling air flow. Blanks for high density modules are available to fill unused host module slots.

To Install the Module in a Prisma II XD Chassis

Note: This procedure assumes that the chassis is installed in a rack.

> **WARNING:**
>
> **Avoid damage to your eyes! Do not look into any optical connector while the system is active. Even if the unit is off, there may still be hazardous optical levels present.**

Complete the following steps to install the module in the chassis.

> **CAUTION:**
>
> **Always use a screwdriver to loosen or tighten the screws holding the application modules, ICIM2-XD, fan assembly, power supply modules, DC-to-DC converters, or blanking panels in place. Do not attempt to loosen or tighten these screws solely by hand.**

1 Locate the fiber tray at the bottom of the chassis and the application module slots inside the chassis as shown in the following illustration.

T14666
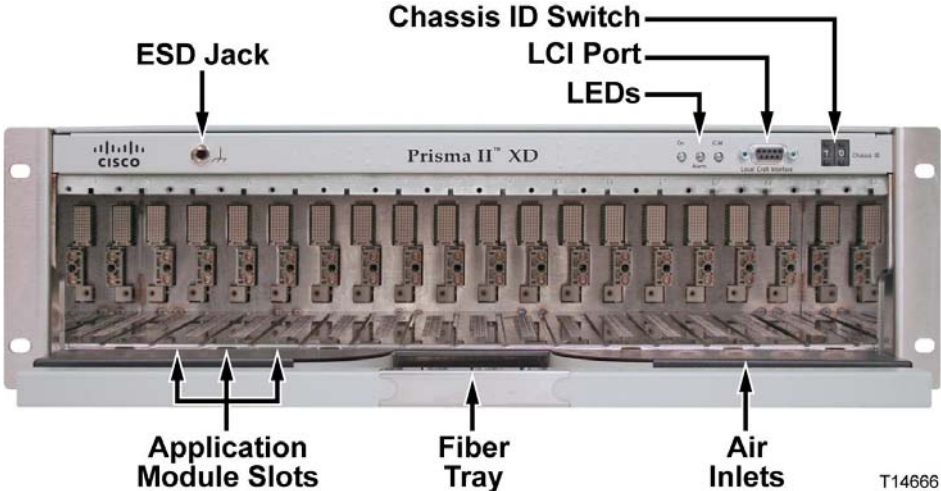
2 Align the ridges on the top and bottom of the module with the module guide slots located on the chassis.

3 Gently slide the module into the chassis until its power and communications connections join connectors on the midplane bus. *Do not force the module into the chassis*. If properly aligned, it should slide in with minimal force.

T14667
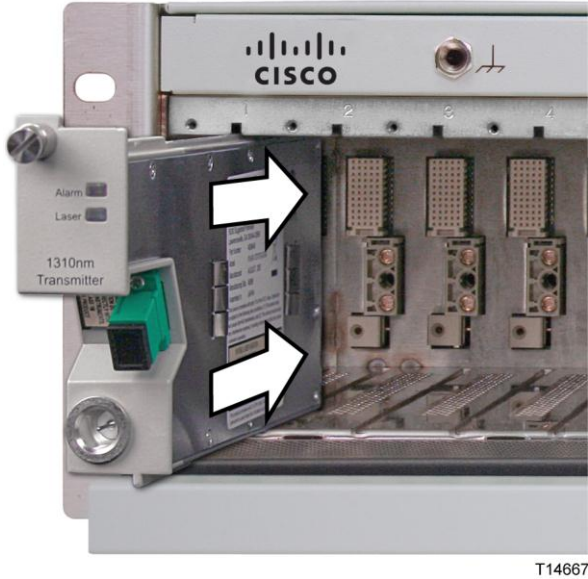
4 Tighten the screw at the top of the module to secure it in the chassis. Use a 3/8-in. flat-blade screwdriver to secure. *Do not over-tighten*.

5 Fill any unused chassis slots with module blanks to help ensure proper cooling air flow.

Connecting Optical Cables

Fiber Fish Tool

> ⚠️ **WARNING:**
>
> **Unterminated fiber cables and connectors may emit invisible laser radiation. Avoid direct exposure to the laser light source. Ensure that the fiber cable is terminated before "fishing."**

The Fiber Fish tool that was shipped with the Prisma II Chassis is used to pull an optical cable from the rear of the chassis to the front of the chassis so the optical cables can be connected to optical connectors on the front panel of the modules.
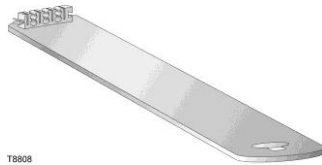
Fiber Fish Tool Hook

At the end of the Fiber Fish tool is a small hook that allows you to hold an optical cable so that you can pull it through to the front panel of the chassis.
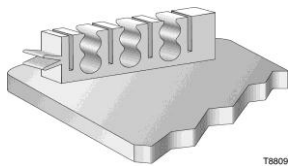
To Pull the Optical Cable to the Module

1 Insert the Fiber Fish tool through the slot located just above the bottom of the chassis.

2 At the rear of the chassis, locate the appropriate optical cable.

3 Insert the optical cable into the notched area of the Fiber Fish tool as shown below.
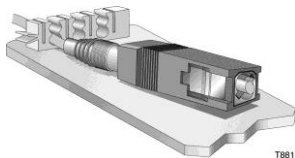
4 At the front of the chassis, pull the Fiber Fish tool (with cable attached) to the front of the chassis.

5   Disengage the optical cable from the Fiber Fish tool and attach to the appropriate connector on the desired module.

> ⚠️ **CAUTION:**
>
> **Proper operation of this equipment requires clean optical fibers. Dirty fibers will adversely affect performance. Proper cleaning is imperative.**

The proper procedure for cleaning optical connectors depends on the connector type. The following describes general instructions for fiber optic cleaning. Use your company's established procedures, if any, but also consider the following.

Cleaning fiber optic connectors can help prevent interconnect problems and aid system performance. When optical connectors are disconnected or reconnected, the fiber surface can become dirty or scratched, reducing system performance.

Inspect connectors prior to mating, clean as needed, and then remove all residue. Inspect connectors after cleaning to confirm that they are clean and undamaged.

Recommended Equipment

- CLETOP or OPTIPOP ferrule cleaner (for specific connector type)
- Compressed air (also called "canned air")
- Lint-free wipes moistened with optical-grade (99%) isopropyl alcohol
- Bulkhead swabs (for specific connector type)
- Optical connector scope with appropriate adaptor

Tips for Optimal Fiber Optic Connector Performance

- Do not connect or disconnect optical connectors with optical power present.
- Always use compressed air before cleaning the fiber optic connectors and when cleaning connector end caps.
- Always install or leave end caps on connectors when they are not in use.
- If you have any degraded signal problems, clean the fiber optic connector.
- Advance a clean portion of the ferrule cleaner reel for each cleaning.
- Turn off optical power before making or breaking optical connections to avoid microscopic damage to fiber mating surfaces.

To Clean Optical Connectors

> ⚠️ **Warning:**
>
> - **Avoid personal injury! Use of controls, adjustments, or procedures other than those specified herein may result in hazardous radiation exposure.**
>
> - **Avoid personal injury! The laser light source on this equipment (if a transmitter) or the fiber cables connected to this equipment emit invisible laser radiation.**
>
> - **Avoid personal injury! Viewing the laser output (if a transmitter) or fiber cable with optical instruments (such as eye loupes, magnifiers, or microscopes) may pose an eye hazard.**

- Do not apply power to this equipment if the fiber is unmated or unterminated.

- Do not stare into an unmated fiber or at any mirror-like surface that could reflect light emitted from an unterminated fiber.

- Use safety-approved optical fiber cable to maintain compliance with applicable laser safety requirements.

Important: Ensure that no optical power is present prior to this procedure.

1 Turn optical power off to the connector.

2 Using an optical connector scope, inspect the connector for scratches, burns, or other signs of damage.

   Note: If the connector is damaged, replace the jumper.

3 If the connector requires cleaning, swipe it across the face of the appropriate ferrule cleaner several times. This will remove dust and some films.

   Note: You may hear a slight "squeak" while cleaning the connector, indicating that it is clean.

4 Inspect the connector again. If the connector requires further cleaning, clean it using 99% isopropyl alcohol and a lint-free wipe.

5 Swipe the connector across the face of the appropriate ferrule cleaner several more times to remove any film left by the alcohol.

6 Repeat all the steps above as needed until the connector is clean.

To Connect Optical Cables to Module

Note: This procedure assumes that the chassis is mounted in a rack.

Important: Observe laser safety precautions. Refer to the Laser Safety information earlier in this guide.

Complete the following steps for each optical cable to be connected to the module.

1   Attach one end of the optical cable to the optical output connector located on the front of the module.
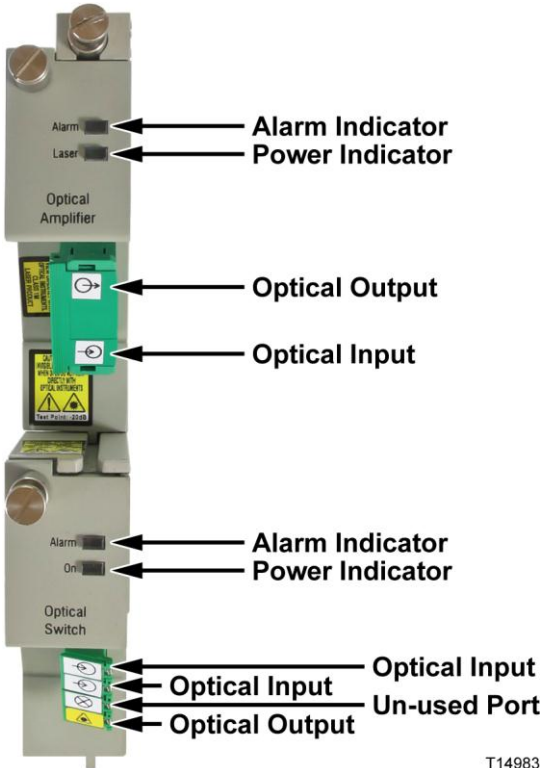
Connecting the ICIM to Additional Chassis

Chassis-to-Chassis ICIM Connections

The Prisma II platform allows the ICIM to be located in one chassis and control modules located in several other chassis. This communication "daisy-chain" can be enabled by connecting cables to the **ICIM IN** and **ICIM OUT** connectors located on the connector interface panel of the chassis. This connection is required if an ICIM in one chassis is to communicate with or control any module located in a separate chassis.

Note: An ICIM can control a maximum of 140 modules. Depending on your application, this is typically 6 or 7 chassis to a rack. Do not exceed these limits.

ICIM IN and ICIM OUT Connectors

Every Prisma II standard and Prisma II XD chassis has a DB9 **ICIM IN** and a DB9 **ICIM OUT** connector for the purpose of chassis-to-chassis ICIM connections. **ICIM IN** is a female connector and **ICIM OUT** is a male connector.

Prisma II Standard Chassis
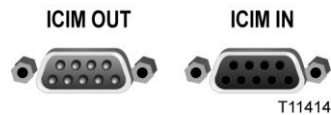
Prisma II XD Chassis
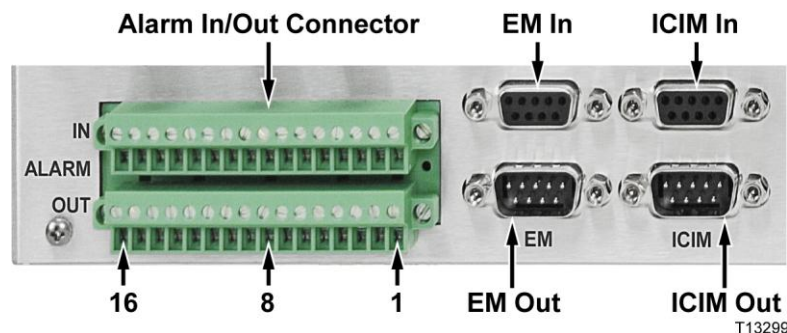
ICIM IN and ICIM OUT Cables

The cable required for both **ICIM IN** and **ICIM OUT** connections is a shielded 9-wire serial extension cable, DB9 Female to DB9 Male. This cable can be purchased locally or from the factory. The chassis data sheet lists the part number for a 6-foot DB9 Female to DB9 Male serial extension cable. The connectors are a serial 9-pin D-shell (EIA 574/232).

To Connect Chassis-to-Chassis ICIM IN and ICIM OUT Ports

1   Connect the serial extension cable from the **ICIM OUT** of the chassis containing the ICIM to the **ICIM IN** connector of the second chassis.

2   Connect a serial extension cable from the **ICIM OUT** of the second chassis to the **ICIM IN** of the third chassis.

3   Continue this daisy-chain connection until all chassis are connected.

4   Connect an **ICIM OUT** terminator, part number 4013014, to the **ICIM OUT** connector on the last chassis in the daisy-chain connection. The **ICIM OUT** terminator ships with the ICIM.

Important:

■   All chassis connected in the daisy-chain must be powered and have a fan tray installed. A chassis connected in the daisy-chain that is not powered or has no fan tray installed will cause faulty operation of the ICIM.

■   All chassis connected in this daisy-chain must have a unique chassis ID number.

■   If the **ICIM OUT** terminator that ships with the ICIM is not installed on the last chassis of a daisy-chain connection, faulty communication with the ICIM may occur.

Configuring Redundancy

You can configure the receiver module for redundancy in one of two ways:

■ Use the ICIM or LCI to configure each EDFA module for either Master or Slave operation, and define the desired Master-Slave relationships between EDFA modules.

This section explains the hardware configurations required to the configuration described above. Procedures for using the ICIM or LCI to configure the module for redundancy are provided in *Operation using ICIM* (on page 43) and *Operation using LCI* (on page 67).

All Prisma II HD-EDFA modules ship from the factory configured as a standalone EDFA. The user control **Operating Mode** default is **Single**. The ICIM, LCI software, or ROSA software can be used to reconfigure a module as a **Slave** or as **Master** and operate in redundant mode.

The only additional hardware requirement for redundancy is that every chassis in the configuration must be connected to the same ICIM domain using an appropriate interconnect cable (part number 180143 or equivalent) through the chassis ICIM IN and ICIM OUT ports.

Notes:

■ Every chassis that does not have an ICIM installed but has an open ICIM IN or ICIM OUT connector on the back panel must have an ICIM bus terminator, part number 4013014 or equivalent, installed in the open ICIM connector (one terminator per chassis is sufficient).

■ The ICIM itself is needed only to configure modules for redundant operation. It is not required to support actual redundant operation.

■ For redundant operation master and slave modules must be alarm free (Enabled, optical input applied).

■ Redundant operation of master will be indicated by solid green led. LCI and ICIM will also indicate master is active. Redundant operation of slave will be indicated by flash green led (On/Off 0.5 sec and 1.5 sec Off). LCI and ICIM will also indicate slave is in Stdby.

Example 1: Single Chassis Configuration

This example shows the control parameter values needed to define the Master-Slave relationship between two EDFA modules installed in slots 1 and 12 of chassis 23.
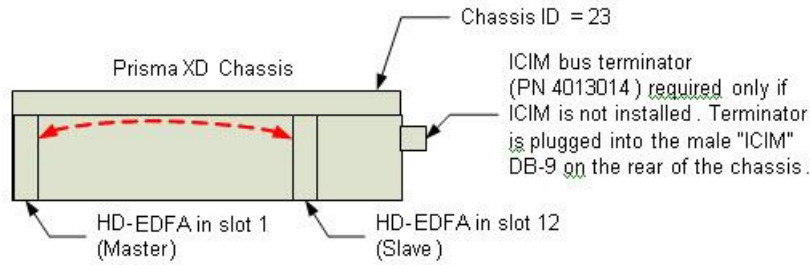
Control	Slot 1 Settings	Slot 12 Settings
Operational Mode	Master	Slave
Redundant Chassis id	23	23
Redundant Slot id	12	1

Example 2: Multiple Chassis Configuration

This example shows the control parameter values needed to define Master-Slave operation using four individual HD-EDFA modules; in slots 6 and 27 of chassis 31 and slots 5 and 10 of chassis 11.
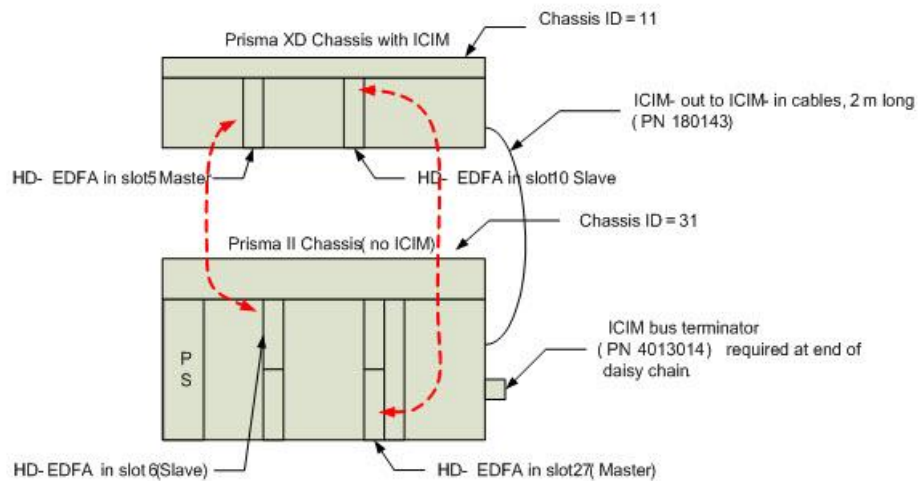
Control	Slot 5 Settings	Slot 10 Settings	Slot 6 Settings	Slot 27 Settings
Operational Mode	Master	Slave	Slave	Master
Redundant Chassis id	31	31	11	11
Redundant Slot id	6	27	5	10

In this example:

- HD-EDFA in slot 27 of chassis 31 is backed up by HD-EDFA in slot 10 of chassis 11.

- HD-EDFA in slot 5 of chassis 11 is backed up by HD-EDFA in slot 6 of chassis 31.

3

Operation using ICIM

Introduction

The procedures in this chapter apply if you are using the Prisma II ICIM2 front-panel interface to configure and operate the module. For information on using CLI commands or the ICIM Web Interface to configure and operate the module, see the appropriate documentation for your Prisma II system release.

Scope of This Chapter

Included in this chapter are descriptions of the ICIM2 front-panel keyboard and liquid crystal display (LCD), and detailed procedures on how to use front-panel menus to configure the module.

Note: You must use CLI commands or the ICIM Web Interface to configure and operate the module when using the ICIM2-XD. For details, see the appropriate documentation for your Prisma II system release.

In This Chapter

ICIM Introduction

Laser Warning

> ⚠️ **WARNING:**
>
> - **Avoid personal injury! Use of controls, adjustments, or procedures other than those specified herein may result in hazardous radiation exposure.**
>
> - **Avoid personal injury! The laser light source on this equipment (if a transmitter) or the fiber cables connected to this equipment emit invisible laser radiation. Avoid direct exposure to the laser light source.**
>
> - **Avoid personal injury! Viewing the laser output (if a transmitter) or fiber cable with optical instruments (such as eye loupes, magnifiers, or microscopes) may pose an eye hazard.**

- Do not apply power to this equipment if the fiber is unmated or unterminated.

- Do not stare into an unmated fiber or at any mirror-like surface that could reflect light emitted from an unterminated fiber.

- Do not view an activated fiber with optical instruments such as eye loupes, magnifiers, or microscopes.

- Use safety-approved optical fiber cable to maintain compliance with applicable laser safety requirements.

- Even if the unit is off, there may still be hazardous optical levels present.

ICIM Function

The ICIM functions as the module-user interface as well as the interface between the Prisma II modules and the network management system.

The ICIM allows local module configuration and status monitoring for up to 140 modules located in multiple chassis. The ICIM features easy-to-use software that can be navigated locally on models equipped with a front-panel keypad and LCD display.

The ICIM can also be navigated remotely using CLI commands or the ICIM Web Interface. For additional information, see the appropriate documentation for your Prisma II system release.

Important:

- Do not operate any Prisma II Chassis without a fan tray installed properly. If a fan tray is not installed in the Prisma II Chassis, the ICIM will not communicate with any of the modules in that chassis.

- All chassis connected in a daisy-chain must be powered and have a fan tray installed. A chassis that is connected but is either not powered, or does not have a fan tray installed will cause faulty operation of the ICIM.

- All chassis connected in this daisy-chain must have a unique chassis identification (ID) number.

- The last chassis in the daisy-chain must have a terminator installed in the **ICIM OUT** connector. Otherwise, faulty communication with the ICIM may occur.

ICIM Block Diagram

A block diagram representing the ICIM2 or ICIM2-XD is shown below.
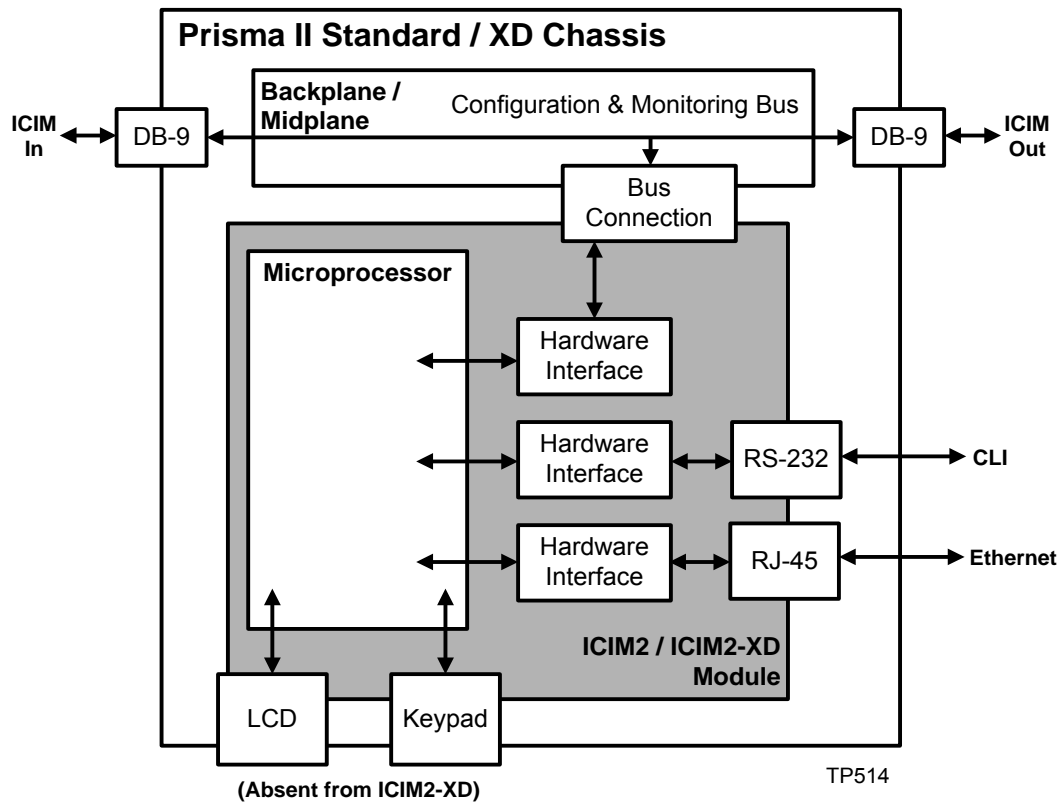
ICIM2 Front Panel

ICIM2 Illustration (Front Panel)
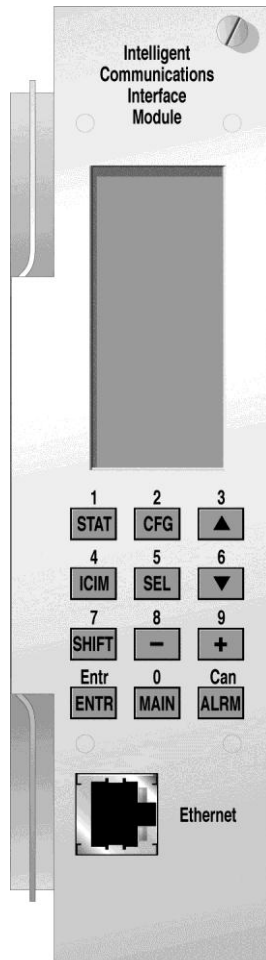
ICIM2 Front Panel Features

Part	Function
LCD screen	Displays the ICIM2 menus, alarms, and status information.
12-key numeric keypad	Used to navigate the ICIM2 menus and configure the application modules.
Ethernet connector	Directly connects the ICIM2 to an IP network. The ICIM2 Ethernet port is suitable for connection to intra-building wiring, non-exposed wiring or cabling only.
Yellow LED on Ethernet connector	Blinks to indicate Ethernet receive activity.
Green LED on Ethernet connector	Glows when a link is established on the Ethernet port.
RS232 connector	Used to connect a PC to the Prisma II system for CLI communication and setup.

ICIM LCD

The ICIM LCD is the operator's visual link to the ICIM software. When the ICIM is installed and powered up, the **MAIN** menu is displayed on the LCD.

ICIM MAIN Menu Illustration

The ICIM MAIN menu is shown below.
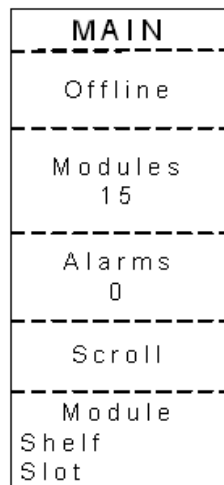
ICIM Keypad

The ICIM keypad has 12 keys that allow you to input and monitor operational parameters. Each key and a brief description of its function are shown here.

Button	Function
STAT	Displays status information for the selected module.
CFG	Displays configuration information for the selected module.
ALRM	Displays all of the parameters in alarm for a selected module.
▲	Moves the menu selection area up. Also increases numerical readings of selected configuration parameters.
▼	Moves the menu selection area down. Also decreases numerical readings of selected configuration parameters.
SEL	Selects the highlighted parameter.
ICIM	Displays ICIM module information such as firmware version, serial number, and baud rate.
SHIFT	Shifts function of a keypad button to the function or number label just above that button.
–	Decreases numerical readings of selected configuration parameters.
+	Increases numerical readings of selected configuration parameters.
ENTER	Enters input data (if valid).
MAIN	Exits the current menu and displays the MAIN ICIM menu.

ICIM Password

The ICIM allows you to send configuration commands, change alarm thresholds, and restore factory default settings in Prisma II modules. To prevent unauthorized changes to these parameters, you have the option of using a password protection system. Password authorization only applies to configurable parameters. Status and alarm information is always available on the ICIM, regardless of password implementation.

Note: The following instructions pertain to the use of the ICIM2 front-panel interface (LCD and keyboard). Remote password and other administrative functions are also supported using CLI Commands or the ICIM Web Interface. For details, see the appropriate documentation for your Prisma II system release.

Password Protection System

The ICIM menu options available in the password protection system are shown here.

ICIM Menu Option	Description
User Psw	A user-settable password.
	■ Created, entered, and changed by the system operator(s)
	■ Must be exactly eight digits, using only the 0-9 number keys
Change Psw	Changes an existing user password.
Disable Psw	Disables the user password function.
SA Psw	A service password used by factory personnel only.

Important: If you only want to monitor status and alarm data, skip the password function when it appears on the ICIM menu. You can access all module status and alarm information without a password.

However, once a user password is entered, you are required to enter it every time you want to set configurable parameters to any module controlled by that ICIM. Refer to *Expired Password or Inactive Password Messages* (on page 50) and *To Enter the User Password* (on page 50).

To Access the Password Menu

The Password menu allows you to create, enter, change, or disable the user password. It also allows service personnel to use the factory default password.

1   Press the ICIM key.

2   Use the ▼ key to scroll down until **Password** is highlighted.

3   Press the $\boxed{\text{SEL}}$ key. The Password menu appears. **User Psw** is highlighted.

```
┌─────────────┐  ┌─────────────┐  ┌─────────────┐  ┌─────────────┐
│    MAIN     │  │    ICIM     │  │    ICIM     │  │    ICIM     │
├─────────────┤  ├─────────────┤  ├─────────────┤  ├─────────────┤
│             │  │ Shelf    7  │  │ Shelf    7  │  │ Shelf    7  │
│   Offline   │  │ Slot    15  │  │ Slot    15  │  │ Slot    15  │
│             │  ├─────────────┤  ├─────────────┤  ├─────────────┤
├─────────────┤  │ Mfg  Data   │  │ Mfg  Data   │  │ User  Psw   │
│   Modules   │  ├─────────────┤  ├─────────────┤  ├─────────────┤
│      0      │  │             │  │             │  │  SA  Psw    │
├─────────────┤  │  Password   │  │  Password   │  ├─────────────┤
│   Alarms    │  │  IP Setup   │  │  IP Setup   │  │ Change Psw  │
│      0      │  │             │  │             │  ├─────────────┤
├─────────────┤  │             │  │             │  │   Disable   │
│   Scroll    │  │             │  │             │  │     Psw     │
├─────────────┤  ├─────────────┤  ├─────────────┤  │             │
│   Module    │  │ Update Adr  │  │ Update Adr  │  │             │
│   Shelf     │  │             │  │             │  │             │
│   Slot      │  │             │  │             │  │             │
└─────────────┘  └─────────────┘  └─────────────┘  └─────────────┘
                                                          TP012
```

Expired Password or Inactive Password Messages

The entry of a valid password allows changes to system parameters for a period of 10 minutes. If more than 10 minutes has passed since your last keystroke, and you attempt to make any changes to system parameters, the menu displays **Psw Expired.** If, after more than 10 minutes, you attempt to disable the password the menu displays **Failed, Password Not Active**. If either of these messages is displayed, you are required to re-enter the password. To re-enter the password, follow the procedure in *To Enter the User Password* (on page 50).

To Enter the User Password

To use the user password feature, you must create and enter a password of exactly eight digits using only the 0-9 number keys.

The password remains active for 10 minutes after your last keystroke. To change configuration parameters after 10 minutes, you must re-enter your password.

Complete the following steps to enter a user password.

1   Access the Password menu as shown in *To Access the Password Menu* (on page 49).

2   Press the $\boxed{\text{SEL}}$ key. The user password menu appears.

3   When **User Psw/Shift Off** appears, press the $\boxed{\text{SHIFT}}$ key to display **Shift On**, and then enter the eight digits of your password, using the 0-9 number keys.

■   To change a digit you have just typed, use the **CAN** (Cancel) function by pressing the $\boxed{\text{ALRM}}$ key. This deletes the last digit typed.

4   Press the $\boxed{\text{ENTER}}$ key to enter the password. The display updates to show whether your password entry was accepted.

- If the password is accepted, the word **Accepted** appears in the menu, and you are able to return to the MAIN menu.
- If the password was rejected, the word **Rejected** appears in the menu. Reasons for a password to be rejected include:
  – Entering more than eight digits for the password.
  – Pressing keys other than the 0-9 number keys.
  – Entering an incorrect password if a valid password has been entered.

  If the password is rejected, press the [SHIFT] key to return to the password menu and re-enter the password as described in step 3 above.

```
┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐
│     ICIM     │  │     ICIM     │  │     ICIM     │  │     ICIM     │
├──────────────┤  ├──────────────┤  ├──────────────┤  ├──────────────┤
│ Shelf      0 │  │ Shelf      0 │  │ Shelf      0 │  │ Shelf      0 │
│ Slot      15 │  │ Slot      15 │  │ Slot      15 │  │ Slot      15 │
├──────────────┤  ├──────────────┤  ├──────────────┤  ├──────────────┤
│              │  │              │  │              │  │              │
│  User Psw    │  │  User Psw    │  │  User Psw    │  │  User Psw    │
│              │  │  * * * * * * * * │  │  1 2 3 4 * * * * │  │ 1 2 3 4 5 6 7 8 │
├──────────────┤  ├──────────────┤  ├──────────────┤  ├──────────────┤
│              │  │              │  │              │  │              │
│              │  │              │  │   Rejected   │  │   Accepted   │
│              │  │              │  │              │  │              │
│  Shift Off   │  │  Shift On    │  │  Shift Off   │  │  Shift Off   │
└──────────────┘  └──────────────┘  └──────────────┘  └──────────────┘
                                                              TP013
```

To Change the User Password

If a user password has been entered, it may be changed. However, the current password must be active prior to changing it. If the current password has expired (more than 10 minutes have passed since your last keystroke), you must re-enter the current password before changing to a new one.

1 Access the Password menu as shown in the procedure *To Access the Password Menu* (on page 49).

2 Use the [▼] key to scroll down until **Change Psw** is highlighted.

3 Press the [SEL] key to select **Change Psw**.

4 When **Change Psw /Shift Off** appears, press the [SHIFT] key to display **Shift On**, and then enter the eight digits of your new password, using the 0-9 number keys.

  If at any time you input a digit that is incorrect or wish to change a digit, use the **CAN** (Cancel) function by pressing the [ALRM] key to delete that digit.

5 Press the [ENTER] key to input the new password. As a result:

- The ICIM updates the display to show if your password entry was accepted or rejected.
- If the entry was accepted, you are able to return to the MAIN menu.

6 If the new password you entered is rejected, press the [SHIFT] key to return to the password entry menu. Clear all digits using the **CAN** (Cancel) function, then re-enter an 8-digit password using only the 0-9 number keys. Press the [ENTER] key to input the password.

```
┌─────────────┐   ┌─────────────┐   ┌─────────────┐   ┌─────────────┐
│     ICIM    │   │     ICIM    │   │     ICIM    │   │     ICIM    │
│ ─ ─ ─ ─ ─ ─ │   │ ─ ─ ─ ─ ─ ─ │   │ ─ ─ ─ ─ ─ ─ │   │ ─ ─ ─ ─ ─ ─ │
│ Shelf     7 │   │ Shelf     7 │   │ Shelf     7 │   │ Shelf     7 │
│ Slot     15 │   │ Slot     15 │   │ Slot     15 │   │ Slot     15 │
│ ─ ─ ─ ─ ─ ─ │   │ ─ ─ ─ ─ ─ ─ │   │ ─ ─ ─ ─ ─ ─ │   │ ─ ─ ─ ─ ─ ─ │
│  User Psw   │   │             │   │             │   │             │
│             │   │ Change Psw  │   │ Change Psw  │   │ Change Psw  │
│ ─ ─ ─ ─ ─ ─ │   │             │   │  ********    │   │  87654321   │
│   SA Psw    │   │             │   │             │   │             │
│ ─ ─ ─ ─ ─ ─ │   │ ─ ─ ─ ─ ─ ─ │   │ ─ ─ ─ ─ ─ ─ │   │ ─ ─ ─ ─ ─ ─ │
│ Change Psw  │   │             │   │             │   │             │
│ ─ ─ ─ ─ ─ ─ │   │             │   │             │   │             │
│  Disable    │   │  Shift Off  │   │  Shift On   │   │  Shift On   │
│    Psw      │   │             │   │             │   │             │
└─────────────┘   └─────────────┘   └─────────────┘   └─────────────┘
                                                            TP014
```

To Disable the User Password using ICIM

If a user password has been entered, you may disable it at any time. However, the current password must be active prior to disabling it. If the current password has expired (more than 10 minutes have passed since your last keystroke), you must re-enter the current password before disabling it.

1 Press the [ICIM] key.

2 Use the [▼] key to scroll down until **Password** is highlighted.

3 Press the [SEL] key.

4 Use the [▼] key to scroll down until **Disable Psw** is highlighted.

5 Press the [SEL] key to select **Disable Psw**.

6 If the current password is active, the menu displays **Password Is Now Disabled**. You can now make changes to parameters without any password.

7 If the current password has expired (more than 10 minutes have passed since your last keystroke), the menu displays **Failed, Password Not Active**. If this occurs, you must re-enter the current password and repeat this procedure.

```
┌─────────────────┐   ┌─────────────────┐   ┌─────────────────┐
│      I C I M    │   │      I C I M    │   │      I C I M    │
├─────────────────┤   ├─────────────────┤   ├─────────────────┤
│ S h e l f    7  │   │ S h e l f    7  │   │ S h e l f    7  │
│ S l o t     15  │   │ S l o t     15  │   │ S l o t     15  │
├─────────────────┤   ├─────────────────┤   ├─────────────────┤
│   U s e r  P s w │  │                 │   │                 │
│                 │   │  E n t e r  P s w│  │  E n t e r  P s w│
├─────────────────┤   │  8 7 6 5 * * * * │  │  8 7 6 5 4 3 2 1 │
│    S A  P s w   │   │                 │   │                 │
├─────────────────┤   ├─────────────────┤   ├─────────────────┤
│ C h a n g e  P s w│ │   P a s s w o r d│  │   F a i l e d ,  │
│                 │   │    I s  N o w   │   │  P a s s w o r d │
├─────────────────┤   │  D i s a b l e d │  │  N o t  A c t i v e│
│    D i s a b l e │  │                 │   │                 │
│      P s w      │   │  S h i f t  O f f │  │  S h i f t  O f f │
└─────────────────┘   └─────────────────┘   └─────────────────┘
                                                  TP015
```

Operating the ICIM

Using the ICIM

Once the module is installed, it runs without the aid of an operator. Unless alarms are generated or your system configuration changes, you should not need to make any adjustments to the module beyond the initial setup.

To Access the ICIM LCD Contrast

To access the ICIM LCD contrast control from the MAIN menu, press the ICIM key. Use the + key to increase or the − key to decrease ICIM display contrast.

ICIM MAIN Menu

A few seconds after power-up, the MAIN menu (shown below) appears. Press the SEL key to select the specific option.

Display	Description
Offline	Indicates network management system communication status with the ICIM.
Modules	Indicates the number of modules in the ICIM domain.
Alarms	Displays the number of modules that are in alarm. Selecting this option allows scrolling through all modules in alarm condition.
Scroll	Allows scrolling through all modules in the ICIM domain.
Module Shelf Slot	Allows selection of any specific module in the ICIM domain.

ICIM MAIN Menu Illustration

The ICIM MAIN menu is shown below.
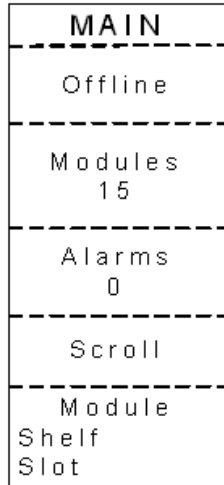
```
    MAIN
- - - - - - - -
   Offline
- - - - - - - -

  Modules
    15
- - - - - - - -
   Alarms
     0
- - - - - - - -
   Scroll
- - - - - - - -
   Module
 Shelf
 Slot
```
TP011

Prisma II ICIM Menu

To display the ICIM menu, press the [ICIM] key. The ICIM menu (shown below) appears. Press the [SEL] key to select the specific option.

Display	Description
Shelf **Slot**	Displays the location of the ICIM module.
Mfg Data	Displays manufacturing data about the ICIM.
Password	Allows you to enter, change, or disable a system password. See **Using the ICIM Password** earlier in this chapter.
Update Adr	If the Chassis ID number switch has been changed, you must highlight the **Update Adr** menu and press the [SEL] key for the ICIM to recognize the change.

TP016

Prisma II MAIN Menu and ICIM Menu Structure

Pressing the MAIN key initiates the MAIN software menu. Pressing the ICIM key initiates the ICIM software menu. The MAIN and ICIM software structures are shown below.
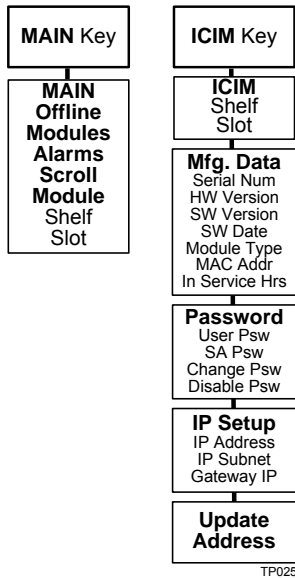
TP025

Prisma II HD EDFA Module Software Menu Structure

From the MAIN or SCROLL menus, you can navigate to the MODULE menu. From the MODULE menu, press the STAT , CFG , or ALRM key to display the desired parameter menu.

Mfg. Data	MAIN or SCROLL Menu	MAIN or SCROLL Menu	MAIN or SCROLL Menu
Module Type			
Serial #			
Date Code			
Sw Ver			
Script Ver			
InService Hrs	MODULE Menu	MODULE Menu	MODULE Menu
Spec Data			

Mfg. Data
Module Type
Serial #
Date Code
Sw Ver
Script Ver
InService Hrs
Spec Data

Restore
Factory
Defaults

MAIN or SCROLL Menu

MODULE Menu

STAT Key

STATUS
Inpwr
OutPwr
LasTemp
LasBias
LasLim
TecCur
ModTemp
LaserOn
RedEdfa
EdfaSta
AmpType

Set Alarm
Thresholds

MAIN or SCROLL Menu

MODULE Menu

CONFIG Key

CONFIG
OpMode
Mode
Enable
Service
LoInpEna
SetPwr
SetGain
RedChas
RedSlot

MAIN or SCROLL Menu

MODULE Menu

ALARMS Key

ALARMS
PsOk
OutPwr
IntPs
Enable
LasTemp
LasBias
InPwr
Service
CANBus
RedAmp

Checking the Operating Status using the ICIM

To Check the Operating Status using ICIM

You can use the ICIM to check the status of all operating parameters of this module. All status information is displayed on the ICIM LCD.

1   At the MAIN menu, press the ▼ key to highlight the **Shelf** and **Slot** fields**.**

2   Press the SEL key to address the **Shelf** number. Then press the + key or the − key to scroll to the number of the desired shelf.

3   Press the ENTER key. The **Slot** field is highlighted.

4   Press the + key or the − key to scroll to the number of the desired slot.

5   Press the ENTER key. The **MODULE** menu appears on the ICIM LCD.

6   Press the STAT key.

7   Press the ▲ key or the ▼ key to scroll through the monitored parameters until you find the parameter of interest.

8   Check the status of the desired parameter or select other parameters to monitor. When finished, press the MAIN key to return to the **MAIN** menu.

STATUS Menus

Press the STAT key to select the STATUS menu. Typical STATUS menus are shown below.

```
┌─────────────┐   ┌─────────────┐
│   STATUS    │   │   STATUS    │
│ ─────────── │   │ ─────────── │
│ Shelf     5 │   │ Shelf     5 │
│ Slot     12 │   │ Slot     12 │
│ ─────────── │   │ ─────────── │
│             │   │             │
│  HD EDFA    │   │  HD EDFA    │
│             │   │             │
│ ─────────── │   │ ─────────── │
│  LasTemp    │   │  LasBias    │
│ Majh 20.0   │   │ Majh -0.001 │
│ MinH 15.0   │   │ MinH -0.010 │
│ MinL -15.0  │   │ MinL -1.000 │
│ MajL -20.0  │   │ MajL -2.000 │
│   ▲ ▼       │   │   ▲ ▼       │
└─────────────┘   └─────────────┘
                        T15005
```

Configuring the Module using the ICIM

To Configure Parameters using the ICIM

You can use the ICIM to configure the parameters of this module.

1   From the **MAIN** menu, press the ⬇ key to highlight the **Shelf** and **Slot** fields**.**

2   Press the SEL key to address the **Shelf** number. Then press the ➕ key or the ➖ key to scroll to the number of the desired shelf.

3   Press the ENTER key. The **Slot** field is highlighted.

4   Press the ➕ key or the ➖ key to scroll to the number of the desired slot.

5   Press the ENTER key. The **MODULE** menu appears on the ICIM LCD.

6   To configure the module, press the CFG key.

7   Press the ⬆ key or the ⬇ key to scroll through the configurable controls until you find the parameter of interest.

8   Press the SEL key to select the highlighted control.

9   Press the ➕ key or the ➖ key to activate or change the value of the selected control.

10 Press the ENTER key to save the changes and return to the MAIN menu.

Config Menus

When the CONFIG menu is selected, the Shelf number field is highlighted. The shelf and slot number fields may only be incremented with the ➕ key or the ➖ key. The ⬇ key highlights the Slot number field. Once you exit the slot field, the Up and Down arrows will scroll through the parameters that are specific to this module.

Sample CONFIG menus are shown below.

```
┌─────────────────┐  ┌─────────────────┐  ┌─────────────────┐  ┌─────────────────┐  ┌─────────────────┐
│     CONFIG      │  │     CONFIG      │  │     CONFIG      │  │     CONFIG      │  │     CONFIG      │
│ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │
│ Shelf        5  │  │ Shelf        5  │  │ Shelf        5  │  │ Shelf        5  │  │ Shelf        5  │
│ Slot        16  │  │ Slot        16  │  │ Slot        16  │  │ Slot        16  │  │ Slot        16  │
│ ─ ─ ─ ─ ─ ─ ─ ─ │  │                 │  │                 │  │                 │  │                 │
│    HD EDFA      │  │                 │  │                 │  │                 │  │                 │
│ ─ ─ ─ ─ ─ ─ ─ ─ │  │    HD EDFA      │  │    HD EDFA      │  │    HD EDFA      │  │    HD EDFA      │
│    OpMode       │  │                 │  │                 │  │                 │  │                 │
│    Mode         │  │                 │  │                 │  │                 │  │                 │
│    Enable       │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │
│    Service      │  │                 │  │                 │  │                 │  │                 │
│    LoInpEna     │  │    OpMode       │  │    Mode         │  │    Enable       │  │    Service      │
│    SetPwr       │  │    Single       │  │    CnstPwr      │  │    On           │  │    Off          │
│    Gain         │  │                 │  │                 │  │                 │  │                 │
│    Red Chas     │  │                 │  │                 │  │                 │  │                 │
│    Red Slot     │  │                 │  │                 │  │                 │  │                 │
│     ▲ ▼         │  │     ▲ ▼         │  │     ▲ ▼         │  │     ▲ ▼         │  │     ▲ ▼         │
└─────────────────┘  └─────────────────┘  └─────────────────┘  └─────────────────┘  └─────────────────┘

┌─────────────────┐  ┌─────────────────┐  ┌─────────────────┐  ┌─────────────────┐  ┌─────────────────┐
│     CONFIG      │  │     CONFIG      │  │     CONFIG      │  │     CONFIG      │  │     CONFIG      │
│ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │
│ Shelf        5  │  │ Shelf        5  │  │ Shelf        5  │  │ Shelf        5  │  │ Shelf        5  │
│ Slot        16  │  │ Slot        16  │  │ Slot        16  │  │ Slot        16  │  │ Slot        16  │
│                 │  │                 │  │                 │  │                 │  │                 │
│                 │  │                 │  │                 │  │                 │  │                 │
│    HD EDFA      │  │    HD EDFA      │  │    HD EDFA      │  │    HD EDFA      │  │    HD EDFA      │
│                 │  │                 │  │                 │  │                 │  │                 │
│ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │
│                 │  │                 │  │                 │  │                 │  │                 │
│    LoInpEna     │  │    SetPwr       │  │    Gain         │  │    Red Chas     │  │    Red Slot     │
│    Off          │  │    20.0 dBm     │  │    15.0 dB      │  │    1            │  │    1            │
│                 │  │                 │  │                 │  │                 │  │                 │
│     ▲ ▼         │  │     ▲ ▼         │  │     ▲ ▼         │  │     ▲ ▼         │  │     ▲ ▼         │
└─────────────────┘  └─────────────────┘  └─────────────────┘  └─────────────────┘  └─────────────────┘
```

T15006

Checking Module Alarms using the ICIM

To Check Alarms using ICIM

If the red ALARM LED on the front panel is blinking, a minor alarm condition is indicated. If the ALARM LED on the front panel is illuminated, a critical alarm conditions is indicated.

Alarms fall into one of the following categories.

- Major low

- Minor low

- Minor high

- Major high

1   From the MAIN menu, press the [▼] key to highlight the **Shelf** and **Slot** fields**.**

2   Press the [SEL] key to address the **Shelf** number. Then press the [+] key or the [−] keys to scroll to the number of the desired shelf.

3   Press the [ENTER] key. The **Slot** field is highlighted.

4   Press the [+] key or the [−] key to scroll to the number of the desired slot.

5   Press the [ENTER] key. The **MODULE** menu appears on the ICIM LCD.

6   Press the [ALRM] key. Module alarm conditions appear on the ICIM LCD.

7   Use the [▲] key or the [▼] key to scroll through alarm conditions until the desired alarm is displayed.

8   Monitor the alarm condition(s). Take appropriate action. Verify that all settings and thresholds relating to the alarm indication are set correctly to rule out an unintended alarm.

9   When finished, press the [MAIN] key to return to the MAIN menu.

ALARMS Menus

When a module ALARMS menu is selected, press the [▼] key or the [▲] key to scroll through alarms. Some typical ALARMS menus are shown below.

```
 ┌─────────────────┐  ┌─────────────────┐
 │   A L A R M S   │  │   A L A R M S   │
 │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │
 │ S h e l f     5 │  │ S h e l f     5 │
 │ S l o t    1 2  │  │ S l o t    1 2  │
 │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │
 │                 │  │                 │
 │  H D   E D F A  │  │  H D   E D F A  │
 │                 │  │                 │
 │ ─ ─ ─ ─ ─ ─ ─ ─ │  │ ─ ─ ─ ─ ─ ─ ─ ─ │
 │                 │  │                 │
 │   I n P w r     │  │   O u t P w r   │
 │ M a j o r  L o w│  │ M a j o r  L o w│
 │                 │  │                 │
 │      ▲  ▼       │  │      ▲  ▼       │
 └─────────────────┘  └─────────────────┘
                              T15004
```

Note: For details on all alarm parameters, see *Module Parameter Descriptions* (on page 89).

To Set Adjustable Alarm Thresholds using the ICIM

You can use the ICIM to change the adjustable alarm thresholds of this module from their factory default values.

1   At the MODULE menu, press the [STAT] key. The STATUS menu appears on the ICIM LCD.

2   Press the [SEL] key. The alarm thresholds previously set are displayed. If the label **n/a** is displayed, you cannot configure that alarm threshold. Press the [▼] key to highlight the alarm threshold for the next parameter.

3   When the threshold that you wish to set is highlighted, press the [ENTER] key.

4   Press the [▼] key or the [▲] key to change the increment size.

5   Press the [+] key or the [−] key to adjust the alarm threshold.

Note: Press the Cancel ([ALRM]) key to return to the previous menu.

6   Press the [ENTER] key to save the changes. The message **Data Saved** appears on the ICIM LCD.

7   When finished, press the [MAIN] key to return to the MAIN menu.

Alarm Threshold Menus

Some typical alarm threshold menus are shown below.

```
┌─────────────────┐   ┌─────────────────┐
│    S T A T U S  │   │    S T A T U S  │
│─ ─ ─ ─ ─ ─ ─ ─ ─│   │─ ─ ─ ─ ─ ─ ─ ─ ─│
│ S h e l f     5 │   │ S h e l f     5 │
│ S l o t      12 │   │ S l o t      12 │
│─ ─ ─ ─ ─ ─ ─ ─ ─│   │─ ─ ─ ─ ─ ─ ─ ─ ─│
│                 │   │                 │
│   H D  E D F A  │   │   H D  E D F A  │
│                 │   │                 │
│─ ─ ─ ─ ─ ─ ─ ─ ─│   │─ ─ ─ ─ ─ ─ ─ ─ ─│
│                 │   │                 │
│   L a s T e m p │   │   L a s B i a s │
│ M a j H 4 0 . 0 0│  │ M a j H 6 2 . 2 0│
│ M i n H 3 0 . 0 0│  │ M i n H 5 2 . 2 0│
│ M i n L 2 0 . 0 0│  │ M i n L 3 2 . 2 0│
│ M a j L 1 0 . 0 0│  │ M a j L 2 2 . 2 0│
└─────────────────┘   └─────────────────┘
                              TP600
```

Note: For details on all alarm thresholds, see *Module Parameter Descriptions* (on page 89).

Checking Manufacturing Data using the ICIM

To Check Manufacturing Data

You can display the manufacturing data for this module on the ICIM LCD.

Complete the following steps to access the manufacturing data.

1   From the MAIN menu, press the [▼] key to highlight the **Shelf** and **Slot** fields**.**

2   Press the [SEL] key to address the **Shelf** number. Then press the [+] key or the [−] key to scroll to the number of the desired shelf.

3   Press the [ENTER] key. The **Slot** field is highlighted.

4   Press the [+] key or the [−] key to scroll to the number of the desired slot.

5   Press the [ENTER] key. The MODULE menu for this module will be selected, as shown on the left below. Press the [▼] key to enter the start of the MFG. DATA menus, as shown on the right below.

```
   M O D U L E           M F G . D A T A
- - - - - - - - - -    - - - - - - - - - -
S h e l f      5       S h e l f      5
S l o t     1 2        S l o t     1 2
- - - - - - - - - -    - - - - - - - - - -


   H D  E D F A           H D  E D F A


- - - - - - - - - -    - - - - - - - - - -
   A l a r m s            M o d u l e
- - - - - - - - - -          T y p e
   M f g .  D a t a         3 0 2 2
       ▲ ▼                    ▲ ▼
```

T15008

6   Use the [▲] and [▼] keys to scroll through the manufacturing data.

MFG. DATA Menus

When the **MFG. DATA** menu is selected, the [▼] key or the [▲] key allows you to scroll through the manufacturing parameters specific to this module. Sample **MFG. DATA** menus are shown below.

```
  M F G . D A T A          M F G . D A T A          M F G . D A T A          M F G . D A T A
 S h e l f      5         S h e l f      5         S h e l f      5         S h e l f      5
 S l o t      1 2         S l o t      1 2         S l o t      1 2         S l o t      1 2


    H D  E D F A              H D  E D F A              H D  E D F A              H D  E D F A


     M o d u l e              S e r i a l #              S w  R e v            I n  S e r v i c e
       T y p e                A A Y C U A              C F _ C C B 3              H o u r s
       3 0 2 2              D a t e  C o d e           S c r i p t  V e r          1 0 0
                               J 1 1                      N A
       ▲ ▼                     ▲ ▼                        ▲ ▼                      ▲ ▼
```

T15007

Note: For details on all manufacturing data parameters, see *Module Parameter Descriptions* (on page 89)

Saving the Configuration using the ICIM

To Save the Current Configuration

1   After you have changed a parameter or entered data, press the ENTER key to save the changes and return to the MAIN menu.

2   If you do not save your changes for two minutes, or if you press the SHIFT   CAN keys at the same time, changes are aborted and the display returns to the MAIN menu.

Configuration Complete

If no alarms are indicated after using the ICIM to configure this module to your system specifications, no further action is necessary. The module operates without further input. Alarms, changes in operating parameters, electrical power fluctuations, or changes in system design may be cause for additional action.

4

Operation using LCI

Introduction

This chapter provides instructions for installing and using the LCI. This chapter applies if you are using the LCI to operate a module.

In This Chapter

LCI Introduction

Laser Warning

> ⚠ **WARNING:**
>
> - **Avoid personal injury! Use of controls, adjustments, or procedures other than those specified herein may result in hazardous radiation exposure.**
>
> - **Avoid personal injury! The laser light source on this equipment (if a transmitter) or the fiber cables connected to this equipment emit invisible laser radiation. Avoid direct exposure to the laser light source.**
>
> - **Avoid personal injury! Viewing the laser output (if a transmitter) or fiber cable with optical instruments (such as eye loupes, magnifiers, or microscopes) may pose an eye hazard.**

- Do not apply power to this equipment if the fiber is unmated or unterminated.

- Do not stare into an unmated fiber or at any mirror-like surface that could reflect light emitted from an unterminated fiber.

- Do not view an activated fiber with optical instruments such as eye loupes, magnifiers, or microscopes.

- Use safety-approved optical fiber cable to maintain compliance with applicable laser safety requirements.

- Even if the unit is off, there may still be hazardous optical levels present.

LCI Function

LCI is software that functions as a user interface for the Prisma II platform. LCI is installed on a computer, which is then connected to a Prisma II Chassis. Using LCI, you can configure and monitor the modules in the chassis to which the computer is connected.

Important: Do not operate any Prisma II Chassis without a fan tray installed. If a fan tray is not installed in the Prisma II Chassis, the LCI will not communicate with any of the power supplies in that chassis.

System Requirements

You will need the following computer software and hardware to run LCI.

Computer Requirements

- Pentium II 300 MHz processor or equivalent
- 128 MB RAM
- 10 MB available hard drive space
- CD-ROM Drive
- Windows 95 or later operating system software

Cable Requirements

The required cable is a standard serial extension cable, DB9 Female to DB9 Male. This cable can be purchased locally or ordered from the factory as part number 180143. The connectors are a serial 9-pin D-shell (EIA 574/232).

Installing LCI

This section describes how to install your LCI software.

To Install the LCI Software

Complete the following steps to install the LCI software.

1   Obtain the LCI installation program from Cisco Services and copy the program file to your Windows desktop.

2   Launch the LCI installation program. The Welcome screen appears as shown in the following illustration.
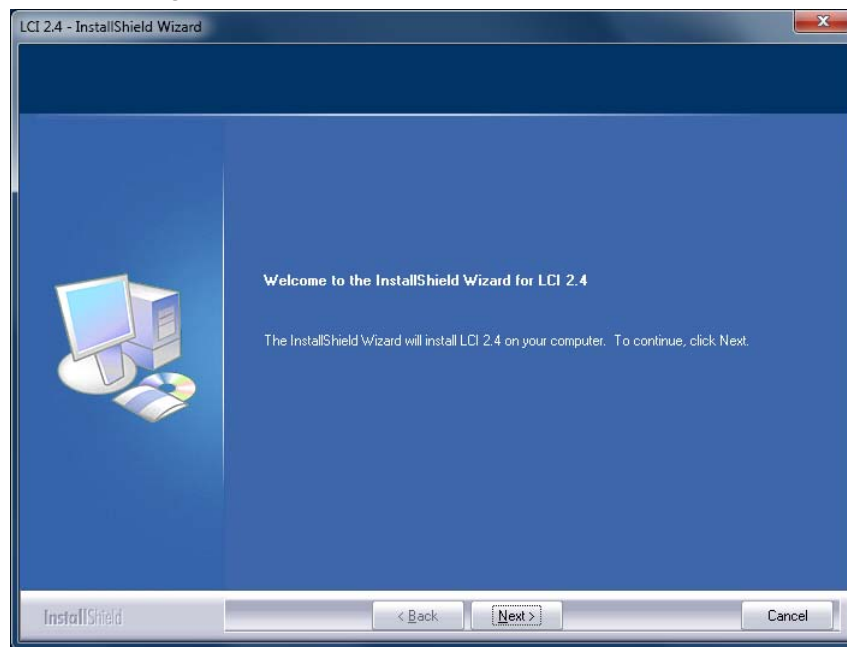
3 Click **Next** to continue with the installation process. The Ready to Install the Program screen appears as shown in the following illustration.
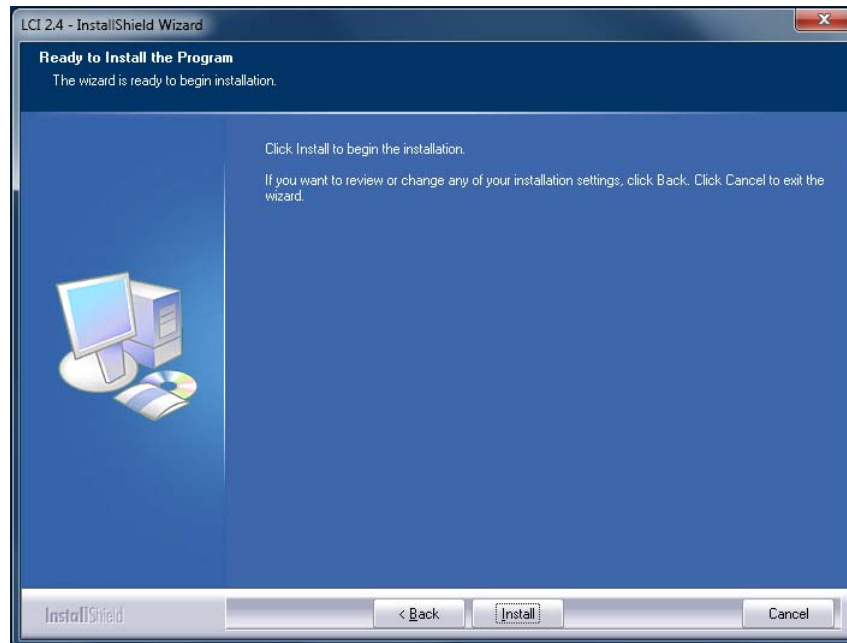
4 Click **Install** to begin installation. After a moment, the Setup Status screen appears, displaying a progress indicator as shown in the following illustration.
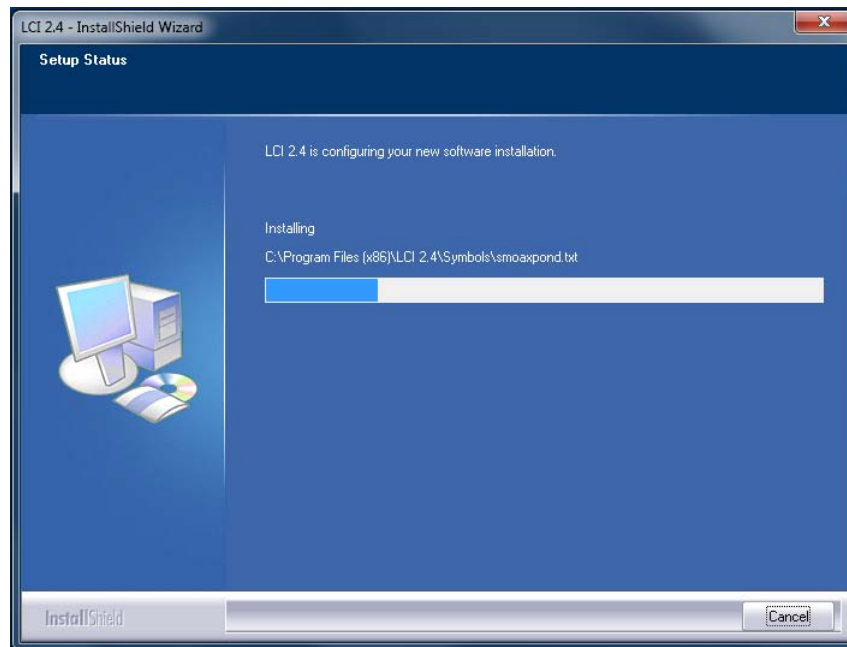
5   When finished, the "wizard" asks if you want to install the Silicon Labs driver, which is required when using LCI with a node product.

◾   If you are using LCI with a node product, choose the **Launch** option, click **Next**, and follow steps of the wizard to install the driver.

◾   If you are not using LCI with a node product, choose the **Exit Installation** option and then click **Next**.
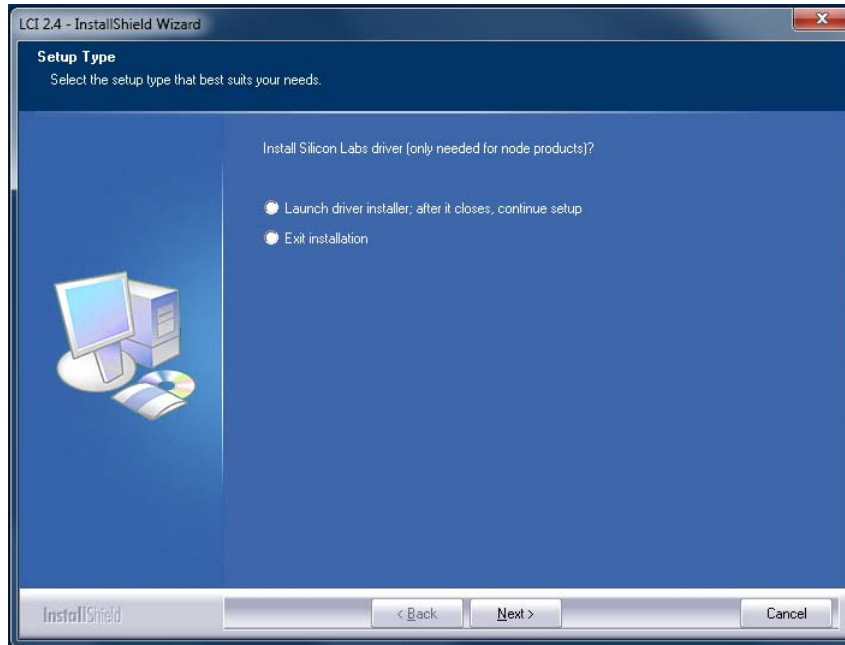
6   When finished, the InstallShield Wizard Complete screen appears as shown in the following illustration.
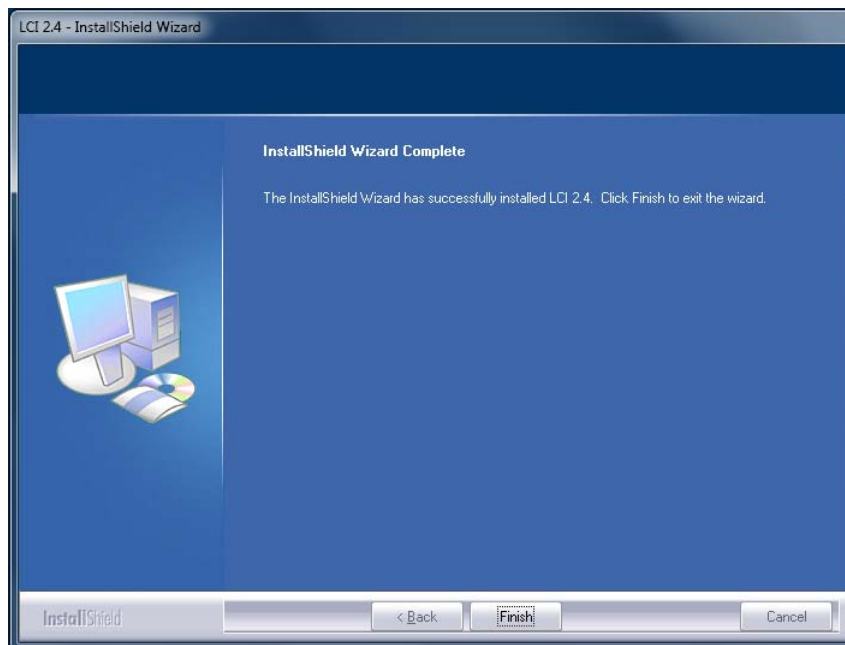
7 Click **Finish** to exit the Install wizard. An LCI shortcut is placed on your Windows desktop as shown in the following illustration.

The LCI software is now ready to use.

Connecting Your Computer to the Chassis

Before you start LCI, you must first connect your computer to the chassis that contains the module(s) you want to check.

Important:

■ LCI only communicates with modules installed in the chassis to which your computer is connected. To check other modules, you must connect your computer to the chassis in which they are installed.

■ If LCI does not communicate with a module in the chassis to which your computer is connected, it may be necessary to update the LCI application.

To Connect a Computer to the Chassis

Complete the following steps to connect your computer to the chassis.

1   Plug one end of a 9-pin RS-232 serial extension cable into your computer.

2   Plug the other end of the cable into the LCI port, labeled **Local Craft Interface**.

Standard Prisma II Chassis
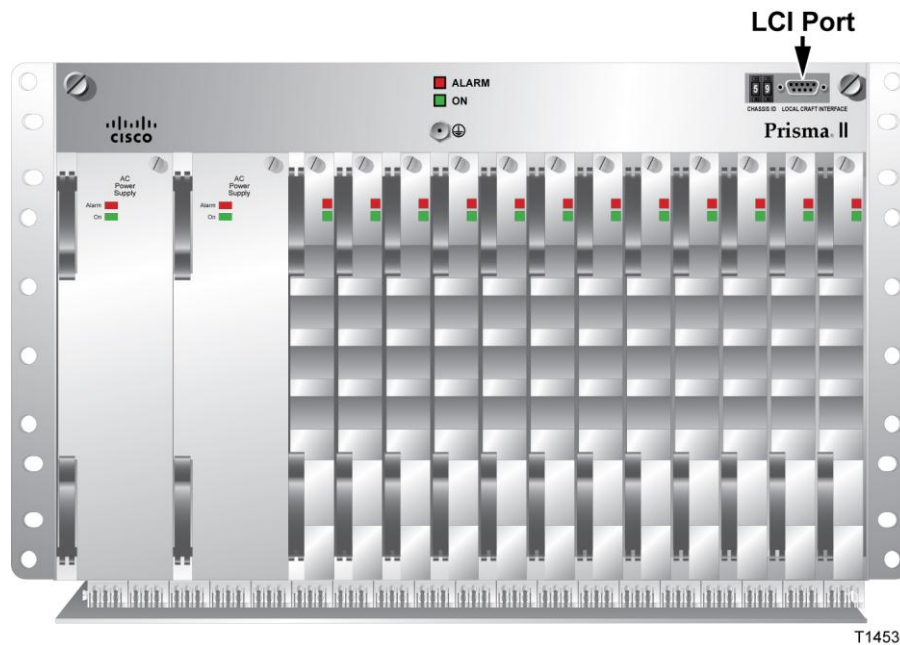
Prisma II XD Chassis (Top Right Corner Detail)
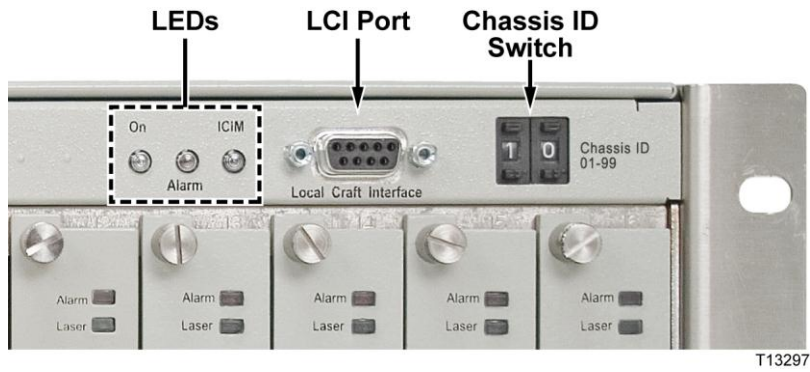
Starting LCI Software

When you start LCI, it polls the module(s) located in the chassis to which your computer is attached. For each module it finds, LCI does the following:

- Represents the module in the module tree of the main LCI window

- Makes the polling information available so you can check and configure various parameters

Important: Your computer must be connected to the chassis before you start LCI. For instructions, refer to *Connecting Your Computer to the Chassis* (on page 74).

To Start LCI Software

Complete the following steps to start the LCI software.

1   Double-click the LCI icon on your Windows desktop.

The LCI Detect Configuration window appears as shown below.
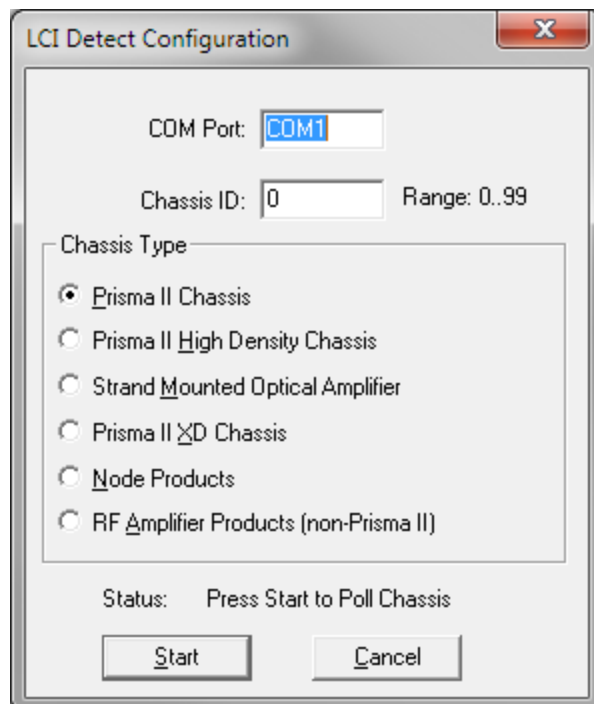
2 In the LCI Detect Configuration window, select the appropriate COM port, chassis ID, and chassis type, and then click **Start**.

The LCI polls the modules in the chassis, and when finished, displays a Refresh Complete message.
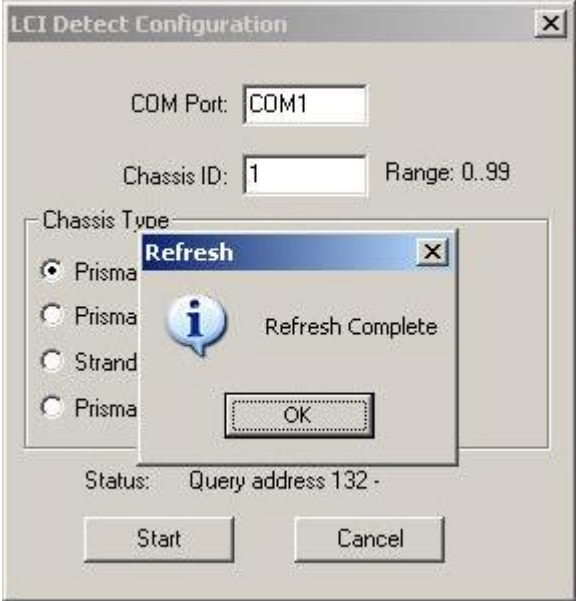
3 Click **OK** to continue with LCI startup.

The main LCI window appears as shown in the example below.
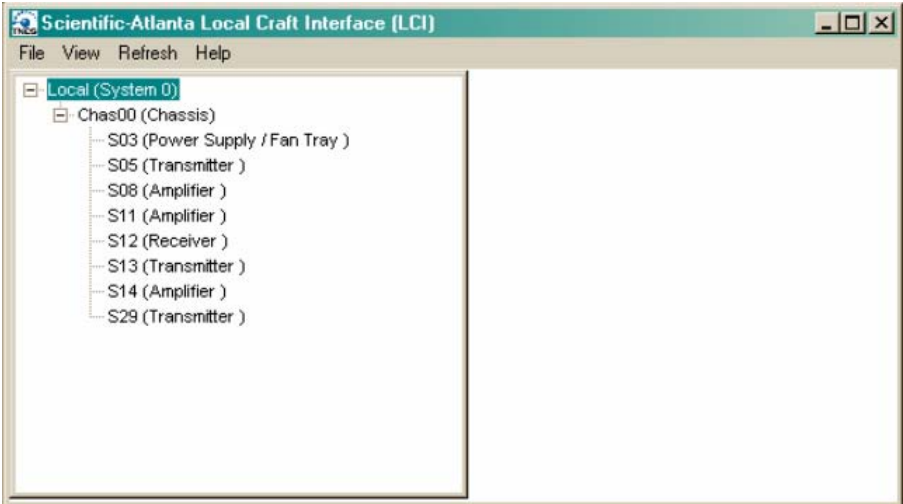
LCI Module Tree

Introduction

The LCI main window contains a tree that represents your system in a hierarchical manner.
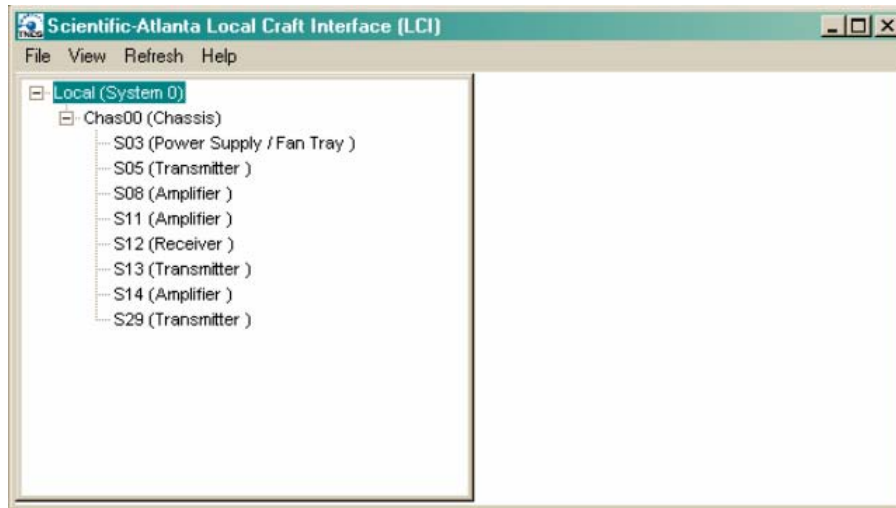
Module Tree

In the graphic above, the module tree represents a computer connected to a chassis that contains ten modules. The three tree levels are described in the following table.

Module Tree Level	Description
Local (System 0)	Computer being used
Chass00 (Chassis)	Chassis the computer is connected to
Sxx (Module name)	Module(s) located within the chassis. Each module is of the format *chassis slot location (module name)*.
	Slot location is from 17-32 if the module is located at the lower slot of the host module. The slot number will be the regular upper slot number plus 16.

Accessing Module Details

The Module Details window displays information about module parameters, alarms, and status. You can access this window from the module tree using one of several methods:

■ Double-click the chassis to display a graphic image of the chassis, and then double-click the module in the graphic.

■ Right-click the chassis in the module tree to display a context menu, and then choose **Open** from the menu.

■ Right-click the module in the module tree to display a context menu, and then select **Details** from the menu.

■ Double-click the module in the module tree.

The procedures in this chapter show the module right-click method. In practice, use the method that you find most convenient.

Module Details Window

1 Right-click the module and then click Details.

Result: The Module Details window appears.

HD-EDFA, HD-EDFA-GF

HD-EDFA-VGF

2   Proceed with viewing or configuring information. Terms in bold text are limits or values that may be changed by the user.

3   Double-click the limit or value to change.

Result: A Change Dialog box appears.

The following screens are typical examples of Change Dialog boxes.

HD-EDFA, HD-EDFA-GF

Change Value Dialog 2	Change Value Dialog 2
Chas01.S113	Chas01.S113
P2-HD-Optical Amplifier	P2-HD-Optical Amplifier
Enable Laser	Set Mode
○ Off ● On	○ ConstantGain ● ConstantPower
Cancel Execute	Cancel Execute

Change Value Dialog	N-State Command Dialog
Chas01.S113	Chas01.S113
P2-HD-Optical Amplifier	P2-HD-Optical Amplifier
Set Pwr	Operational Mode
Range(s)=14.0..17.0,Step=0.5	Command to Slave / Master / **Single**
Command to [17.0] dBm	
Cancel Execute	Cancel Execute

Change Value Dialog	Change Value Dialog
Chas01.S113	Chas01.S113
P2-HD-Optical Amplifier	P2-HD-Optical Amplifier
Redundant Amplifier ID Chassis	Redundant Amplifier ID Slot
Range(s)=0..99,Step=1	Range(s)=1..32,Step=1
Command to [2]	Command to [5]
Cancel Execute	Cancel Execute

HD-EDFA-VGF

4   In the Command to box, type the value to use for the limit or select the appropriate radio button.

5   Click **Execute**.

Result: The new value appears.

5

Maintenance and Troubleshooting

Introduction

This chapter describes the maintenance guidelines and troubleshooting procedures for this Prisma II module.

Qualified Personnel

Only appropriately qualified and skilled personnel should attempt to install, operate, maintain, and service this product.

> ⚠ **WARNING:**
>
> **Allow only qualified and skilled personnel to install, operate, maintain, and service this product. Otherwise, personal injury or equipment damage may occur.**

In This Chapter

Maintenance

The following maintenance is recommended to ensure optimal performance.

Frequency	Maintenance Required
Yearly	■ Check all parameters and test points.
	■ Record data.
	■ Make adjustments as needed.
	■ Make sure all cables are mated properly.
	■ Inspect cables for stress and chafing.
	■ Make sure all retaining screws are tight.
	■ Replace chassis air filter, if present. Depending on office environment cleanliness and filtration, the chassis air filter may require more frequent servicing.
When needed	Carefully clean the module with a soft cloth that is dampened with mild detergent.

Maintenance Record

It may be helpful to establish a maintenance record or log for this equipment. You may want to record laser power level, laser temperature readings, laser bias current, or power supply voltages, as well as the filter change dates.

Large variations in any of the parameters above should be investigated prior to failure.

General Troubleshooting Information

This troubleshooting information describes the most common alarms and gives typical symptoms, causes, and items to check before contacting Customer Service.

Equipment Needed

You may need the following equipment to troubleshoot these modules.

- Digital voltmeter
- Fiber connector cleaning materials

Additional Assistance

If you need additional assistance, contact one of our Technical Service Centers or your local sales subsidiary. Refer to *Customer Information* (on page 87) for contact information.

Troubleshooting

Refer to *Troubleshooting Alarm Conditions* (on page 86) to identify and correct faults.

⚠ **WARNING:**

Avoid electric shock and damage to this product! Do not open the enclosure of this product. There are no user-serviceable parts inside. Refer servicing to qualified and skilled personnel.

Troubleshooting Alarm Conditions

EDFA Module Alarm Conditions

If the red ALARM indicator is illuminated or is blinking, check the display on the front panel to determine the cause of the alarm.

Alarm	Function	Possible Causes	Possible Solutions
LasBias	Laser Bias Current Failed	Automatic power control circuit failure.	Contact Cisco Services for assistance.
LasTemp	Laser Temperature High or Low	■ Laser temperature out of specification. Laser could be faulty. ■ Chassis air filter requires changing.	Contact Cisco Services for assistance.
ModTemp	Module Temperature High or Low	Ambient temperature is too high due to: ■ A failure in the building air conditioning system. ■ Airflow through the rack has been restricted or cut off. ■ Prisma chassis cooling fans are not operating properly.	Ensure the airflow system has not been damaged or removed. Repair or replace fan tray as needed. To troubleshoot the chassis cooling fans, refer to *Prisma II Chassis Installation and Operation Guide*, part number 713375.
InPwr	Optical Input power High or Low	■ Optical source not transmitting. ■ Faulty optical cables or connections.	Check optical source and cables and call connections.
OutPwr	Optical Output Power High or Low	Laser could be faulty.	Contact Cisco Services for assistance.

6

Customer Information

If You Have Questions

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.

Access your company's extranet site to view or order additional technical publications. For accessing instructions, contact the representative who handles your account. Check your extranet site often as the information is updated frequently.

A

Module Parameter Descriptions

Introduction

This appendix provides control, alarm, monitor, and manufacturing data parameters for this equipment.

In This Appendix

High Density EDFA Parameters

Operating Status Parameters

The following table describes the HD EDFA operating status parameters.

Parameter Name	Function	Typical Value	Unit
Optical Input power	Optical input power	5.0	dBm
Output Power	Optical output power	17 – 22	dBm
Laser Temperature	Laser temperature	25.0 or 45.0*	degC
Laser Bias Current	Laser operating current	0.3 – 0.80	A
Laser Limit	Laser operating current limit	1.2	A
Laser TEC Current	Thermoelectric cooler current	0 – 1.05	A
Module Temperature	Module temperature	30.0	degC
Amplifier Status	Module on/off status	On	dB
Amplifier Type	EDFA type	On	dB

* Depending on the type of laser.

Alarm Data Parameters

The following table describes the HD EDFA alarm data parameters.

Alarm Name	Major High	Minor High	Minor Low	Major Low	Values	Typical Value	Hysteresis	Unit
Laser Bias Current	-0.001	-0.010	na	na	OK Alarm	0.625	0.001	AQ
Optical Output Level	1.0	0.7	-0.7	-1.0	OK Alarm	17 20 21 22	0.1	dBm
Input Power	na	na	na	na	OK Alarm	na	0.1	dBm
Laser Temperature *	20.0	15.0	-15.0	-20.0	OK Alarm	25.0	1.0	degC
Laser Enabled Status *	na	na	na	na	OK Alarm	na	na	na

* This alarm sets the unit of the safe state. In the safe state, the amplifier is turned off, causing the optical amplifier output to be disabled.

Manufacturing Data Parameters

The following table describes the HD EDFA manufacturing data parameters.

Parameter Name (lCI)	ICIM Abbreviation	Typical Values
Description	Module	HD EDFA
Software Revision	Sw Ver	1.70
Serial Number	Serial #	MMAAFKHJ
Time of Service	In Service Hrs (initial value)	0
-	Spec Data	Special Data
Day Code	Date Code	L07
Module Type	Module Type	1023
-	Restore Factory Defaults	Restores the module factory default configuration settings.

Configurable Parameters

The following table describes the HD EDFA configurable parameters.

Parameter Name	Products	Function	Default Value	Min	Typical	Max	Step	Unit
Mode	All	Sets operating mode of amplifier	(A)	na	na	na	Constant Gain / Constant Power / Constant Power Flat (VGF only)	na
Enable	All	Enables or disables amplifier	Off	na	na	na	Off / On	na
Set Power	HD EDFA 17	Sets optical output level	17	14	17	17	0.5	dBm
	HD EDFA 20	Sets optical output level	20	17	20	20	0.5	dBm
	HD EDFA 22	Sets optical output level	22	19	22	22	0.5	dBm
	HD EDFA-GF 17 L&H	Sets optical output level	17	14	17	17	0.5	dBm
	HD EDFA-GF 20 L&H	Sets optical output level	20	17	20	20	0.5	dBm

Parameter Name	Products	Function	Default Value	Min	Typical	Max	Step	Unit
	HD EDFA-VGF 17	Sets optical output level	17	5	17	17	0.5	dBm
	HD EDFA-VGF 20	Sets optical output level	20	5	20	20	0.5	dBm
	HD EDFA-VGF 21	Sets optical output level	21	5	21	21	0.5	dBm
Set Gain	HD EDFA 17	Sets gain level in Constant Gain Mode	12	10	12	14	1	dB
	HD EDFA 20	Sets gain level in Constant Gain Mode	15	13	15	17	1	dB
	HD EDFA 22	Sets gain level in Constant Gain Mode	17	15	17	19	1	dB
	HD EDFA-GF 17H	Sets gain level in Constant Gain Mode	12	10	12	14	1	dB
	HD EDFA-GF 20H	Sets gain level in Constant Gain Mode	15	13	15	17	1	dB
	HD EDFA-GF 17L	Sets gain level in Constant Gain Mode	7	5	7	9	1	dB
	HD EDFA-GF20L	Sets gain level in Constant Gain Mode	10	8	10	12	1	dB
	HD EDFA-VGF 17	Sets gain level in Constant Gain Mode	17	5	17	17	1	dB
	HD EDFA-VGF 20	Sets gain level in Constant Gain Mode	20	8	20	20	1	dB
	HD EDFA-VGF 21	Sets gain level in Constant Gain Mode	15	5	15	15	1	dB

Glossary

ac, AC

    alternating current. An electric current that reverses its direction at regularly recurring intervals.

AGC

    automatic gain control. A process or means by which gain is automatically adjusted in a specified manner as a function of input level or other specified parameters.

CAN

    cancel. The cancel character.

dc, DC

    direct current. An electric current flowing in one direction only and substantially constant in value.

DFB laser

    distributed feedback laser. An injection laser diode that has a Bragg reflection grating in the active region in order to suppress multiple longitudinal modes and enhance a single longitudinal mode.

EDFA

    erbium doped fiber amplifier. Optical fibers doped with the rare earth element, erbium, which can amplify light in the 1550 nm region when pumped by an external light source.

EIA

    Electronic Industries Association. A United States association that provides standards for use between manufacturers and purchasers of electronic products.

EMC

    electromagnetic compatibility. A measure of equipment tolerance to external electromagnetic fields.

ESD

electrostatic discharge. Discharge of stored static electricity that can damage electronic equipment and impair electrical circuitry, resulting in complete or intermittent failures.

HD

high density.

I/O

input/output.

ICIM

intelligent communications interface module.

IP

Internet protocol. A standard that was originally developed by the United States Department of Defense to support the internetworking of dissimilar computers across a network. IP is perhaps the most important of the protocols on which the Internet is based. It is the standard that describes software that keeps track of the internetwork addresses for different nodes, routes, and outgoing/incoming messages on a network. Some examples of IP applications include email, chat, and Web browsers.

LCD

liquid crystal display. A display medium made of liquid crystal. Liquid crystal's reflectance changes when an electric field is applied. Commonly used in monitors, televisions, cell phones, digital watches, etc.

LCI

local craft interface.

LED

light-emitting diode. An electronic device that lights up when electricity passes through it.

MIB

management information base. SNMP collects management information from devices on the network and records the information in a management information base. The MIB information includes device features, data throughput statistics, traffic overloads, and errors.

nm

nanometer. One billionth of a meter.

NMS

network management system. A software system designed specifically to monitor a network and to facilitate troubleshooting.

OMI

optical modulation index, expressed in decimal or percentage notation.

OPSW

optical switch.

PLL

phase lock loop. An electronic servo system controlling an oscillator to maintain a constant phase angle relative to a reference signal.

QAM

quadrature amplitude modulation. An amplitude and phase modulation technique for representing digital information and transmitting that data with minimal bandwidth. Both phase and amplitude of carrier waves are altered to represent the binary code. By manipulating two factors, more discrete digital states are possible and therefore larger binary schemes can be represented.

RF

radio frequency. The frequency in the portion of the electromagnetic spectrum that is above the audio frequencies and below the infrared frequencies, used in radio transmission systems.

RMA

return material authorization. A form used to return products.

ROSA®

RCDS open system architecture.

RT

remote terminal. Remote equipment of a supervisory system.

SBS

stimulated Brillouin scattering. The easiest fiber nonlinearity to trigger. When a powerful lightwave travels through a fiber, it interacts with acoustical vibration modes in the glass. This causes a scattering mechanism to be formed that reflects some of the light back to the source.

SMC

> status monitoring and control. The process by which the operation, configuration, and performance of individual elements in a network or system are monitored and controlled from a central location.

SNMP

> simple network management protocol. A protocol that governs network management and the monitoring of network devices and their functions.

TEC

> thermoelectric cooler. A device used to dissipate heat in electronic assemblies.

torque

> A force that produces rotation or torsion. Usually expressed in lb-ft (pound-feet) or N-m (Newton-meters). The application of one pound of force on a lever at a point on the lever that is one foot from the pivot point would produce 1 lb-ft of torque.

TX

> transmit or transmitter.

Index

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