



# Cisco Prisma II EDR Transmitter 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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## Important Safety Instructions

**Read these instructions. Keep these instructions. Heed all warnings. Follow all instructions. Only use attachments/accessories specified by the manufacturer.**

### 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.

## Important Safety Instructions

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.**

## Important Safety Instructions

### 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 **Equipotential Bonding** for connection instructions.

## Important Safety Instructions

### Equipotential Bonding

If this equipment is equipped with an external chassis terminal marked with the IEC 60417-5020 chassis icon () , the installer should see 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 VDC/-60 VDC 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 VDC/-60 VDC 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.

## Important Safety Instructions

- 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.



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- 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](http://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. See 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. See 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:

## **Important Safety Instructions**

### **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 Canadienne Statement**

This apparatus complies with Canadian ICES-003.  
Cet appareil est conforme 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.



## Safe Operation for Software Controlling Optical Transmission Equipment

If this document 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, see the appropriate section of the equipment documentation.

For safe operation of this software, see 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.**



## Warning Labels

The following labels are located on this product.

Laser Warning Label



Product and Laser Information Label





# 1

## Module Introduction

### Overview

This chapter describes the Cisco Prisma II Enhanced Digital Return (EDR) Transmitter module and the Cisco EDR 85 System in which it is used.

### Purpose

This guide provides information about the transmitter. This chapter describes the front and back panels, and presents a setup summary for the transmitter.

### 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 transmitter module
- Installation procedures
- Transmitter monitoring at the receiver
- Maintenance and troubleshooting
- Customer support information

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## EDR 85 System Overview

The Cisco EDR 85 System supports digital transmission of reverse path signals over a fiber optic link from the node to the hub or headend. The system includes a selection of transmitter modules, of which the Prisma II EDR Transmitter is one example, and a companion Cisco Prisma EDR PRX85 Receiver module.

In its included Integrated Transmitter Host Module, the Prisma II EDR Transmitter has a double-wide high density (HD) form factor and can mount directly into two adjacent application slots in a Prisma II XD chassis. The EDR 85 System receiver module has a single-wide HD form factor and can mount directly into a single application slot in a Prisma II XD chassis. An accessory Prisma II Host Module is available to adapt a pair of transmitter or receiver modules for mounting in a standard (full-height) Prisma II chassis.

Both transmitter and receiver modules use Small Form Factor Pluggable (SFP) optical pluggable modules (OPMs) for enhanced flexibility. The EDR 85 System operates over the 5-85 MHz range and supports all standard reverse frequency bandwidths at 40, 42, 55, 65, and 85 MHz.

**Note:** Although the receiver module supports both 1:1 and 2:1 multiplexing configurations, the Prisma II EDR Transmitter supports 2:1 multiplexing only. Accordingly, the instructions in this document are confined to 2:1 multiplexing configurations.

## Features

The EDR 85 2:1 Multiplexing System has the following features:

- High-performance Digital Return technology
  - 12-bit encoding enables transmission of analog video in the reverse band
  - High-order digital modulation signals (for example, 16 QAM, 64 QAM, and 256 QAM)
- Multiple operating modes in the EDR receiver support EDR transmitter and legacy integrated bdr node transmitter
- Optical pluggable modules (OPMs) enable flexible inventory management
- Long-reach transmission capabilities eliminate the need for optical amplifiers, reducing cost and space requirements
- Capable of sending 2:1 multiplexed 5-85 MHz reverse signals over a single fiber
  - Compatible with Cisco's 40 wavelength Dense Wave Division Multiplexing (DWDM) system

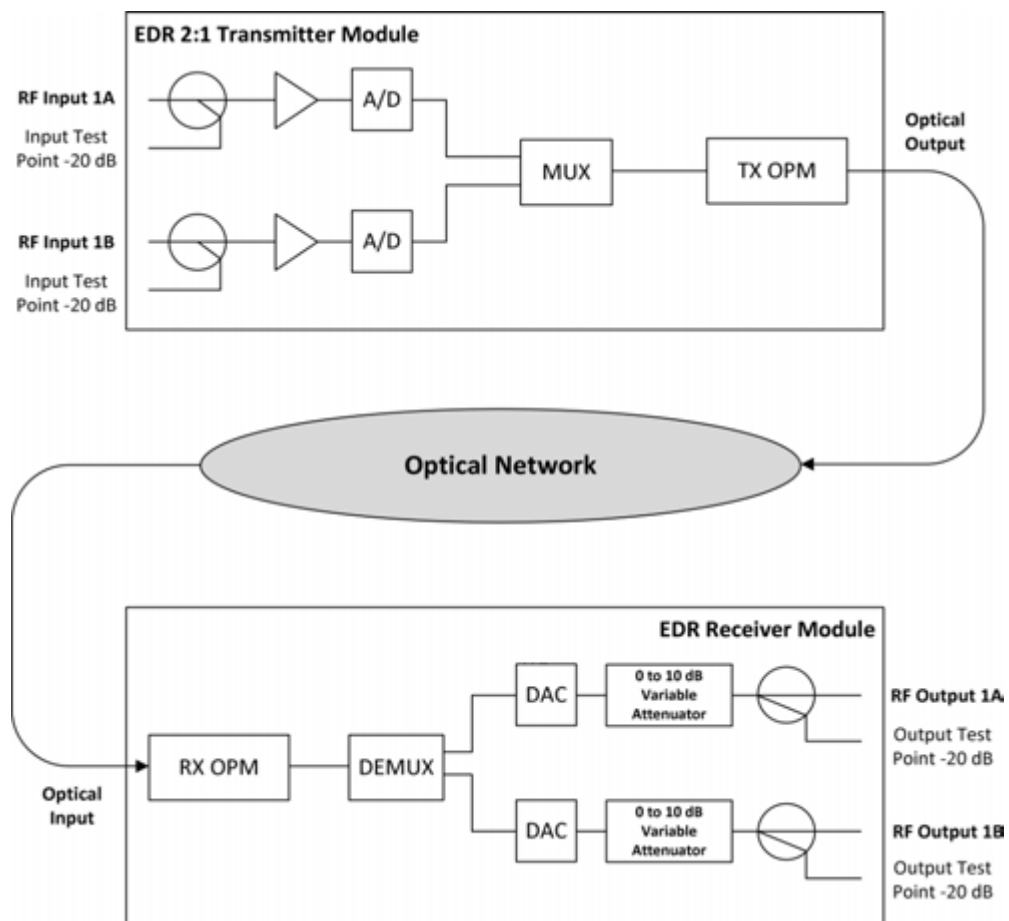
## Chapter 1 Module Introduction

- Enables independent balancing of reverse traffic at EDR receiver ports
- Simplified setup reduces installation time and expertise requirements
- Distance- and temperature-independent link performance simplifies engineering and maintenance requirements
- Space-saving, high-density deployment in Prisma II or Prisma II XD chassis increases deployment cost-efficiency
- Monitoring of transmitter parameters available at the receiver

As with the legacy bdr multiplexing system, the EDR 85 System leverages 2:1 multiplexing to reduce fiber usage.

## System Block Diagram

The following is a block diagram of the EDR 85 2:1 Multiplexing System.





## System Description

The Cisco EDR system is a set of long-haul transport products for CATV reverse path applications. The system is designed to transport analog reverse path spectra from hub or headend to hub or headend over optical fiber. Reverse path signals are typically DOCSIS and DAVIC data.

At the transmitter, one or two analog reverse path signals occupying the 5 - 85 MHz reverse band spectrum are sampled by an analog-to-digital converter (ADC). A high-speed serial data stream is constructed by scrambling and framing the data. This data stream is carried optically over fiber to a remote hub or headend, where the receiver detects the optical signal and converts it back to a serial electrical signal. The data is unpacked and sent to a digital-to-analog converter (DAC), which reconstructs the originally transmitted analog spectrum.

This system consists of an optical transmitter module installed in a Prisma II or Prisma XD chassis, and an optical receiver module installed in another Prisma II or Prisma XD chassis at the hub or headend.



### CAUTION:

**The EDR receiver is designed to work exclusively with EDR transmitters as part of the Cisco EDR system. Results with other transmitters are not guaranteed. Do not install Cisco EDR transmitters in any daisy chain with one or more Cisco EDR receivers.**

The receiver module contains two separate optoelectronic receiver circuits. Optical input is through an OPM connector mounted on the front of the module. The RF output is through two connectors on the rear of the module.

Each RF output can be attenuated by as much as 10 dB, relative to no attenuation, in 0.5 dB increments. The actual RF output levels of the receiver, attenuated by 20 dB, can be monitored at a selectable test point on the front panel.

The receiver supports 2:1 configurations in an XD form factor for both Prisma II (using Host Module) and Prisma XD Chassis. The OPM optical input uses a dual LC/PC connector and supports all standard reverse bandwidths: 40, 42, 55, 65, and 85 MHz.

When used together with the Prisma II EDR Transmitter module, the receiver supports two operating modes, Single 2:1 and Dual 2:1. The factory default operating mode is Dual 2:1; Single 2:1 operation can be selected by the user. For additional details on these operating modes, see *Receiver Operation* (on page 7).

Additionally, the receiver can be operated in any of three redundancy modes: Master, Slave, or Single. When the receiver module is placed in Single operating mode, both receiver channels in the module will continue to operate even if the optical input level falls below the major alarm threshold.

Key operating parameters of the receiver can be controlled and monitored by an ICIM2 or ICIM2-XD, LCI software, ROSA software, CLI commands, or the ICIM Web Interface. In addition, some transmitter information can be monitored via the receiver.

**Note:** Node data is only available for GS7000 Nodes that have a transponder-less LCM installed and an interface cable installed between transmitter and LCM. For details, see the *Cisco Enhanced Digital Return (EDR) C2185 Transmitter for Compact Segmentable Nodes A9020x Installation and Operation Guide*, part number 62-7023683-01

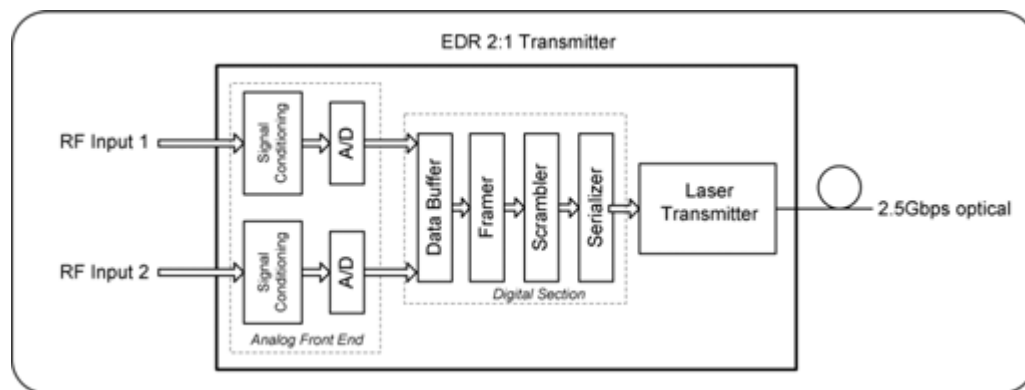
. Some transmitter data is available in all cases.

## Transmitter Operation

At the transmit end of the system, reverse path RF input signals from each Prisma II Transmitter port are routed to an EDR 2:1 Transmitter Module in the Prisma II chassis. The transmitter module converts each signal to a baseband digital data stream and combines the signals into a serial data stream using time-division multiplexing (TDM). The baseband data stream is then converted to an optical signal for transmission to the headend or hub EDR receiver.

The data stream is carried optically over fiber, via an SFP type OPM module, to a remote headend or hub location where the optical signal is detected and converted back to a serial electrical signal. The data is then descrambled and deframed, and is then switched to a digital-to-analog converter (DAC), where the analog spectrum that was sampled at the transmit side is reconstructed. The baseband data stream is converted to an optical signal for transmission back to the headend or hub.

The following block diagram shows the transmitter module's internal components.

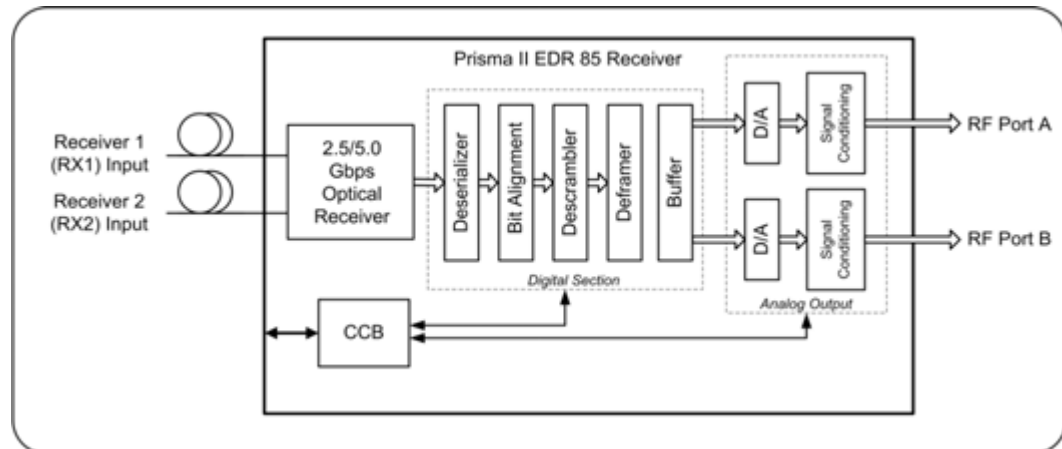


The EDR Transmitter module uses the same style housing as Prisma II optical receivers and transmitters, except that it uses a double-wide module housing. This housing occupies two adjacent slots in the Prisma II or Prisma XD chassis.

## Receiver Operation

At the receive end, typically in a large hub or headend, the EDR Receiver module receives the optical signal and performs the conversion back to the baseband data stream. The resulting data stream is converted back to analog reverse path signals for routing to termination equipment.

The following block diagram shows the receiver module's internal components.



At the headend, the reverse optical receiver converts the optical signal back to an RF signal that is then routed out through the receiver's RF output.

### Operating Modes

When used together with a Prisma II EDR Transmitter, the receiver can be configured for either of two modes of operation:

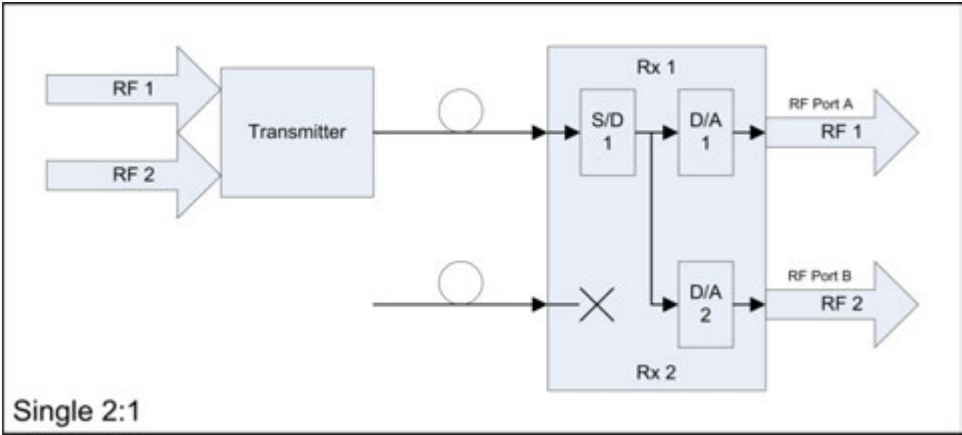
- Single 2:1
- Dual 2:1

These operating modes are described below.

#### Single 2:1 Mode

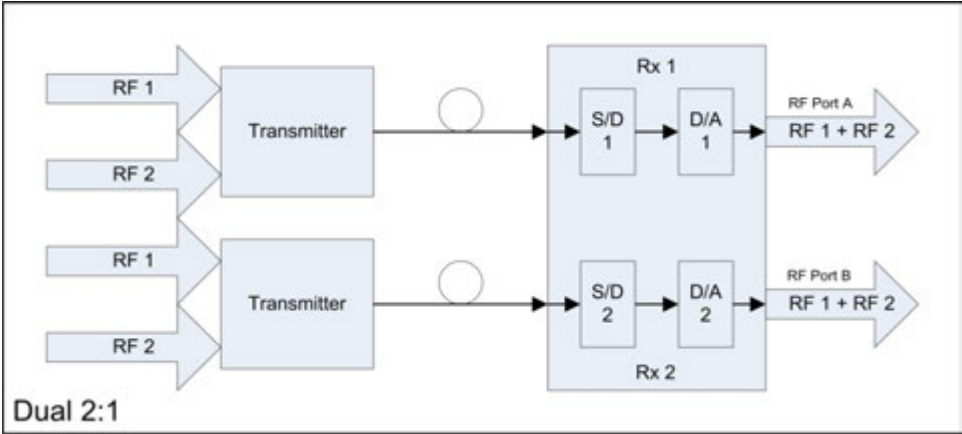
Referring to the diagram below, the EDR transmitter digitizes and combines two RF signals (RF 1 + RF 2) into one serial stream and transmits it over optical fiber to the receiver. At the receiver, the serial stream is deserialized, converted back to its two analog RF components, and then sent to the two RF connectors on the back of the module. RF 1 appears on RF port A, and RF 2 appears on RF port B.

**Note:** The optical fiber must be plugged into the top receiver on the OPM.



Dual 2:1 Mode

Referring to the diagram below, two EDR transmitters are connected to one receiver. Each EDR transmitter digitizes and combines two RF signals (RF 1 + RF 2) into one serial stream and transmits it over optical fiber to the receiver. At the receiver, the serial streams from the two separate transmitters are deserialized and converted back to their two analog RF components. Because the receiver only has two RF ports, the combined signals (RF 1 + RF 2) for each transmitter are sent to the two RF connectors on the back of the module.



The EDR Receiver module is available in the High Density (HD) form factor. The receiver OPMs are available in Standard Range (SR) and Extended Range (XR) configurations. Both configurations feature a dual LC/PC optical input connector that feeds two independent reverse optical receivers, each with its own RF output port.

For additional details on the EDR Receiver module, see the *Cisco Prisma II EDR Receiver Installation Guide*, part number OL-29646-01.

## Prisma II EDR Transmitter Overview

The EDR Transmitter with Integrated Transmitter Host Module is a plug-in module 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 Integrated Host Module installs into a Prisma II XD Chassis directly, or into a standard Prisma II Chassis by means of a Prisma II host module that accepts up to two Prisma II High Density application modules. The EDR Transmitter with Integrated Transmitter Host Module occupies two adjacent application slots in the Prisma II or Prisma II XD chassis.

The transmitter module contains an optical pluggable module (OPM) connector that provides inputs for two separate optical receiver circuits.

All connectors are easily accessible. ALARM and Power ON indicators on the front panel allow you to monitor power and alarm status at a glance.

### Transmitter Features

The transmitter has the following key features:

- Front panel LEDs indicate alarm and power status
- Two RF inputs, each with -20 dB RF test point on front panel
- LC/PC optical output connector in an OPM
- SC/APC optical output connector on front panel
- Plug-and-play capability
- Parametric monitoring via companion Prisma II EDR Receiver module
- Blind-mate radio frequency (RF) connections on module back panel

### Transmitter Status Indicators

The transmitter module has two status indicator LEDs.

Status LED	Indication
Alarm (red)	ON - A laser fault condition exists. OFF - The laser is on and functioning with no faults reported.
On (green)	ON - Power supply is good and module is receiving power. OFF - Module is not receiving power from the power supply.

## Transmitter Optical Input

The optical input is a dual LC/PC connector in an OPM.

## Laser Warning

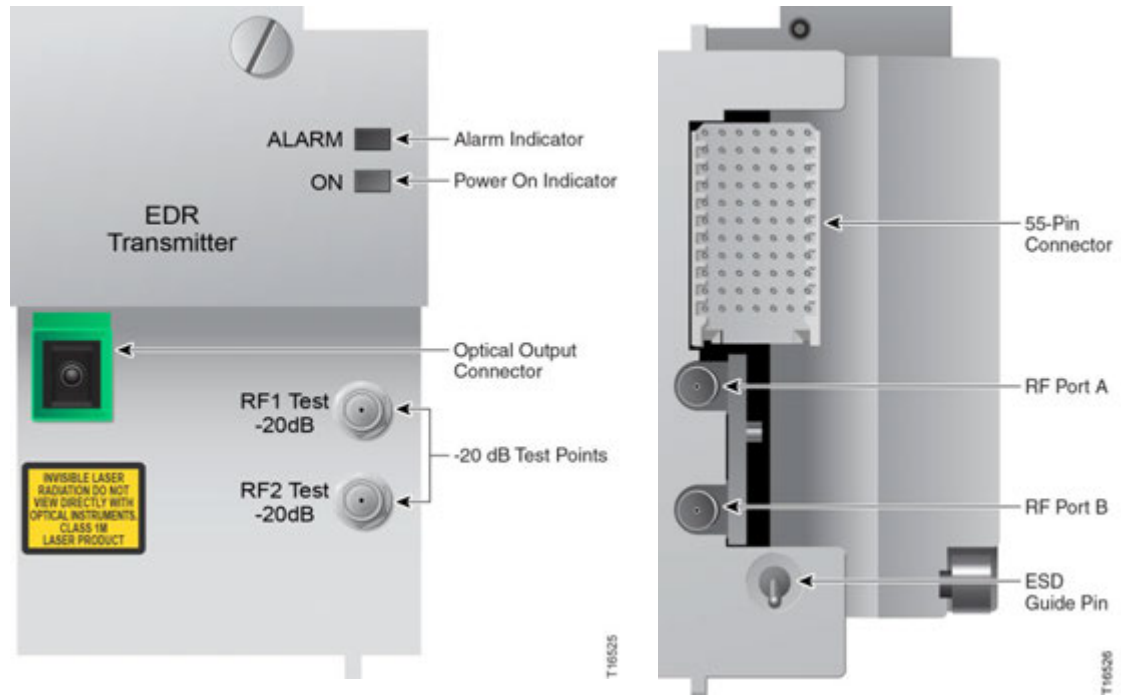


**WARNING:**

**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.**

# EDR Transmitter Front and Back Panel

## Transmitter Illustration (Front and Back)



## Transmitter Front Panel Features

Part	Function
Alarm Indicator LED	Illuminates or blinks when an alarm condition occurs. <ul style="list-style-type: none"> <li>■ Blinks rapidly for about 12 seconds following power-up while FPGA code is loaded.</li> </ul>
Power On Indicator LED	Illuminates when power is supplied to the module. <ul style="list-style-type: none"> <li>■ Blinks rapidly for about 12 seconds following power-up while FPGA code is loaded.</li> <li>■ Glows steadily to indicate Master, Single, or Active Slave operation.</li> <li>■ Blinks to indicate active Slave operation.</li> </ul>
Optical Output Connector	Fiber optic output from the OPM.
-20 dB Test Points	Provides a -20 dB sample of the RF input signal to each channel.

## Back Panel Connectors

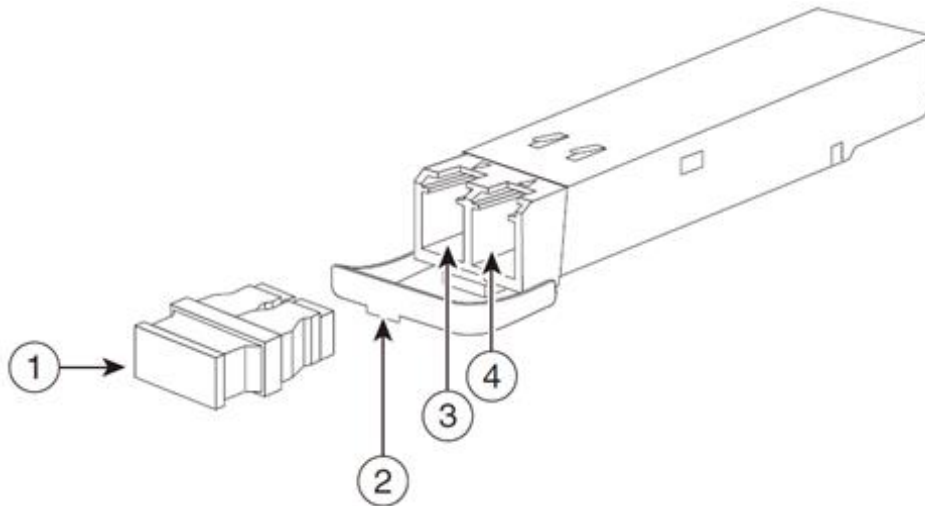
Blind-mate connectors make it easy to install this module. The push-on connector on the back of the module mates with the back plane bus connector inside the chassis. This 55-pin connector and the two RF connectors provide the following facilities.

- RF signal connections
- 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.

## About the OPM

The EDR system makes use of OPM devices at both ends of the reverse path from node to headend or hub. The following illustration identifies the main components of the OPM.



Item	Description
1	Dust plug
2	Bale clasp (shown open; push upward to close)
3	Transmit bore (not in use for the receiver)
4	Receive bore (not in use for the transmitter)



At the node or Prisma II chassis, the reverse transmitter converts one or more RF signal(s) to an optical signal using an installed OPM, and transmits the signal to the headend or hub via fiber optic cable.

When this optical signal reaches the headend or hub, the reverse optical receiver converts the signal to an RF signal and then routes the signal to the receiver's RF output using its installed OPM.

## 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.**

## Prisma II Chassis Host Module

A standard Prisma II Chassis host module is required to mount high density application modules 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.

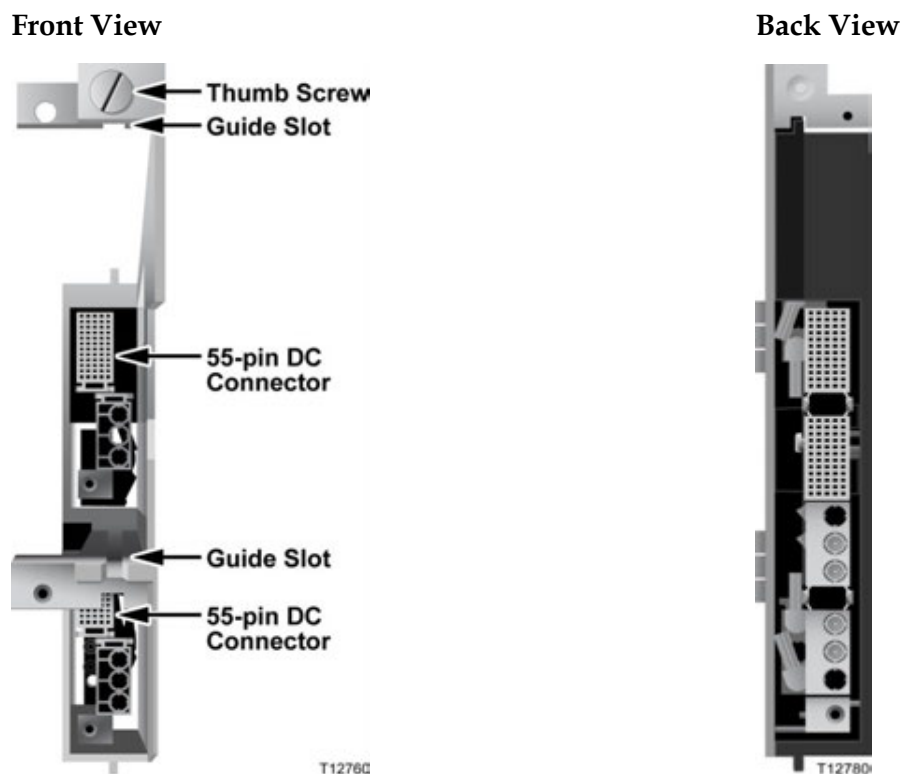
For the Prisma II EDR Transmitter with Integrated Transmitter Host Module, the chassis accepts two double-wide EDR Transmitter modules. This host module occupies two adjacent application slots in the Prisma II chassis.

### Host Module Features

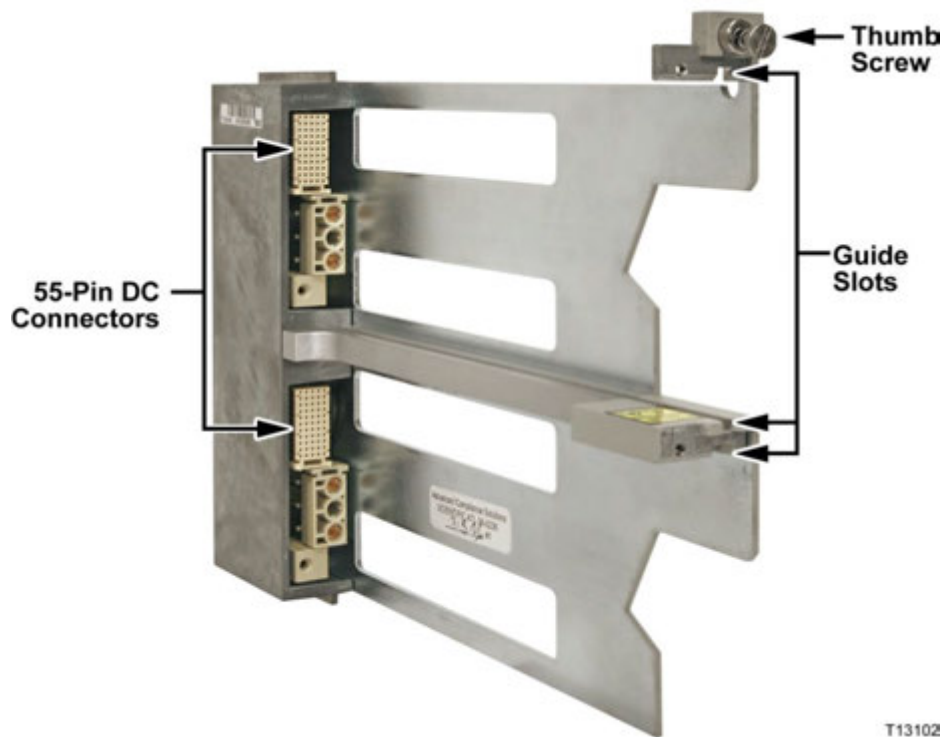
The Prisma II Chassis host module has the following features:

- 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



## 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.

Parameter for the Prisma II EDR Transmitter may be configured only through the corresponding Prisma II EDR Receiver module. See the receiver documentation for details.

### Configuration Summary

You can use the receiver to perform the following configuration tasks:

- Enable or disable each transmitter channel
- Force Mute
- Force Alarm (to service redundant modules)
- Select Master, Slave, or Single operation
- Select attenuation level per channel
- Select transmitter mode
- Enable bandwidth limiting
- Select the node or Prisma II transmitter to view

See the *Cisco Prisma II EDR Receiver Installation Guide*, part number OL-29646-01 for detailed information on configuring this module.

# 2

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## System Installation

### Introduction

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

### In This Chapter

■ Preparing for Installation.....	18
■ Site Requirements .....	19
■ Connecting the RF Cables to the Chassis .....	23
■ Installing the HD Module in the Chassis .....	25
■ Cleaning Optical Connectors .....	29
■ Connecting Optical Cables .....	31
■ Transmitter Module Setup Procedure .....	34

## 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 the module.

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. If you find any damage, contact Cisco Services. See *Customer Information* (on page 39) for contact information.

## Site Requirements

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

### Access Requirements

**WARNING:**

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

Ensure that only authorized personnel have access to this equipment. 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.

- The temperature of the module must be maintained between 0°C and 50°C (32°F and 122°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 double-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 an available pair of application module slots, which are generally slot pairs 5-6 through 15-16.

- If the module occupies the upper host module position, its slot number is the same (5 through 15) as that of the first slot number of the host module.
- If the module occupies the lower host module position, its slot number is 16 plus the first slot number of the host module, or 21 through 31.



#### CAUTION:

**To ensure proper air circulation when installing a single Prisma II EDR Transmitter module in a Prisma II host module, install the transmitter in the upper position and a single-wide application module or blank in the lower position of the host module.**

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 adjacent pair of available application module slots 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.

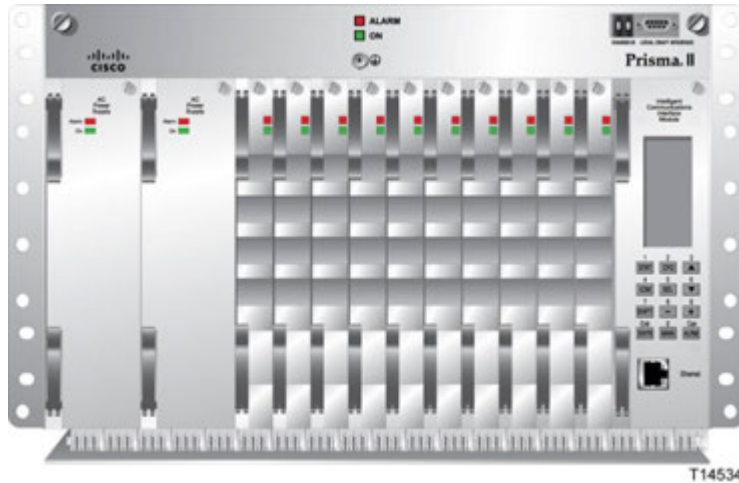
## Prisma II Standard Chassis Style

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**

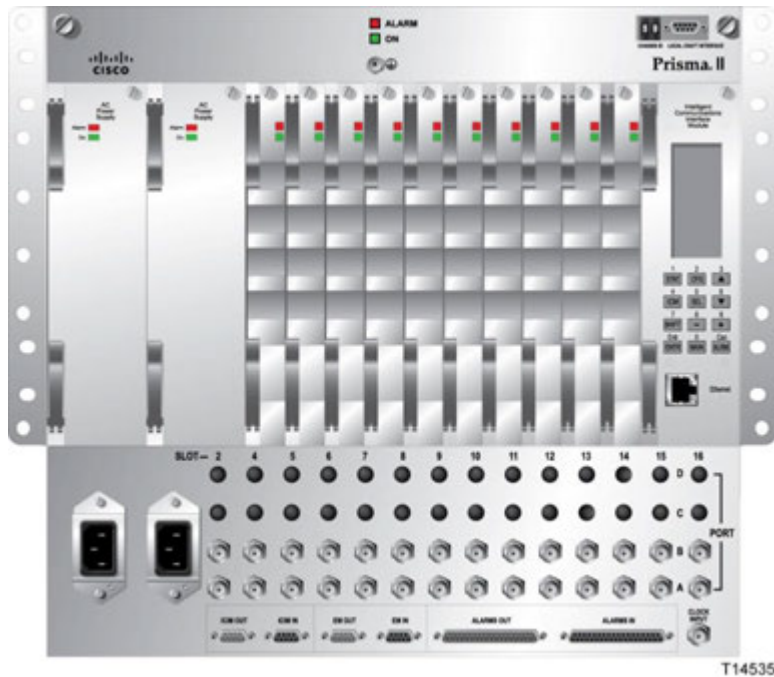
The following illustration shows the front of the rear-access Prisma II standard chassis with two power supplies, 10 full-height modules, and the ICIM installed.



**Front-Access Chassis - Front Panel Illustration**

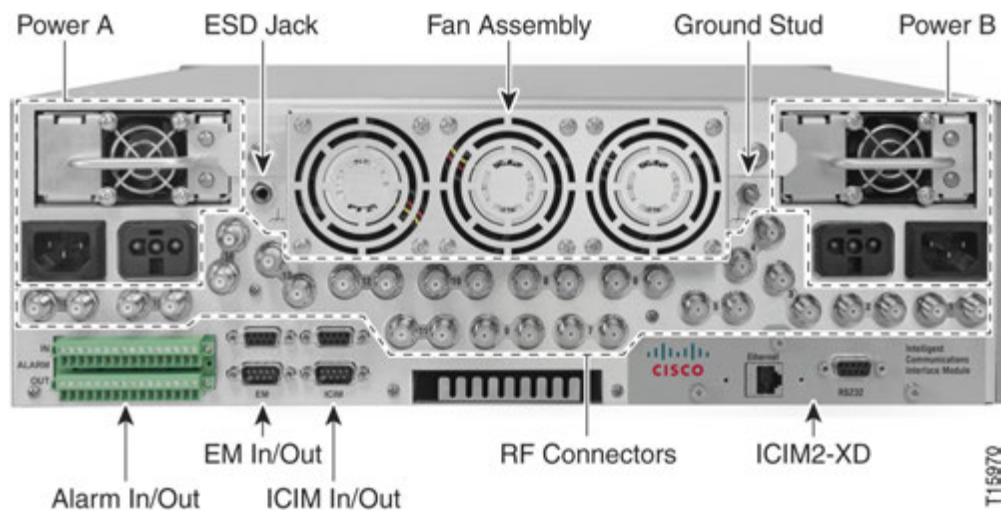
The following illustration shows the front of the front-access Prisma II standard chassis with two power supplies, 10 full-height modules, and the ICIM installed.

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.



## 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

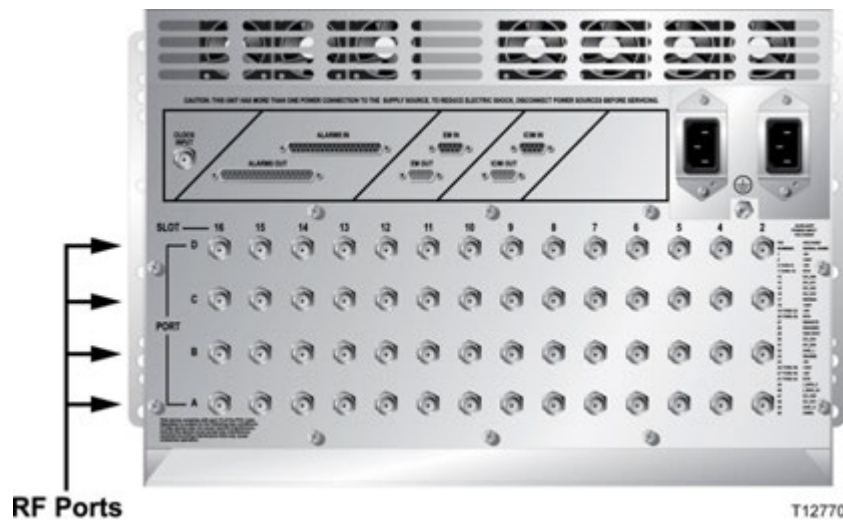
Complete the appropriate procedure in this section to connect RF cables for the module.

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

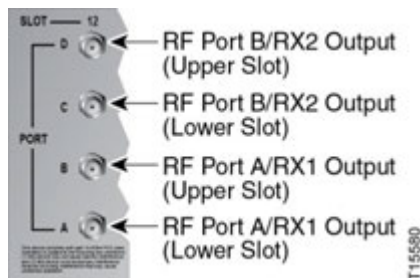
#### Standard Prisma II Chassis

**Note:** This procedure assumes that you are using a host module with application modules installed in both lower and upper half-slot positions. If only one module is installed, it is not necessary to connect RF cables for the unused position.

- 1 Locate the RF ports on the chassis connector panel. The connector panel is on the front of a front-access chassis, and on the rear of a rear-access chassis. The figure below shows the connector panel for a rear-access chassis.



- 2 Connect RF cables to the Port A and Port C connectors for the chassis slot in which the host module will be installed. These are the RF output connections for the module in the lower half-slot position. Hand-tighten the connectors.



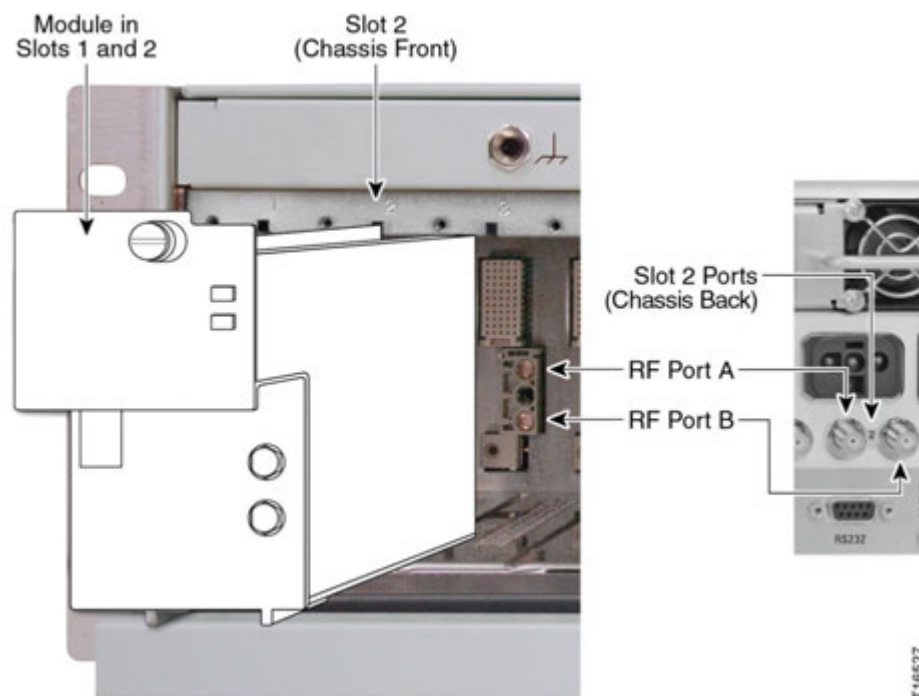
- 3 Route the RF cables from Ports A and C (for the lower half-slot module) to the appropriate RF destinations.

## Chapter 2 System Installation

- 4 Connect RF cables to the Port B and Port D connectors for the chassis slot in which the module will be installed. These are the RF output connections for the module in the upper half-slot position. Hand-tighten the connectors.
- 5 Route the RF cables from Ports B and D (for the upper half-slot module) to the appropriate RF destinations.
- 6 If F connectors are installed, use a 7/16-in. open-end wrench to secure all cables to the connectors at the chassis.

### Prisma II XD Chassis

- 1 Attach a 75-ohm RF cable to the appropriate RF signal source.
- 2 Locate the numbered RF ports at the back of the chassis.



- 3 Attach the other end of the RF cable to the Port A connector of the **second** slot where the module is to be installed (slot 2 in the example shown). This is the RF input connection.
- 4 Use a 7/16-in. open-end wrench to secure all cables to the F connectors at the chassis.

## Installing the HD Module in the Chassis

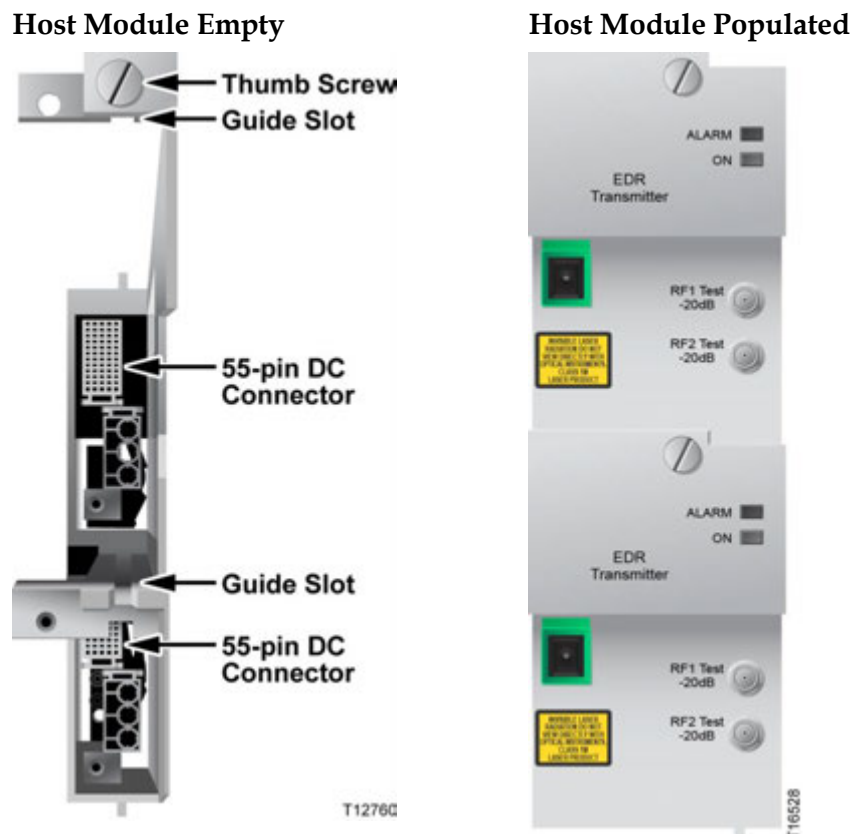
### To Install the Application Modules in the Host Module

**Important:**

- 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.
- Prisma II host modules prior to Rev C (date codes through A2006) do not support the Controller Area Network (CAN) bus.
- To support CAN bus redundancy, the ICIM2 must be Rev B or later.

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

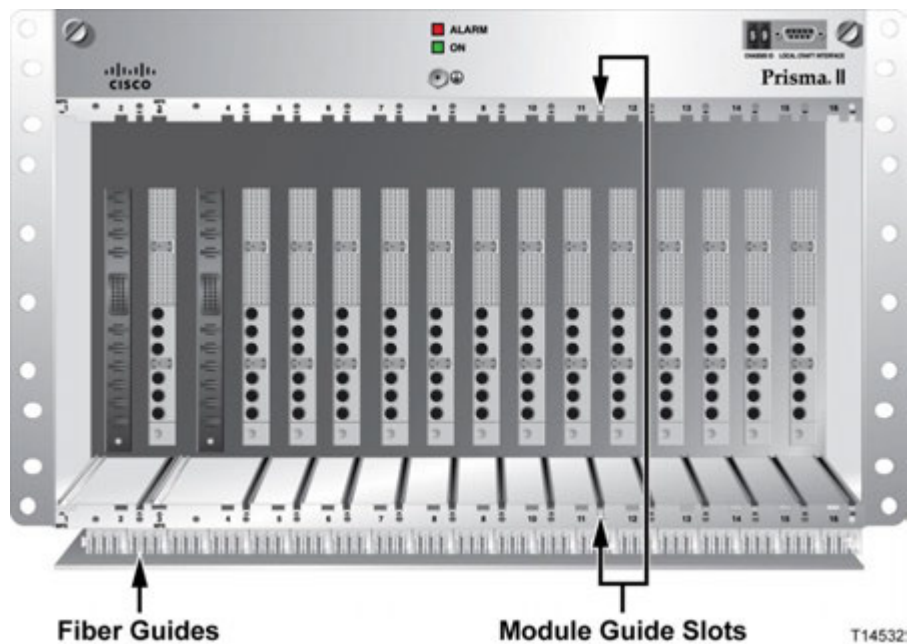
- 1 Align the ridges on the top and bottom of the module with the guide slots located on the host module and the chassis. Be careful to keep the module level as you slide it into the host to avoid bending the pins on the host back plane.
- 2 Gently slide the module into the host module until you feel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



## To Install the Module in the Chassis

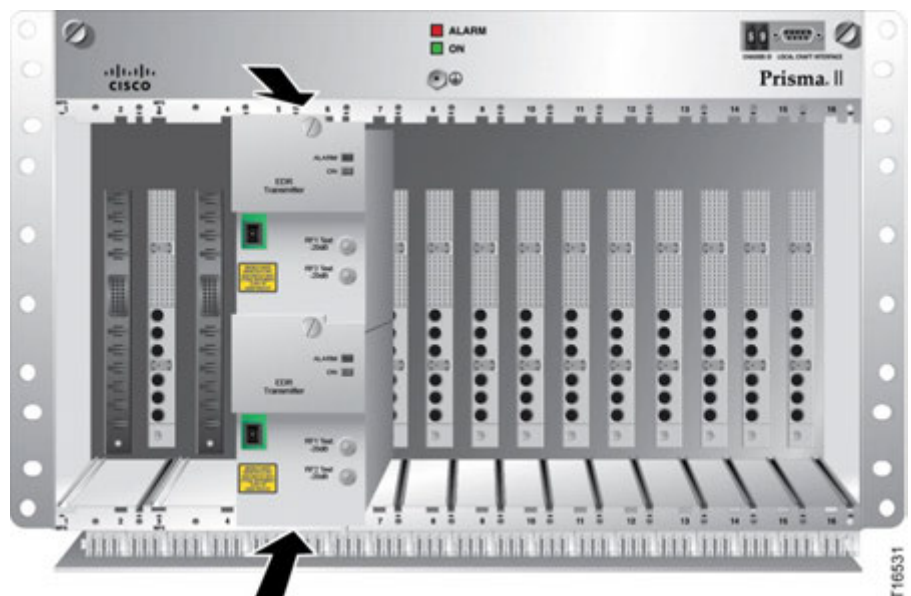
**Note:** This procedure assumes that the chassis is mounted in a rack.

- 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.



- 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.





- 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 from Cisco 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.

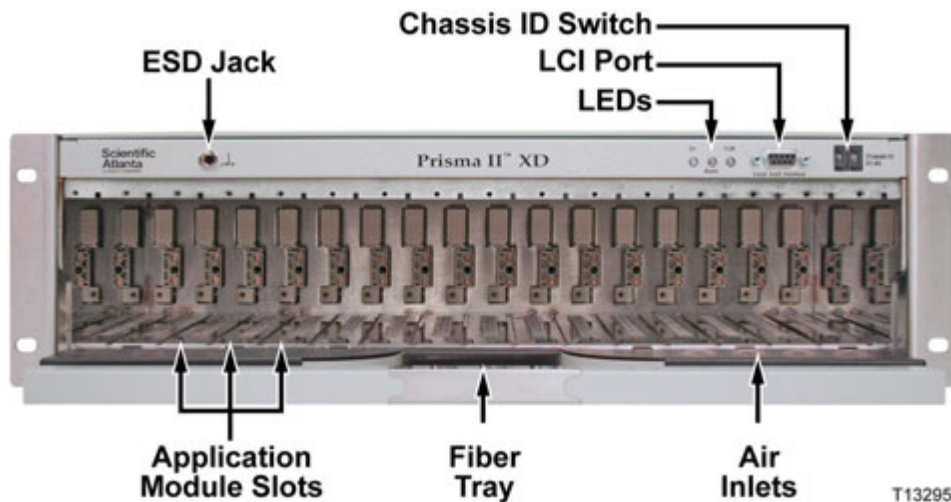
Complete the following steps to install the module in the chassis.



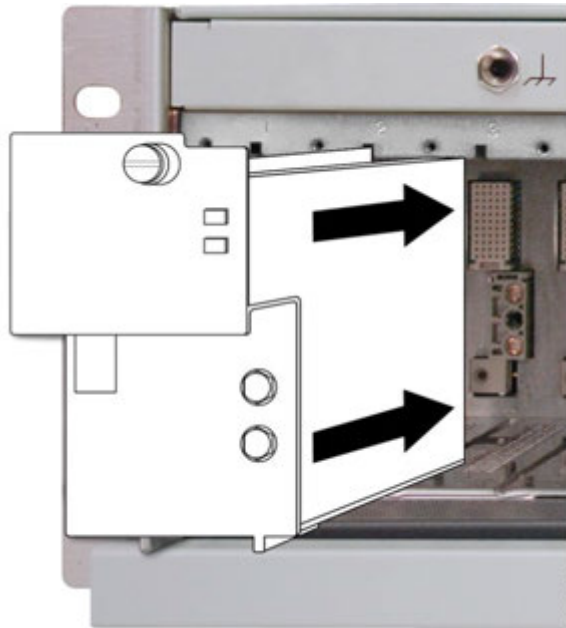
**CAUTION:**

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



- 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.



- 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.



## Cleaning Optical Connectors

**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.

# Connecting Optical Cables

## Cable Routing - Prisma II Chassis

### 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.



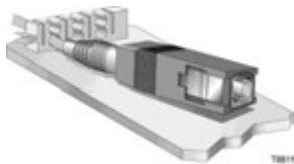
### Fiber Fish Tool Hook

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.

## Cable Routing - Prisma XD Chassis

Feed each fiber through the fiber tray located beneath the Prisma XD Chassis. The fiber tray slides in and out to facilitate routing.

## To Connect Optical Cables to Module

**Important:** Observe laser safety precautions. See **Laser Safety information** earlier in this guide.

**Note:** This procedure assumes that the chassis is mounted in a rack and that fiber optic cable has been run to the chassis front panel.



**CAUTION:**

The OPM is sensitive to electrostatic discharge. Always use an ESD strap or similar individual grounding device when handling or coming into contact with these modules.



**CAUTION:**

Removing and installing the OPM can shorten its useful life. Do not remove and insert the OPM more often than absolutely necessary.

- 1 Select the appropriate OPM for the transmitter from the list provided in the Cisco EDR System data sheet.  
**Note:** See [www.cisco.com](http://www.cisco.com) for data sheets.
- 2 Remove the dust plugs from the OPM and save them for possible future use.
- 3 Line up the OPM with the connector on the side of the transmitter as shown below, and slide the OPM into the connector until it clicks into place.



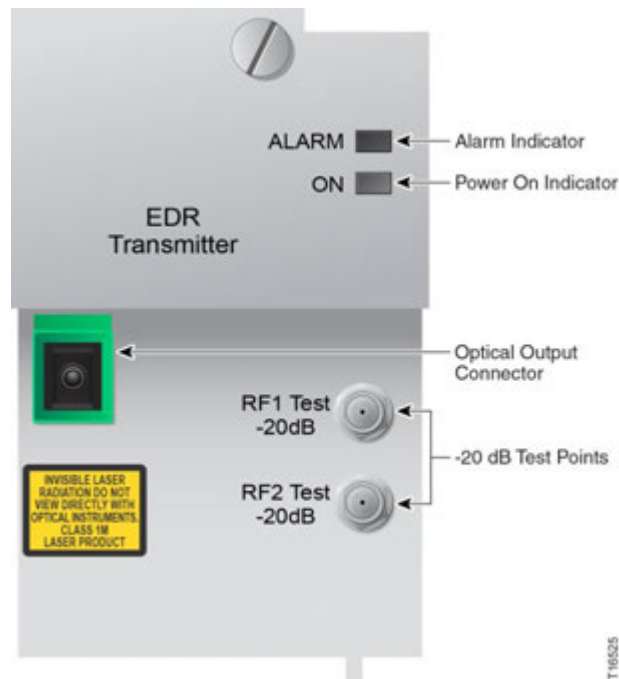
## Connecting Optical Cables

- 4 Install the fiber optic jumper provided between the OPM connector and the front panel optical output connector, as shown below.



**Note:** To ensure the proper bend radius, be sure to route the fiber through the clips as shown.

- 5 Insert the transmitter end of the appropriate fiber optic cable into its receptacle on the transmitter front panel.



- 6 Route the other end of the fiber optic cable to the appropriate destination.

## Transmitter Module Setup Procedure

Transmitter operating parameters are preset at the factory and require no additional configuration before placing the module into service.

To confirm specific transmitter information, review the monitoring interface (ICIM, LCI, and so on) of the Prisma II receiver to which the transmitter is connected. All transmitter information is listed in the Node Data section of the display.

The following example shows an LCI screen for the Prisma II EDR Receiver module with transmitter data displayed under Node Data.

EDR 2:1 Dual Receiver					
Parameters					
Present Value	Present Status	Minor Alarm Low Limit	Minor Alarm High Limit	Major Alarm Low Limit	Major Alarm High Limit
Optical Input 1	4.5	Normal	30.0	0.0	33.0
Optical Input 2	50.0	Normal	23.0	0.0	33.0
dBm					

Alarms		Rx-Controls		Node-Data		Properties	
Summary Status	Normal	Mode Select	Single	Tx OPM Compliant	No	Devtype Revision	1.12
Communication Status	Normal	Enable 1	On	Tx Wavelength	1551.72	Name	S13
		Enable 2	Off	Tx Power	3.18	Graphic	
		Rx 1 Input 1 Enable	On	Tx OPM Serial Number	48968	Service Name	
Power Supply Status	Normal	Rx 1 Input 2 Enable	On	Tx OPM Type	DWDM	Symbol	
Rx 1 Loss Of Data	Normal	Rx 2 Input 1 Enable	On	Tx Type	2:1	Device Location	
Rx 2 Loss Of Data	Normal	Rx 2 Input 2 Enable	On	Tx FW Version	0.32	Alias	
Internal Communication Status	Normal	Limit Bandwidth	Off	Tx OPM TOS	2784	Notify Set A	
Forced Alarm Status	Normal	RF Atten 1	0.0 dB			Notify Set B	
Node Data Valid	Normal	RF Atten 2	0.0 dB			M&C Scan	On/Scan
		Rx Mode	Dual 2:1			Maintenance Mode	Normal
		Node Select	1			Poll Counter	1137
						Script	
						Comm Alarm Threshold	1
						Comm Quality	%
						Address	03
						Port	COM5
						Description	EDR 2:1 Dual Receiver
						Software Revision	1.00.50
						Script Version	N/A
						Serial Number	*ABCDEFG
						Time Of Service	3520 Hrs
						Date Code	A11
						Module Type	2027

Perform the following steps ensure correct operation of the transmitter module:

- 1 Measure the transmitter module optical output power.
- 2 Check the connection of the optical connector. Make sure the optical connector is seated and verify fiber bend radius is greater than 1 inch.



### WARNING:

Always follow laser safety precautions when handling optical fibers.

# 3

## 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 ..... 36
- General Troubleshooting Information..... 37

## Maintenance

The following maintenance is recommended to ensure optimal performance.

Frequency	Maintenance Required
Yearly	<ul style="list-style-type: none"> <li>■ Check all parameters and test points.</li> <li>■ Record data.</li> <li>■ Make adjustments as needed.</li> <li>■ Make sure all cables are mated properly.</li> <li>■ Inspect cables for stress and chafing.</li> <li>■ Make sure all retaining screws are tight.</li> <li>■ Replace chassis air filter, if present. Depending on office environment cleanliness and filtration, the chassis air filter may require more frequent servicing.</li> </ul>
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.

### Troubleshooting

See the *Transmitter Module Troubleshooting Chart* (on page 37) and the **Troubleshooting** section of the *Cisco Prisma II EDR Receiver Installation Guide*, part number OL-29646-01 for help identifying and correcting 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.

### Equipment Needed

The following equipment may be needed to perform some troubleshooting procedures:

- Fiber optic ferrule cleaner, current part number 468517, to clean fiber optic connectors
- 99% alcohol and lint free wipes to clean fiber connectors
- Optical power meter to measure light levels
- Proper fiber connector for optical power meter to make optical connections
- Spectrum analyzer or a field strength meter to measure RF levels

## Transmitter Module Troubleshooting Chart

Symptom	Possible Cause	Possible Solutions
No optical signal output (ALARM LED is Red)	The laser temperature could be too high or low.	Allow up to one minute after power is ON for the temperature to stabilize.  If still no output, contact Cisco Services for assistance.
	The laser could be faulty.	Contact Cisco Services for assistance.
	Automatic power control circuit failure.	Contact Cisco Services for assistance.
	Damaged fiber.	Contact Cisco Services for assistance.
No optical signal output (cont'd)	One or more power supply voltages are out of specification.	Check the power supply for proper operation.
	No AC at receptacle.	Check the receptacle for AC power.
	Blown fuse on the power supply.	Check the power supply fuse and replace as necessary.
	Faulty module.	Contact Cisco Services for assistance.

### Additional Assistance

If you need additional assistance, contact Cisco Services or your local sales subsidiary. See *Customer Information* (on page 39) for contact information.

# 4

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## 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.



# 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.

bdr

baseband digital reverse. Proprietary technology for transporting reverse signals by converting them to from analog to digital format, optionally multiplexing two or more digitized reverse signals, and then converting the electrical signal to an optical format for transmission to a hub or headend via fiber optic link.

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 to suppress multiple longitudinal modes and enhance a single longitudinal mode.

DRR

dual reverse receiver.

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.

## Glossary

### EDR

enhanced digital return. See bdr.

### EIA

Electronic Industries Alliance (formerly Electronic Industries Association). A United States association that provided standards for use between manufacturers and purchasers of electronic products until ceasing operations in February 2011. EIA standards continue to be recognized in the telecommunications industry.

### EMC

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

### EMT

externally-modulated transmitter.

### 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, and so on.

**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.

**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.

## Glossary

RT

remote terminal. Remote equipment of a supervisory system.

RX

receive or receiver.

SBS

stimulated Brillouin scattering. The easiest fiber nonlinearity to trigger. When a powerful light wave 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.



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