Prisma II bdr 2:1 Dual Transmit Processor

Installation and Operation 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.

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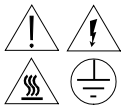
Safety Precautions

Protect Yourself From Electric Shock and Your System From Damage!

- This product complies with international safety and design standards. Observe all safety procedures that appear throughout this guide, and the safety symbols that are affixed to this product.
- If circumstances impair the safe operation of this product, stop operation and secure this product against further operation.



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

You will find this symbol in the literature that accompanies this product. This symbol indicates important operating or maintenance instructions.

You may find this symbol affixed to this product. This symbol indicates a live terminal; the flash points to the terminal device.

You may find this symbol affixed to this product. This symbol indicates a protective earth terminal.

You may find this symbol affixed to this product. This symbol indicates excessive or dangerous heat.

Enclosure

- Do not allow moisture to enter this product.
- Do not open the enclosure of this product unless otherwise specified.
- Do not push objects through openings in the enclosure of this product.

Cables

- Always pull on the plug or the connector to disconnect a cable. Never pull on the cable itself.
- Do not walk on or place stress on cables or plugs.

Factory Service

Refer service only to service personnel who are authorized by the factory.

Compliance

Laser and Electrical Safety

UL 1419:1997: A sample of this equipment has been tested and found to meet the requirements of UL 1419:1997.

CSA C22.2 No. 1:1998: A sample of this equipment has been tested and found to meet the requirements of CSA C22.2 No. 1:1998.

21 CFR: A sample of this equipment has been tested and found to meet the requirements of 21 CFR chapter 1, subchapter J.

Electromagnetic Compatibility

FCC Part 15 Subpart B: This equipment has been tested and found to comply with the limits for a Class A digital device according to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the 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 the user will be required to correct the interference at his own expense.

Industry Canada ICES-003: This Class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Industrie Canadienne ICES-003: Cet appareil numèrique de la class A respecte toutes les exigences du Règlement sur le matèriel brouilleur du Canada.

Laser Safety

Introduction

This product 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 product emits invisible laser radiation. Avoid direct exposure to the laser light source.**

- Do not apply power to this product if the fiber is unmated or unterminated.
- Do not stare into an unmated fiber or at any mirror-like surface that could reflect light that is emitted from an unterminated fiber.
- Do not view an activated fiber with optical instruments.

Warning: Fiber Chips

⚠ WARNING:

Avoid personal injury! Wear safety glasses and use extreme caution when you handle the glass chips that are inside the cladding of the optical fiber. X-ray cannot detect these glass chips if they become embedded in the skin. Place the chips immediately in a small waste container and discard.

Modifications

Do not make modifications to this product without the approval of Cisco.

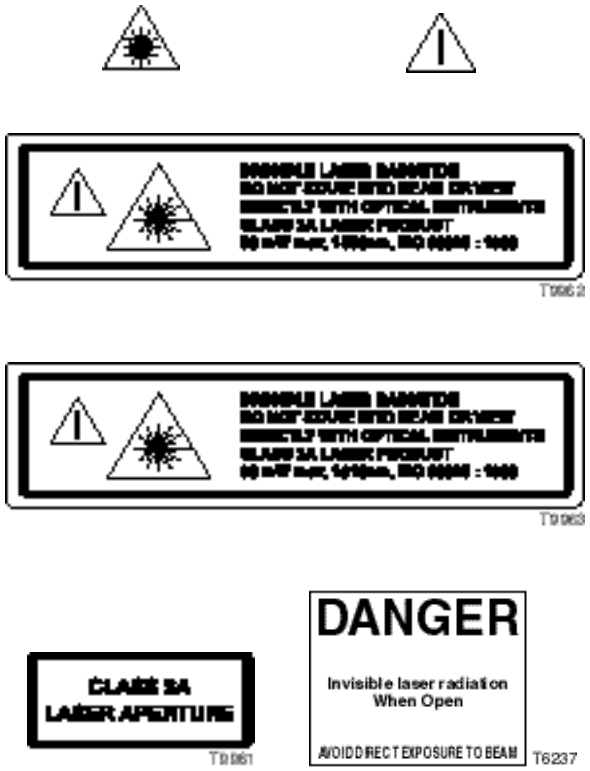
Whenever modifications that may affect hazard levels are made to the optical fiber communication system, the person or organization that performs such modification must reassess hazard levels. They must do this by conducting tests and measurements wherever appropriate for the ensurance of compliance. If there is a change in the hazard level, they must re-label this product.

Maximum Laser Power

The maximum laser power that can be emitted from this product, due to misadjustment or component failure, is 30 mW.

Laser Warning Labels

The transmitter bears one or more of the following labels.



Chapter 1
Introduction

Overview

Introduction

This chapter introduces the front and back panels of the Prisma II™ bdr™ 2:1 Dual Transmit Processor, the Prisma II bdr Optical Transmitter and presents a configuration overview.

Qualified Personnel

Only appropriately qualified and trained personnel should attempt to install this product.

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

In This Chapter

This chapter contains the following topics.

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Prisma II bdr 2:1 Dual Transmit Processor Overview

Introduction

The Prisma II optical network is an advanced transmission system designed to optimize network architectures and increase reliability, scalability, and cost effectiveness. The Prisma II bdr 2:1 Dual Transmit Processor is designed to operate over a wide range of optical input powers and loss budgets. Microprocessor control allows ease of installation and flexibility of application. The Prisma II bdr Dual Transmit Processor houses two independent optical transmitters.

For the purpose of this guide, the Prisma II bdr 2:1 Dual Transmit Processor is referred to as "the processor". The Prisma II bdr Optical Transmitter is referred to as "the optical transmitter."

Processor Features

The processor has the following features.

- Front panel green light emitting diode (LED) to indicate operating status
- Front panel red LED to indicate alarm status
- -20 dB input test point
- Test point selector
- Optical Transmitter insertion slots (two)
- Plug-and-play capability
- Compatibility with Local Craft Interface (LCI) software and Transmission Network Control System (TNCS) software
- Blind mate backplane connections

Processor Operation

The Prisma II platform supports Cisco's Baseband Digital Reverse technology. The Prisma II bdr Digital Reverse 2:1 Multiplexing System includes a unique approach for incorporating network redundancy.

On the transmit end of the system, typically in a hub or remote terminal, two 5-to-42 MHz analog reverse path signals are input to a processor. The processor converts each signal to a baseband digital data stream and time division multiplexes the two streams into a single data stream.

Each processor can convert four 5-to-42 MHz signals into two digital data streams with one data stream feeding each of the optical transmitters.

The optical transmitter installed within the processor converts the baseband data stream to an optical signal for transmission at either 1310 nm or 1550 nm ITU grid wavelengths. ITU grid wavelengths are used for Dense Wave Division Multiplexing (DWDM) applications.

On the receive end of this system, typically in a large hub or headend, each independent Prisma II bdr Optical Receiver located in the processor receives the optical signals and convert them back to the baseband data stream. The receive processor demultiplexes the data stream and converts the two resultant data streams back to two analog RF signals.

The processor can be controlled by an Intelligent Communications Interface Module (ICIM), the LCI software, or TNCS software. The Prisma II bdr 2:1 Dual Transmit Processor will only operate with a Prisma II bdr 2:1 Dual or 2:1 Redundant Receive Processor. It is not compatible with Prisma II bdr 4:1 Redundant Receive Processors or previous Prisma bdr products.

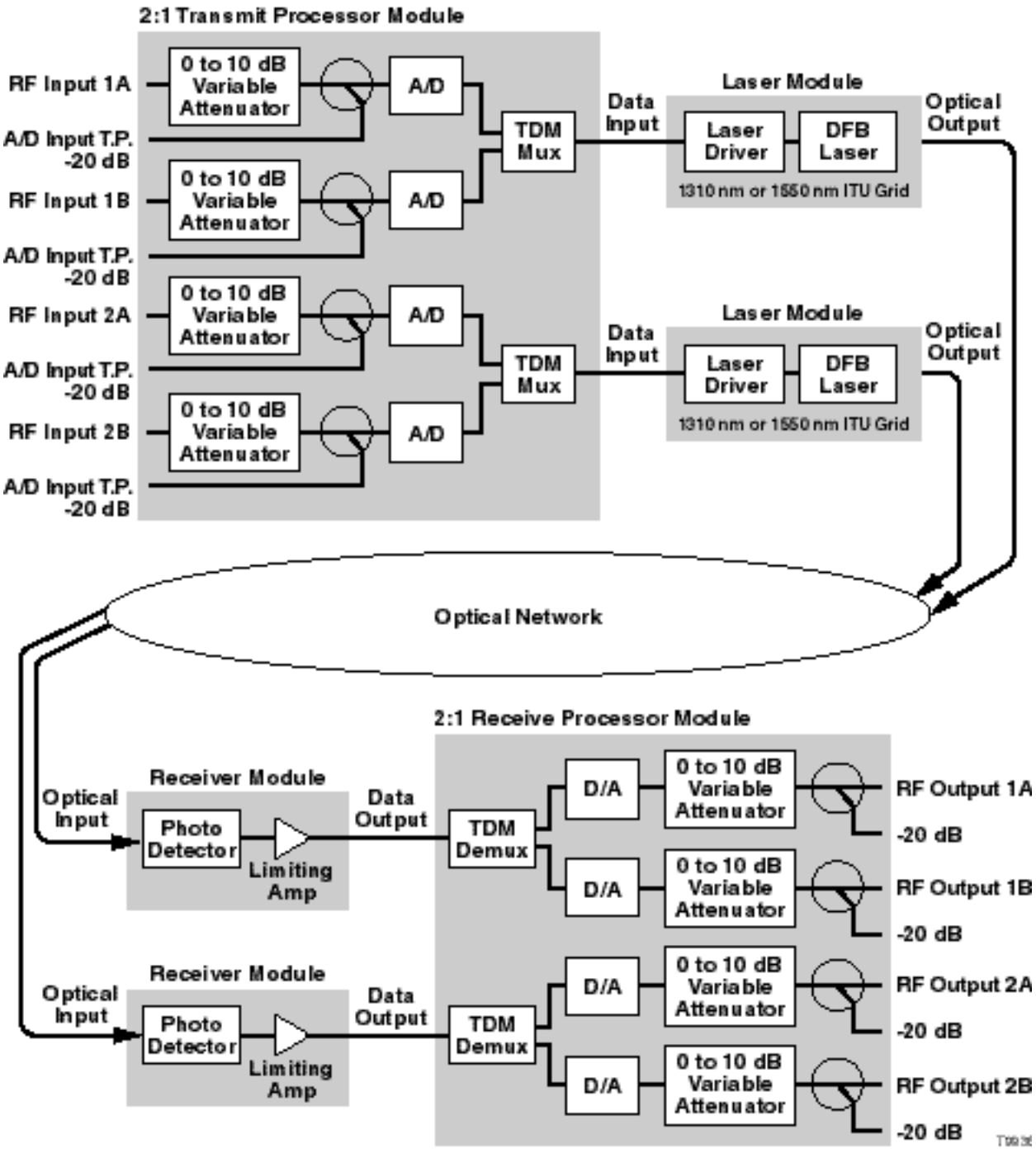
Optical Output

Optical input connectors for the processor are SC/APC.

> ⚠ **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.**

Processor Block Diagram

A block diagram of the processor with two Prisma II bdr Optical Transmitters is shown below.



Processor Front Panel

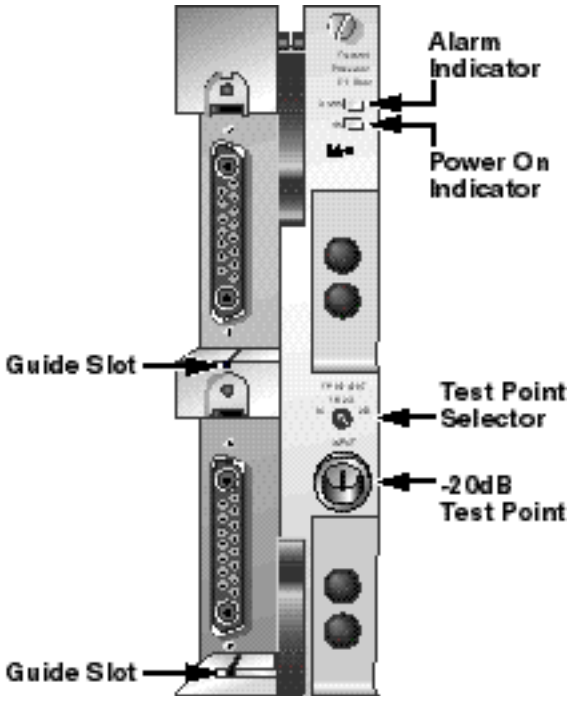
Introduction

This section contains:

- An illustration of the processor front panel
- Descriptions of the front panel features

Processor Front Panel Illustration

The front panel of the processor is shown below.



Processor Front Panel Features

Features of the processor are shown below.

Feature	Description
Alarm Indicator	Illuminates or blinks when an alarm condition occurs
Power On Indicator	Illuminates when power is supplied to the module
-20 dB Test Point	Provides a –20 dB sample of the selected RF output signal
Test point selector	Selects which RF output the –20 dB test point represents
Guide slots	Guide the optical transmitter into the processor

Optical Transmitter

The processor houses one or two optical transmitters. The processor creates a 2.5 Gbps digital representation of the RF reverse path signal and delivers it to the optical transmitter in PECL format. Each optical transmitter outputs an independent high-speed 2.5 Gbps optical signal.

The optical transmitter incorporates a single bicolor LED that is an indicator of optical output and DC power presence to the optical transmitter.

The bicolor LED status is shown in the table below.

Condition	LED Status/Color
DC Power OFF/Optical output OFF	Off
DC Power ON/Alarm condition exists	Red
DC Power ON/No alarm condition	Green
DC Power OFF/Optical output ON	N/A

Processor Back Panel

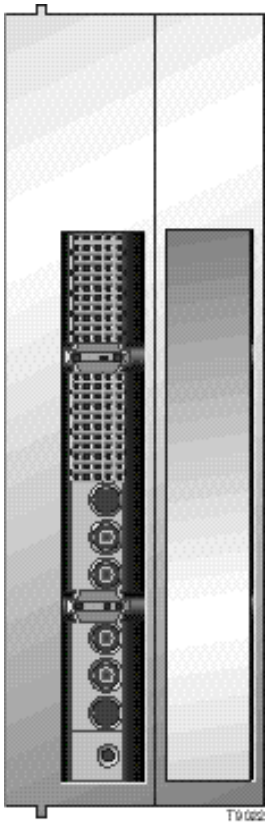
Introduction

Self-mating connectors on the back of the processor allow for easy installation of the processor into the chassis.

Back Panel Connectors

The chassis provides:

- RF signal input connection
- Electrical power input connection
- Alarm communications
- Status monitoring communications
- Communications and control connections



Power and Communications Connector

The power and communications connector on the back of the module mates with a connector inside of the chassis and supplies power from the chassis to the processor. The 110-pin connector also routes alarm and status monitoring information from the processor to the chassis.

Optical Transmitter Front Panel

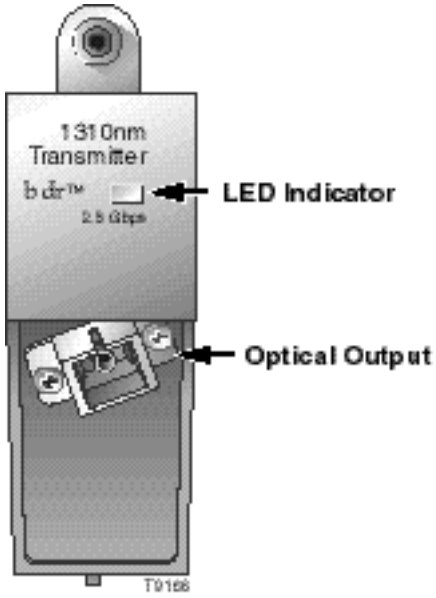
Introduction

This section contains:

- An illustration of the optical transmitter front panel
- Descriptions of the front panel features

Optical Transmitter Front Panel Illustration

The front panel of an optical transmitter is shown below



Optical Transmitter Front Panel Features

The features of the optical transmitter front panel are described below.

Part	Function
LED indicator (bicolor)	• Illuminates red when an alarm condition occurs • Illuminates green when operation is normal
Optical output	Connects the optical output fiber to the processor

Optical Transmitter Identification

Introduction

A product ID number is located on the side of each optical transmitter. This number designates the ITU channel and the wavelength of the optical transmitter.

Optical Transmitter Product ID Number

The following table shows the corresponding ITU channel and wavelength for each product ID number.

Product ID	ITU Channel	Wavelength
Prisma II-BDR-LSM-ITU13-00-SA	13	1567.13 nm
Prisma II-BDR-LSM-ITU15-00-SA	15	1565.49 nm
Prisma II-BDR-LSM-ITU17-00-SA	17	1563.86 nm
Prisma II-BDR-LSM-ITU19-00-SA	19	1562.23 nm
Prisma II-BDR-LSM-ITU21-00-SA	21	1560.60 nm
Prisma II-BDR-LSM-ITU22-00-SA	22	1559.79 nm
Prisma II-BDR-LSM-ITU23-00-SA	23	1558.98 nm
Prisma II-BDR-LSM-ITU25-00-SA	25	1557.63 nm
Prisma II-BDR-LSM-ITU27-00-SA	27	1555.74 nm
Prisma II-BDR-LSM-ITU29-00-SA	29	1554.13 nm
Prisma II-BDR-LSM-ITU31-00-SA	31	1552.52 nm
Prisma II-BDR-LSM-ITU33-00-SA	33	1550.91 nm
Prisma II-BDR-LSM-ITU35-00-SA	35	1549.31 nm
Prisma II-BDR-LSM-ITU37-00-SA	37	1547.71 nm
Prisma II-BDR-LSM-ITU39-00-SA	39	1546.11 nm
Prisma II-BDR-LSM-ITU41-00-SA	41	1544.52 nm
Prisma II-BDR-LSM-ITU43-00-SA	43	1542.93 nm
Prisma II-BDR-LSM-ITU45-00-SA	45	1541.34 nm
Prisma II-BDR-LSM-ITU47-00-SA	47	1539.76 nm
Prisma II-BDR-LSM-ITU49-00-SA	49	1538.18 nm

Product ID	ITU Channel	Wavelength
Prisma II-BDR-LSM-ITU51-00-SA	51	1536.60 nm
Prisma II-BDR-LSM-ITU53-00-SA	53	1535.03 nm
Prisma II-BDR-LSM-ITU55-00-SA	55	1533.46 nm
Prisma II-BDR-LSM-ITU57-00-SA	57	1531.89 nm
Prisma II-BDR-LSM-ITU59-00-SA	59	1530.33 nm
Prisma II-BDR-LSM-1310D-00-SA	1310 DFB	~1310 nm *
Prisma II-BDR-LSM-1310F-00-SA	1310 FP	~1310 nm *
Prisma II-BDR-LSM-1550D-00-SA	1550 DFB	~1550 nm *

* Laser wavelength is not precisely controlled.

Processor Configuration

Introduction

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

Configuration and Monitoring Methods

The table below shows the methods that can be used to configure and monitor the processor.

Method	Description
Prisma II ICIM	If an ICIM is installed in the chassis, it can be used to configure and monitor Prisma II application modules within its domain. For instructions on operating this module using an ICIM, refer to Chapter 3, **Operation Using the ICIM**.
LCI software	LCI running on a locally connected PC can be used to configure operating parameters of Prisma II modules. For instructions on operating this module using LCI, refer to Chapter 4, **Operation Using LCI.**
TNCS software	If an ICIM is installed, TNCS can be used to configure and monitor all functions of the Prisma II modules. For instructions on operating this module using TNCS, see the manual that was shipped with the TNCS software, *TNCS Administrator Software User's Guide*, part number 730201.

Parameter Configuration

Using any of the methods described above, you can do the following:

- Configure the module in master, slave, or independent mode
- Enable or disable noise suppression
- Enable or disable optical transmitter sub-module 1 (top)
- Enable or disable optical transmitter sub-module 2 (bottom)
- Set the amount of RF attenuation for channel A
- Set the amount of RF attenuation for channel B

Configure the Module in Master, Slave, or Independent Mode

Each transmitter can be operated as the master transmitter, a slave transmitter, or independent of any other transmitter. When operated in master mode, the transmitter provides a clock signal to the backplane of the Prisma II chassis. Slave transmitters accept the signal so the data is synchronized among all transmitters. This function will be utilized in future system enhancements. The default setting is **Independent.**

Enable or Disable Noise Suppression

Noise suppression is achieved in the Prisma II bdr products by a quieting signal located outside the reverse path passband, between 1 and 2 MHz. This signal is added to improve the linearity of the products. The default setting is **On.**

Enable or Disable Transmitter Sub-Module

Either the top or bottom laser sub-module may be independently enabled or disabled. Disabling the laser sub-module turns off the optical output from the laser. The default setting is both transmitters **Enabled.**

Set the Amount of RF Attenuation

The RF attenuation on all four RF input ports can be adjusted independently between 0 and 10 dB of attenuation. The default setting on all ports is **0 dB.**

For detailed information on configuring this module, see Chapter 3, **Operation Using the ICIM** or Chapter 4, **Operation Using LCI**.

Processor Configuration Examples

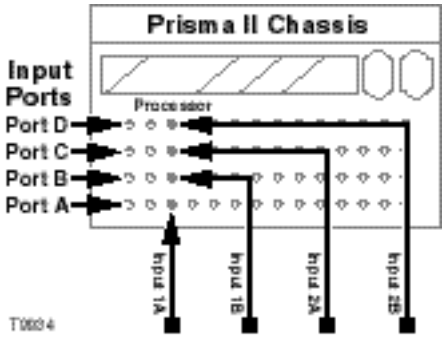
Introduction

The illustrations that follow depict:

- Single processor with two independent optical transmitters
- Single processor configured for internal redundancy
- Two processors configured for external redundancy (same chassis)
- Two processors configured for external redundancy (different chassis)

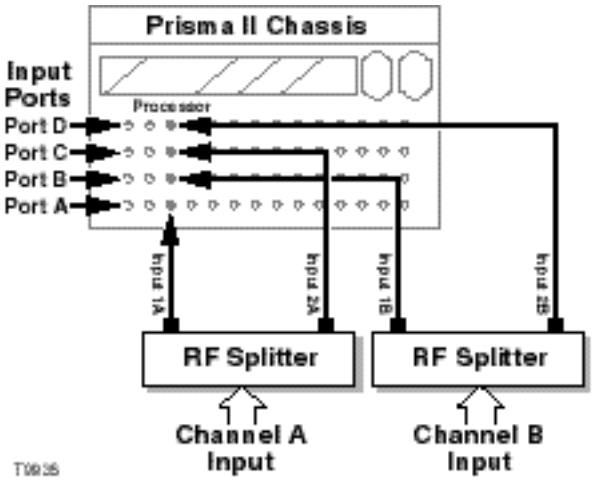
Example 1: Single Processor Configured with Two Independent Optical Transmitters

The illustration below shows the input to a single processor with two optical transmitters configured for independent operation with no redundancy. In this illustration, optical transmitters 1 and 2 are set to **Master.**



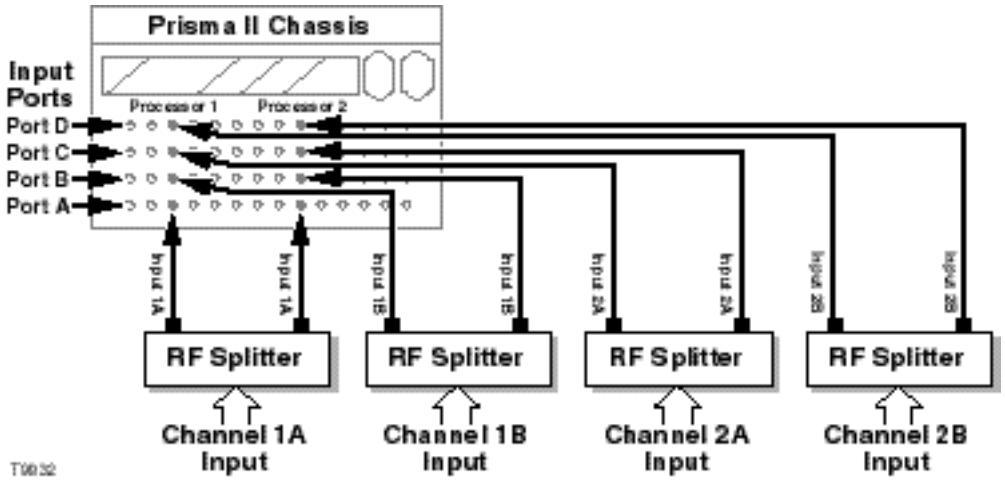
Example 2: Single Processor Configured for Internal Redundancy

The illustration below shows the input to a single processor with two optical transmitters configured for internal redundancy. In this illustration, optical transmitter 1 is set to **Master** and optical transmitter 2 is set to **Internal**.



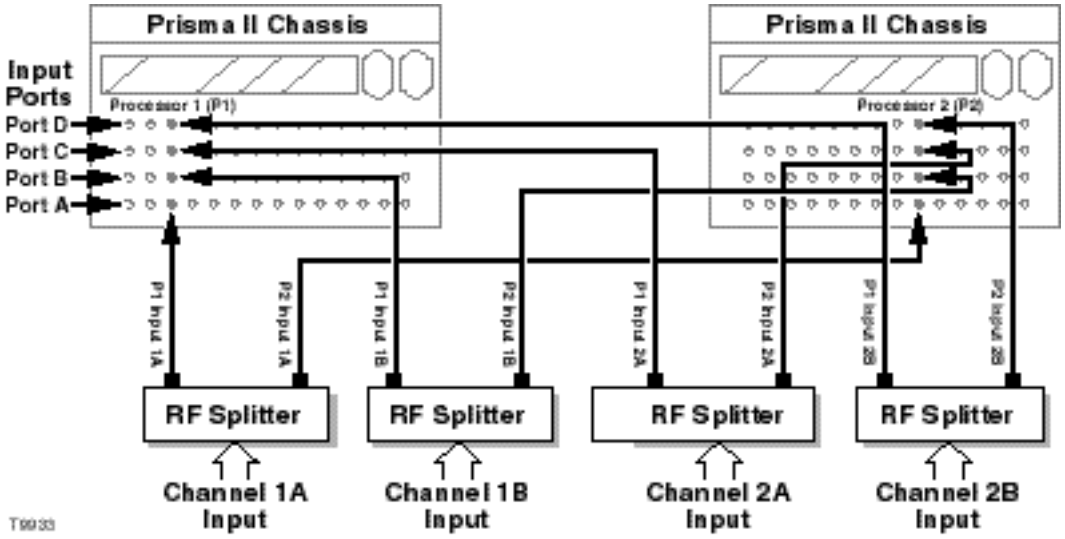
Example 3: Two Processors Configured for External Redundancy (Same Chassis)

The illustration below shows the input to a system with two processors in the same chassis configured for external redundancy. In this illustration, each processor has two optical transmitters. Both optical transmitters in processor 1 are set to **Master** and both optical transmitters in processor 2 are set to **External**.



Example 4: Two Processors Configured for External Redundancy (Different Chassis)

The illustration below shows the input to a system with two processors in different chassis configured for external redundancy. In this illustration, each processor has two optical transmitters. Both optical transmitters in processor 1 are set to **Master** and both optical transmitters in processor 2 are set to **External**.



Chapter 2
Installation

Overview

Introduction

This chapter contains instructions, site requirements, equipment, and tools needed to install the Prisma II bdr 2:1 Dual Transmit Processor and Prisma II bdr Optical Transmitters.

Qualified Personnel

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

In This Chapter

This chapter contains the following topics.

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Prepare for Installation

Introduction

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

Unpacking and Inspecting the Module

As you unpack the module, inspect it for shipping damage. If you find any damage, contact Cisco Services.

Required Equipment and Tools

The following table shows the equipment and tools required to install the module.

You need . . .	To . . .
a 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.
two RF cables with F-type connectors	carry RF input signals.

Site Requirements

Introduction

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 the modules, your site should 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 *Prisma II Chassis Installation and Operation Guide*, part number 713375.

Operating Environment

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

Follow these recommendations to maintain an acceptable operating temperature.

- Temperature inside the rack 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 one or more of the following methods.
  - Air-deflecting baffles
  - Forced-air ventilation
  - Air outlets above enclosures

Power Requirements

All Prisma II modules receive their electrical power from the chassis. The module may be installed with the chassis powered-up.

Space Requirements

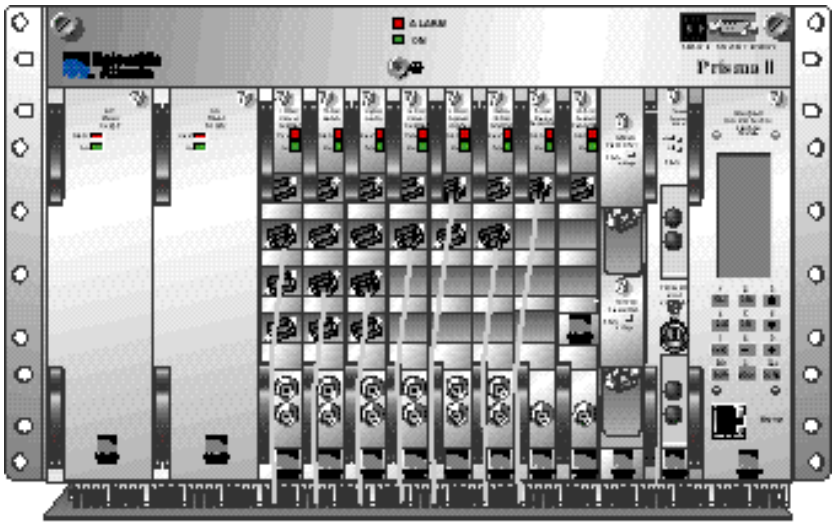
The processor is a double-wide module that is usually installed in slots 5 through 16. Slots 1 through 4 are usually reserved for the power supplies. Slots 15 and 16 are reserved for the Intelligent Communications Interface Module (ICIM), if installed. If an ICIM is not installed, this or any other module could be installed in these slots. Slot 2 and slot 4 are reserved for an internal power supply if installed. If an internal power supply is not installed here, any other single-wide module could be installed in these slots.

Chassis Style

The chassis is configured with front or rear connectors, depending on the system you purchased. Power, RF input/output, and other connectors are 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 the chassis configuration.

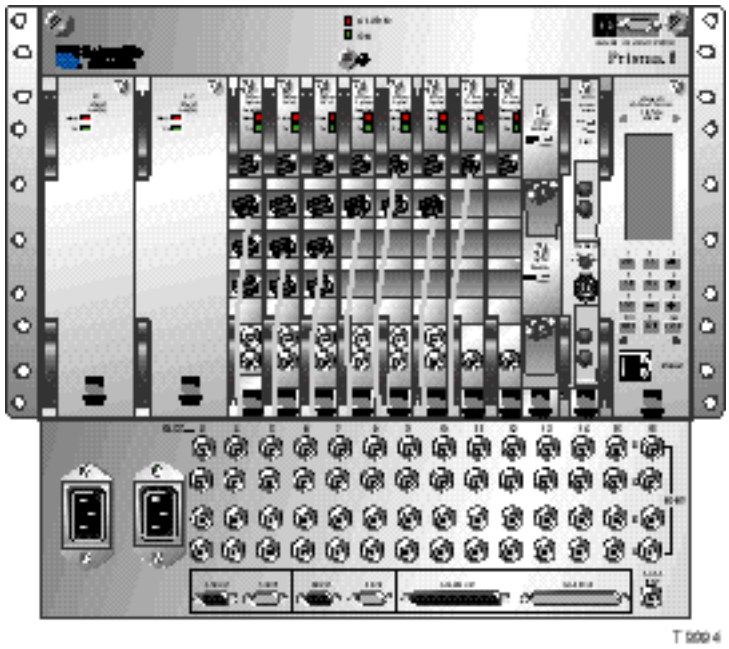
Rear Access Chassis

The rear access chassis is shown here.



Front Access Chassis

The front access chassis is shown here.



Connect RF Cables to the Chassis

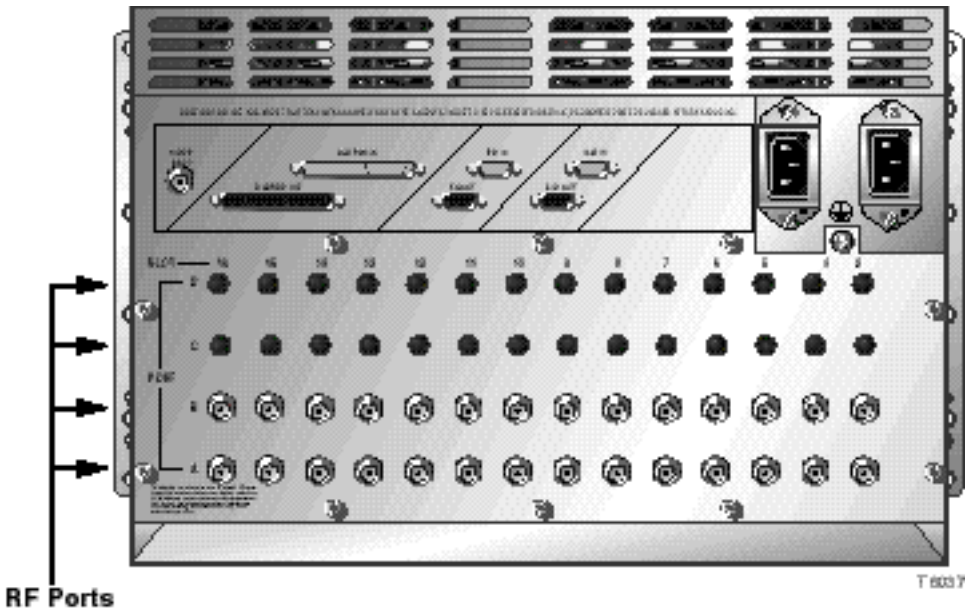
Introduction

The following instructions explain how to make the RF cable connections for the processor.

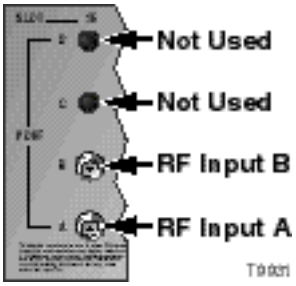
Connecting the RF Cables

Follow these steps to connect the RF cables to the chassis.

1. Locate the RF ports of the corresponding slot where the processor is to be installed.



2. Attach one 75-ohm RF cable to the Port A connector (RF output 1) of the corresponding slot where the module is to be installed. This is the channel A RF input connection.



3. Attach the other 75-ohm RF cable to the Port B connector (RF input 2) of the corresponding slot where the processor is to be installed. This is the channel B RF input connection.
4. Route the RF cables to the appropriate RF sources.
5. If F-connectors are installed, use a 7/16-in. open-end wrench to secure both cables to the connectors at the chassis.
6. Proceed to the next section, **Install the Processor in the Chassis**.

Install the Processor in the Chassis

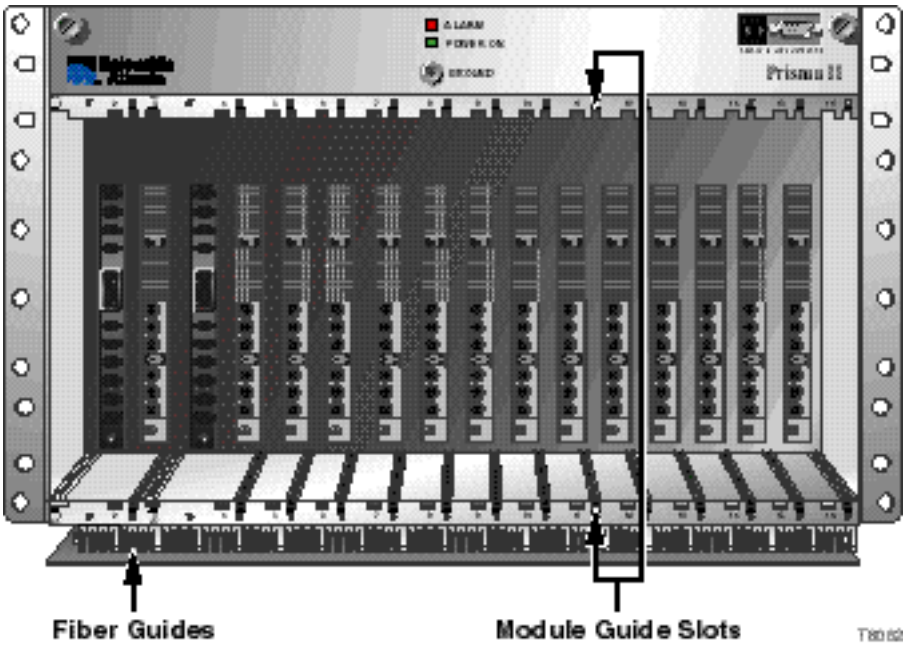
Introduction

The following instructions apply to front access and rear access chassis that are already mounted in a rack.

Installing the Processor

Follow these steps to install the processor in the chassis.

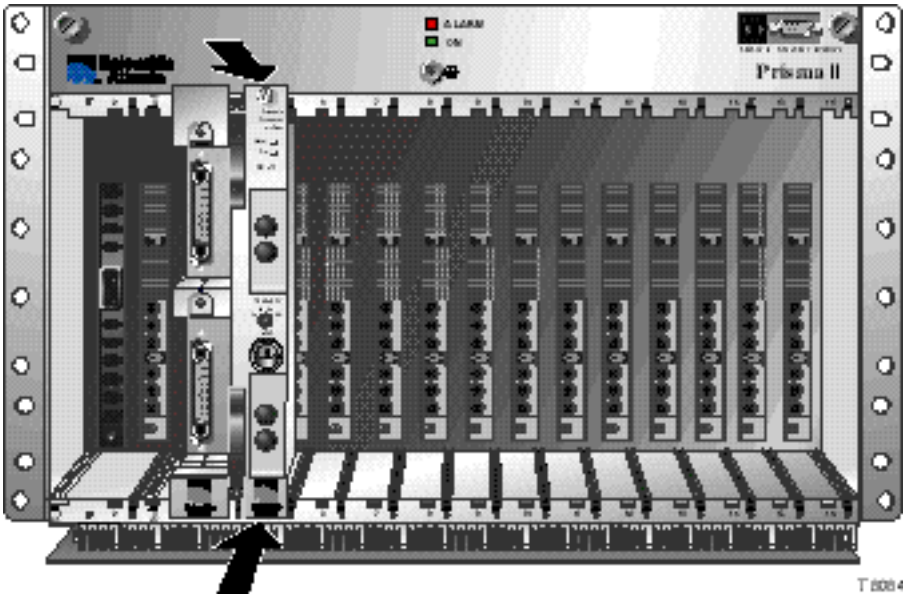
1. Locate the fiber guides at the bottom of the chassis and the module guide slots inside the chassis as shown in the following illustration.



2. Align the ridges on the top and bottom of the processor with the module guide slots located on the chassis. Module ejectors must be fully extended when inserting the processor.

3. Gently slide the processor into the chassis until you feel the power and communications connections on the back of the processor join connectors on the backplane. Use the module ejectors on the left side of the module to lock the module in place.

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



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

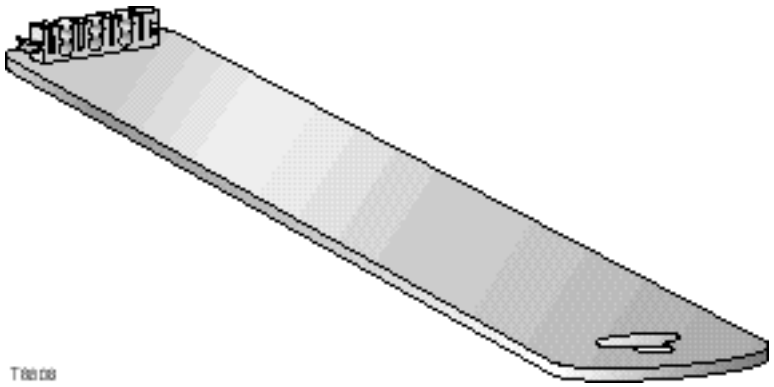
Connect Optical Cables

Introduction

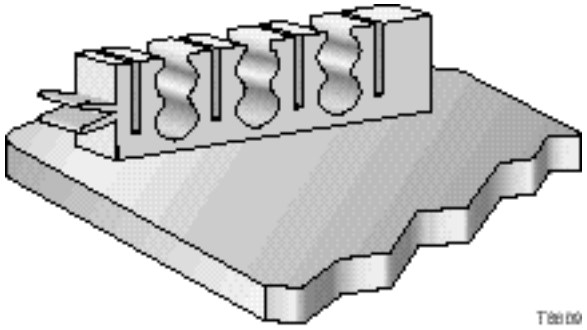
The following instructions explain how to connect optical cables to a processor and optical transmitters.

Fiber Fish Tool Overview

The fiber fish tool that was shipped with the chassis is used to pull ("fish") an optical cable from the rear of the chassis to the front of the chassis so the cable can be connected to an optical connector on the front panel of a module.



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 of the chassis.



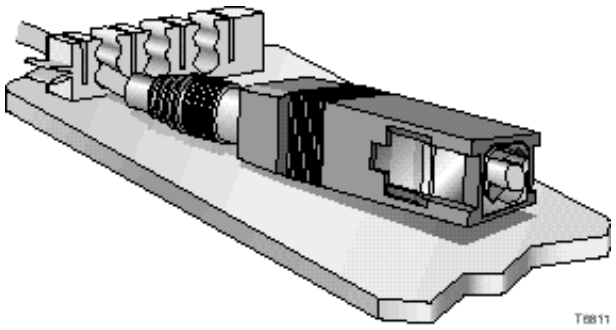
Connecting an Optical Cable to the Processor

Before proceeding, place a protective cap over the end of the cable to protect it while it is being pulled. Using a protective cap is generally a good idea when handling a cable at any time.

> ⚠ **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.**

Follow these steps to pull the cable to the front of the chassis.

1. While facing the front of the chassis, 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 one of the notches on the fiber fish tool.



4. Pull the fiber fish tool (with cable attached) to the front of the chassis.
5. Disengage the cable from the fiber fish tool and remove the protective cap from the cable.
6. Attach the cable to the appropriate connector on the processor front panel.

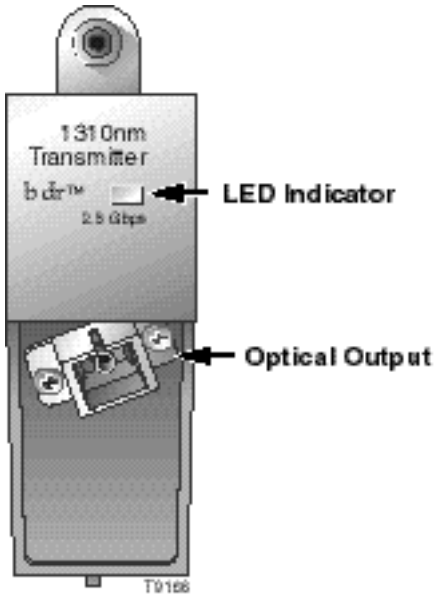
Connecting an Optical Cable to an Optical Transmitter

This procedure assumes that the optical transmitter has not been installed in the processor.

> ⚠ **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.**

Follow these steps to connect an optical cable to each optical transmitter to be installed.

1. Attach one end of the optical cable to the optical output connector located on the front of the optical transmitter.



2. Route the other end of the optical cable to the appropriate destination.
3. Repeat steps 1–2 for the second optical transmitter.

Install Optical Transmitters in the Processor

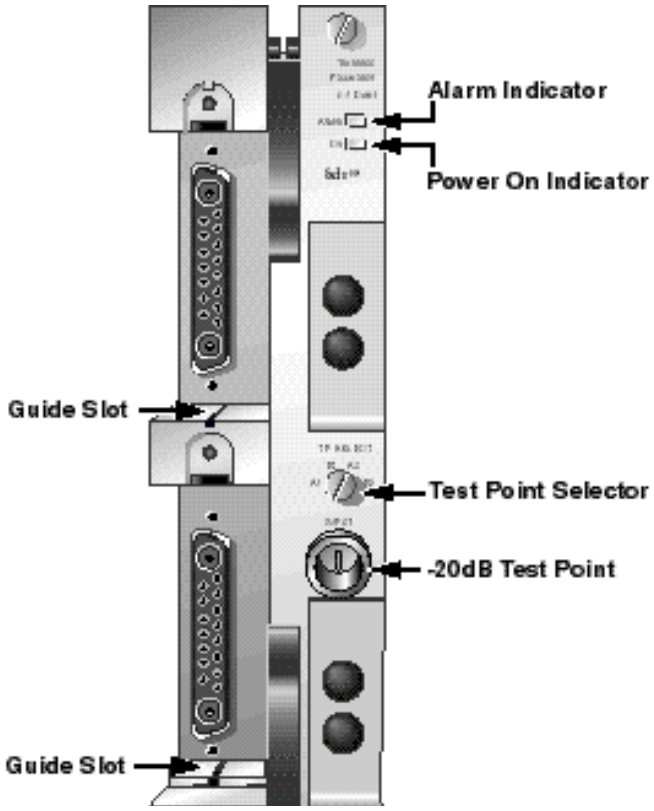
Introduction

For best results, install the processor in the chassis before installing the optical transmitter in the processor.

Installing the Optical Transmitter

Follow these steps to install the optical transmitter in the processor.

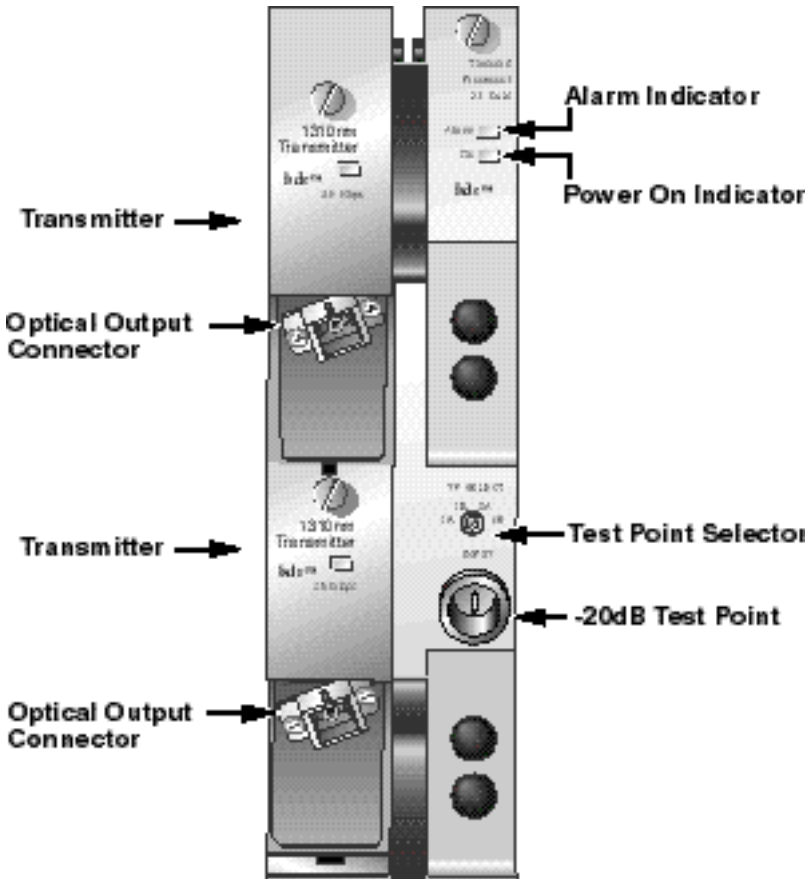
1. Align the ridges on the top and bottom of the optical transmitter with the guide slots located on the processor.



2. Gently slide the optical transmitter into the processor until you feel the power and communications connections on the back of the module join connectors on the processor. Use the thumbscrew on the top of the optical transmitter to lock it in place.

3. Repeat steps 1–2 for the second optical transmitter.

   Result: Both optical transmitters are installed.



Connect Multiple Chassis

Introduction

The Prisma II platform allows an ICIM to be located in one chassis to control application 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.

Note: An ICIM can control a maximum of 82 modules. Depending on your application, this is typically six or seven chassis to a rack. Do not exceed these limits.

Cabling Requirements

The cable required for both **ICIM IN** and **ICIM OUT** connections is a standard "off the shelf" serial extension cable, DB-9 female to DB-9 male, with connectors that are a serial 9-pin D-shell (EIA 574/232).

This cable can be purchased at your local computer store or from Cisco. The Cisco part number for a 6-foot serial extension cable is 180143.

Connecting the Chassis

Follow these steps to make chassis-to-chassis **ICIM IN** and **ICIM OUT** connections.

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 desired chassis are connected.

Notes:

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

Additional Information

For more information on chassis-to-chassis communications, including connections for TNCS and external alarm connections, see **Communication Connections** in Chapter 2 of the *Prisma II Chassis Installation and Operation Guide***,** part number 713375**.**

Alarm I/O Connections

Introduction

The following pages define the **ALARMS IN** and **ALARMS OUT** connectors on the Prisma II chassis. Wiring alarm contacts for external redundancy is also explained.

ALARMS IN Connector

The **ALARMS IN** connector on the Prisma II chassis is a DB-37 female connector.

The table below shows connections for the **ALARMS IN** connector on the chassis.

Chassis Slot	ALARMS IN Pin #	Backplane Name	Function
Fan Tray	20	FAN_TEST	See notes at end of table
2	2	CNT_IN2_1	Slave input
	21	CNT_IN2_2	Module dependent
Fan Tray	3	CNT_IN3_1	Slave input
	22	CNT_IN3_2	Module dependent
4	4	CNT_IN4_1	Slave input
	23	CNT_IN4_2	Module dependent
5	5	CNT_IN5_1	Slave input
	24	CNT_IN5_2	Module dependent
6	6	CNT_IN6_1	Slave input
	25	CNT_IN6_2	Module dependent
7	7	CNT_IN7_1	Slave input
	26	CNT_IN7_2	Module dependent
8	8	CNT_IN8_1	Slave input
	27	CNT_IN8_2	Module dependent

Chassis Slot	ALARMS IN Pin #	Backplane Name	Function
9	9	CNT_IN9_1	Slave input
	28	CNT_IN9_2	Module dependent
10	10	CNT_IN10_1	Slave input
	29	CNT_IN10_2	Module dependent
11	11	CNT_IN11_1	Slave input
	30	CNT_IN11_2	Module dependent
12	12	CNT_IN12_1	Slave input
	31	CNT_IN12_2	Module dependent
13	13	CNT_IN13_1	Slave input
	32	CNT_IN13_2	Module dependent
14	14	CNT_IN14_1	Slave input
	33	CNT_IN14_2	Module dependent
15	15	CNT_IN15_1	Slave input
	34	CNT_IN15_2	Module dependent
16	16	CNT_IN16_1	Slave input
	35	CNT_IN16_2	Module dependent
N/A	1, 17, 18, 19, 36, 37	Not used	N/A

Notes:

- FAN_TEST is meant for factory use and is normally left open. Connecting this input to ground turns off all the chassis fans.
- The return path for all connections is chassis ground.

ALARMS OUT Connector

The **ALARMS OUT** connector on the Prisma II chassis is a DB-37 male connector.

The table below shows connections for the **ALARMS OUT** connector on the chassis.

Chassis Slot	ALARMS OUT Pin #	Backplane Name	Function
2	2	CNT_OUT2_1	Alarm state
	21	CNT_OUT2_2	Module dependent
Fan Tray	3	CNT_OUT3_1	Alarm state
	22	CNT_OUT3_2	Module dependent
4	4	CNT_OUT4_1	Alarm state
	23	CNT_OUT4_2	Module dependent
5	5	CNT_OUT5_1	Alarm state
	24	CNT_OUT5_2	Module dependent
6	6	CNT_OUT6_1	Alarm state
	25	CNT_OUT6_2	Module dependent
7	7	CNT_OUT7_1	Alarm state
	26	CNT_OUT7_2	Module dependent
8	8	CNT_OUT8_1	Alarm state
	27	CNT_OUT8_2	Module dependent
9	9	CNT_OUT9_1	Alarm state
	28	CNT_OUT9_2	Module dependent
10	10	CNT_OUT10_1	Alarm state
	29	CNT_OUT10_2	Module dependent

Chassis Slot	ALARMS OUT Pin #	Backplane Name	Function
11	11	CNT_OUT11_1	Alarm state
	30	CNT_OUT11_2	Module dependent
12	12	CNT_OUT12_1	Alarm state
	31	CNT_OUT12_2	Module dependent
13	13	CNT_OUT13_1	Alarm state
	32	CNT_OUT13_2	Module dependent
14	14	CNT_OUT14_1	Alarm state
	33	CNT_OUT14_2	Module dependent
15	15	CNT_OUT15_1	Alarm state
	34	CNT_OUT15_2	Module dependent
16	16	CNT_OUT16_1	Alarm state
	35	CNT_OUT16_2	Module dependent
N/A	1, 17, 18, 19, 20, 36, 37	Not used	N/A

Notes:

- Return path for all connections is chassis ground
- Alarm state indications:
  - Normal (with module installed): closed to ground
  - Critical alarm (or module not installed): open to ground
- Alarm relay rating: 2A 30 V DC (resistive)

Prisma II Redundancy Interface Panel Overview

Introduction

The Prisma II Redundancy Interface Panel is an accessory to the Prisma II platform. The interface panel is intended to be used with the master/slave feature and the contact closure alarm feature of the Prisma II platform.

The terminals on the interface panel serve as extensions to the two DB-37 connectors labeled **ALARM IN** and **ALARM OUT** on the connector interface panel of the chassis.

The interface panel consists of the rack-mount panel, two cables, and jumper wire. The panel is to be mounted near the designated chassis in a 19-inch rack.

Slave Mode Operation in Prisma II Modules

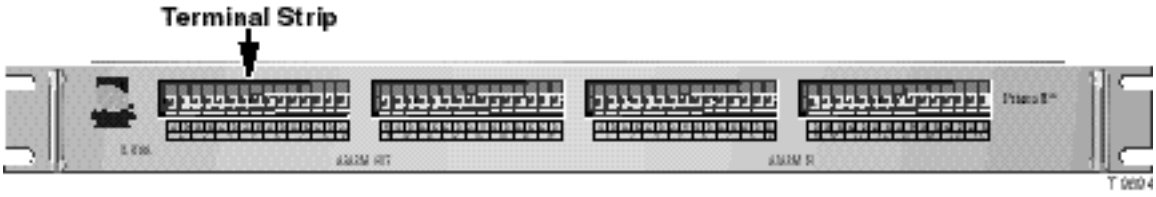
All Prisma II modules can be hard-wired to operate as a backup or slave module in a parallel redundant mode.

In this mode, a master and a slave module are interconnected and configured so that, if a critical fault occurs in the master, its output is turned off. When this happens, the slave module senses that the master is no longer operating and is automatically enabled. If the master's critical alarm disappears (for example, by replacing the module), the slave turns off and the master is re-enabled.

Prisma II modules are factory configured in master mode. To operate in slave mode, modules must be hard-wire connected and manually reconfigured using an ICIM, LCI software, or TNCS software.

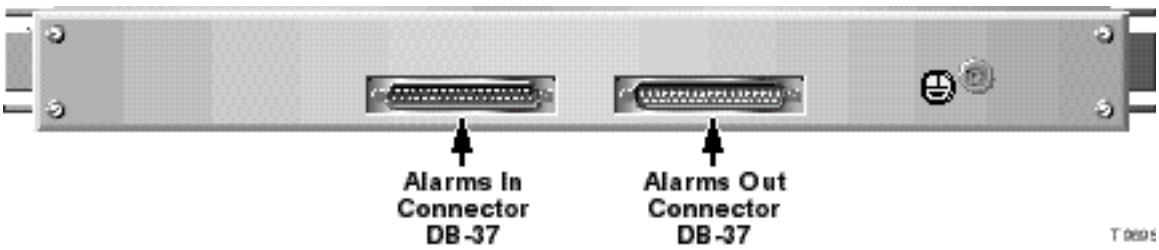
Redundancy Interface Panel Illustration (Front)

The front of the interface panel is shown below.



Redundancy Interface Panel Illustration (Rear)

The rear of the interface panel is shown below.



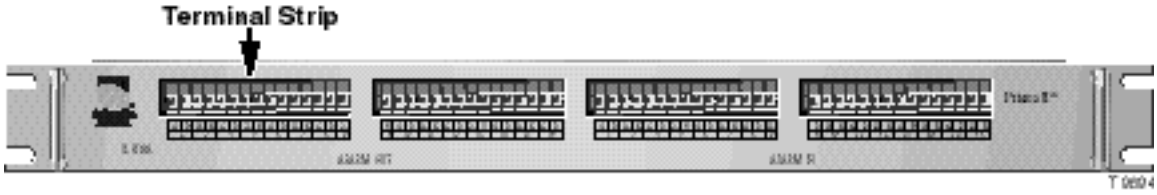
Interface Panel Features

Introduction

This section describes the various features of the Prisma II Redundancy Interface Panel.

Chassis Slot Numbers

The Prisma II Chassis has sixteen slots. Each chassis slot has two alarm outputs and two alarm inputs. Slot numbers and the corresponding outputs and inputs are represented and labeled just below the terminal strips on the front of the Prisma II Redundancy Interface Panel.



Note: Slot 1 of the chassis is always reserved for the power supply and has no terminals on the panel. Slot 3 is represented on the interface panel, but is reserved for the fan tray. Therefore, the interface panel's slot 3 spring terminals can only be used as alarm outputs or inputs for the fan tray.

Terminals Strips

The front of the interface panel has four terminal strips that house spring terminals for each slot. The two left-side strips house two **ALARM OUT** terminals for each of the chassis slots 2 through 16, and the two right-side strips house two **ALARM IN** terminals for each of the chassis slots 2 through 16.

Spring Terminals

The spring terminals are the points where the actual hard-wire connections between modules are made. Each spring terminal on the interface panel is an extension of a pin on the **ALARMS OUT** and **ALARMS IN** connectors on the chassis. Pressing the bottom lever of the spring terminal allows insertion of a jumper wire into the hole of the terminal. Releasing the lever secures the wire to the terminal.

Alarm Terminal Designations

The **ALARM OUT** and **ALARM IN** terminal strips, chassis slot numbers, and A/B spring terminals are labeled just below the terminal strips on the front of the interface panel.

Interface Panel Installation and Connections

Introduction

The following instructions explain how to:

- Connect the Prisma II Redundancy Interface Panel to a chassis
- Connect a slave module to a master module
- Check the master/slave connection

Cabling Requirements

The table below shows the items required to install the interface panel and to connect a slave module to a master module.

Item	Function
Two DB-37 cables	Serve as extensions of the **ALARMS IN** and **ALARMS OUT** connectors on the chassis
Jumper wire, 20-gauge insulated	Makes hard-wire connections between spring terminals. It is to be cut to length, end-stripped, and inserted in the spring terminal.
Wire routing clips	Gather loose jumper wires near the interface panel
Mounting screws (not included)	Mount the interface panel in a rack
Screwdriver (not included)	Tightens the mounting screws in the interface panel
Ground cable (not included)	Ties the interface panel to earth ground

Installing the Interface Panel

Follow these steps to install the interface panel.

1. Position the interface panel in the rack near the designated chassis.
2. Insert a mounting screw through each of the four mounting slots on the front of the interface panel, and then into the rack (screws are not included.)
3. Use an appropriate screwdriver to tighten each mounting screw until it is tight (screwdriver is not included).
4. Tie the interface panel to earth ground via the ground stud (ground cable is not included).

   Important: Grounding the interface panel via the ground stud is especially important for ESD and EMC performance.

Connecting the Interface Panel to the Chassis

Follow these steps to connect the interface panel to the chassis.

1. Connect the female end of one DB-37 cable to the male end **ALARMS OUT** connector on the chassis.
2. Connect the male end of the same DB-37 cable to the female end **ALARM OUT** connector on the rear of the interface panel.
3. Connect the male end of the second DB-37 cable to the female end **ALARMS IN** connector on the chassis.
4. Connect the female end of the second DB-37 cable to the male end **ALARM IN** connector on the rear of the interface panel.

Connecting a Slave Module to a Master Module

Follow these steps to connect a slave module to a master module using the interface panel.

Notes:

- To configure a module as master or slave, use the ICIM, the LCI software, or TNCS software as shown in the guide that was shipped with the specific Prisma II module.
- For information about typical master/slave connections, refer to **Master/Slave Connections Overview** later in this chapter.

1. On the **ALARM OUT** strip at the front of the interface panel, locate the slot number representing the chassis slot location of the master module. Connect one end of a jumper wire to spring terminal A of that slot number.
2. Connect the other end of the same jumper wire to the A terminal of the slot of the slave module on the **ALARMS IN** connector. This connection may or may not be on the same interface panel.
3. Repeat steps 1 and 2 for the B terminals of both the master and the slave module's **ALARM IN** and **ALARM OUT** terminal strips.
4. Upon connecting all wires, adhere the wire routing clips to the interface panel and connect the wires onto the clips.

Checking the Master/Slave Connection

Follow these steps to verify that the master/slave connection is operating properly.

1. Ensure that all master and slave modules are installed, power is applied to your system, and all cable connections between the chassis and the interface panel(s) are secure.
2. Verify that the primary module is configured to operate as a master and the backup module is configured to operate as a slave (or as externally redundant when connecting bdr processors).
3. Ensure that all jumper wires are securely connected to the proper terminals.
4. When the system is powered and properly configured, remove the master module and verify that the slave module turns on and begins operation. If the slave does not operate, review the installation and connection steps given in this section.

Master/Slave Connections Overview

Introduction

This overview describes the:

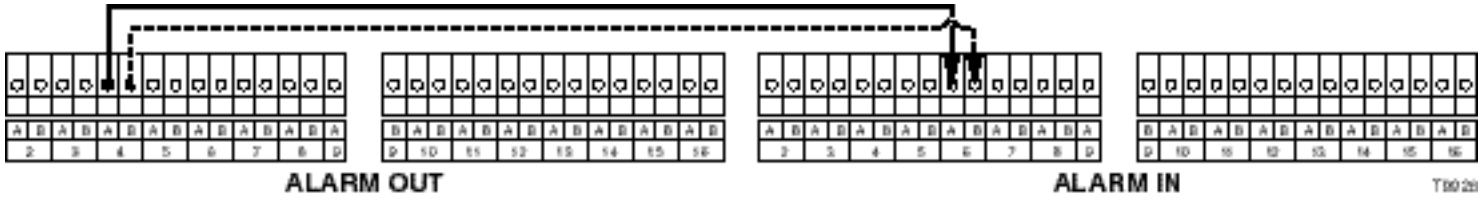
- Interface panel terminal strips
- Typical master/slave jumper connections for modules in the same chassis and in separate chassis

Interface Panel Terminal Strips

On the interface panel terminal strips, all chassis slots except for slot 1 and slot 3 are available. Each chassis slot has two outputs (A and B) and two inputs (A and B) for communication of alarm information to or from other modules. However, on most Prisma II modules, the B output is disabled.

Typical Master/Slave Jumper Connections for Modules in the Same Chassis

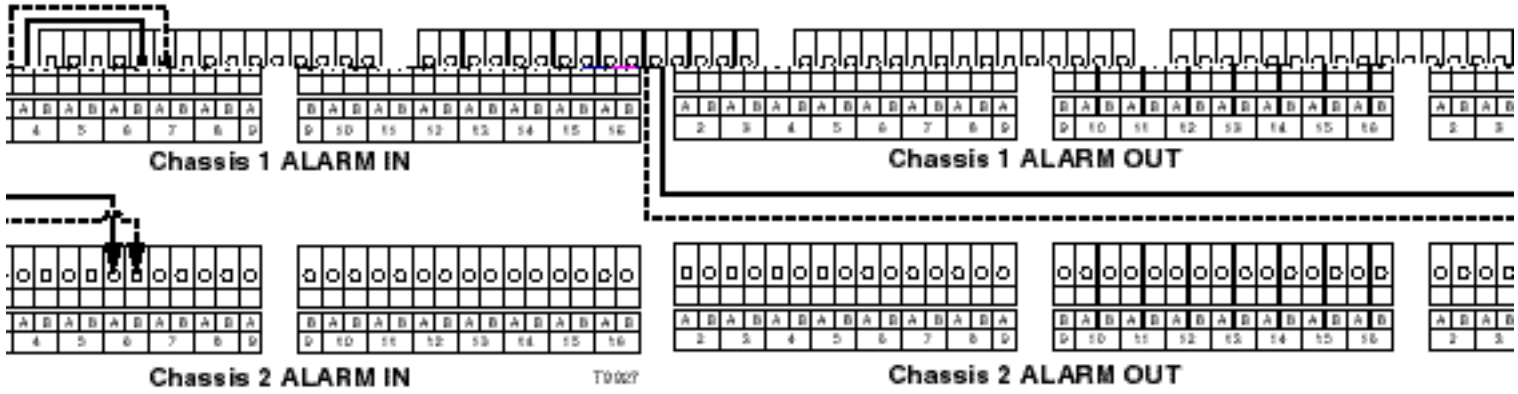
The diagram below shows the **ALARM OUT** and **ALARM IN** terminal strips and jumper connections for a typical master/slave connection between two modules in the same chassis. The master module is assumed to be in slot 4 and the slave module is in slot 6. If a critical fault occurs in the master module, its relay signal travels from the slot 4 **ALARM OUT** terminal to the slave module slot 6 **ALARM IN** terminal. This turns on the slave module in slot 6. The slave module continues in operation until the master module is fixed. At that time, the master module automatically takes over and the slave module switch relay turns off.



Typical Master/Slave Jumper Connections for Modules in Separate Chassis

Important: Each chassis that is used for alarm connections must have a separate, dedicated interface panel.

The diagram below shows jumper connections for a typical master/slave connection between two modules in separate chassis. The master module is shown in chassis 1, slot 4 and the slave module is in chassis 2, slot 6. If a critical fault occurs in the master module, its relay signal is carried via the jumpers, from the chassis 1, slot 4 **ALARM OUT** terminal to the chassis 2, slot 6 **ALARM IN** terminal. This turns on the slave module located in chassis 2, slot 6. The slave module continues in operation until the master module is fixed. At that time, the master module automatically takes over and the slave module switch relay turns off.



Chapter 3
Operation Using the ICIM

Overview

Introduction

The procedures in this chapter apply if you are using the Prisma II Intelligent Communications Interface Module (ICIM) to configure and operate the Prisma II bdr 2:1 Dual Transmit Processor.

Included in this chapter are descriptions of the ICIM front panel and the ICIM LCD, and detailed procedures on how to use the software menus to configure the processor.

In This Chapter

This chapter contains the following topics.

Topic	See Page
ICIM Introduction	3-2
ICIM Front Panel	3-3
ICIM Password	3-6
ICIM Operation	3-14
Monitor Processor Status Using the ICIM	3-18
Configure the Processor Using the ICIM	3-22
Check Processor Alarms Using the ICIM	3-27
Check Manufacturing Data Using the ICIM	3-33
Save the Configuration Using the ICIM	3-36

⚠ 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.

ICIM Introduction

Introduction

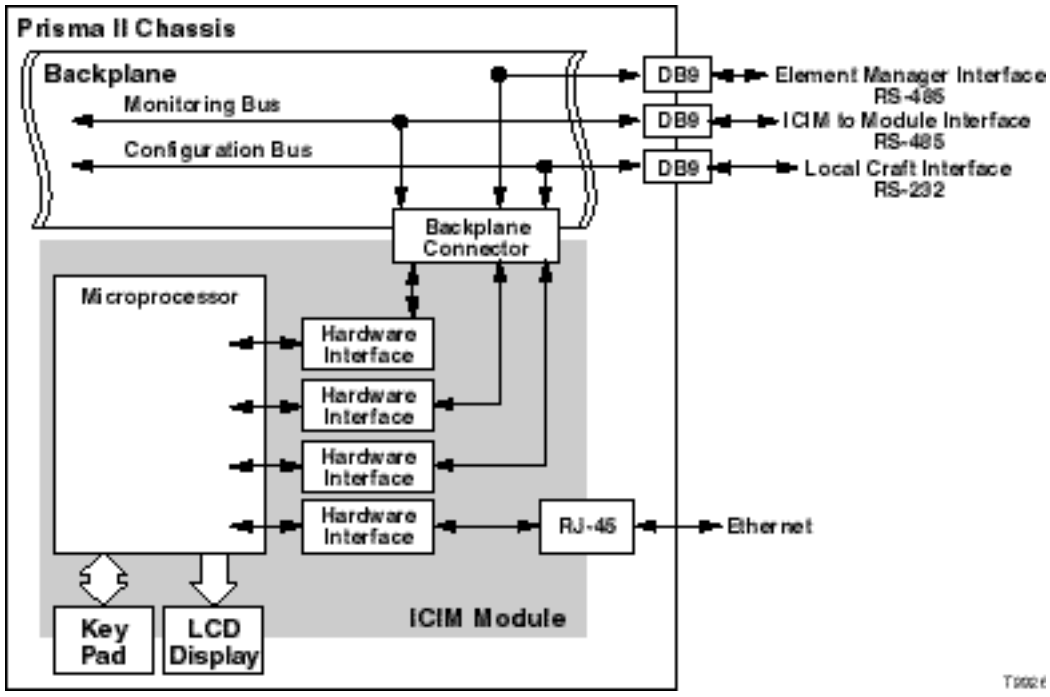
The ICIM functions as the user interface for the Prisma II application modules, as well as the interface between the Prisma II modules and the Transmission Networks Control Systems (TNCS) software. The ICIM allows local module configuration and status monitoring for up to 82 modules located in multiple chassis. The ICIM features easy-to-use software that is navigated using the numeric keypad and the LCD display.

Important:

- Do not operate any Prisma II Chassis without a fan tray properly installed. If a fan tray is not installed in the chassis, the ICIM will not communicate with any of the modules in the chassis.
- All chassis connected in a "daisy-chain" fashion 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 the daisy-chain must have a unique chassis ID number.

ICIM Block Diagram

The ICIM is illustrated in the block diagram below.



ICIM Front Panel

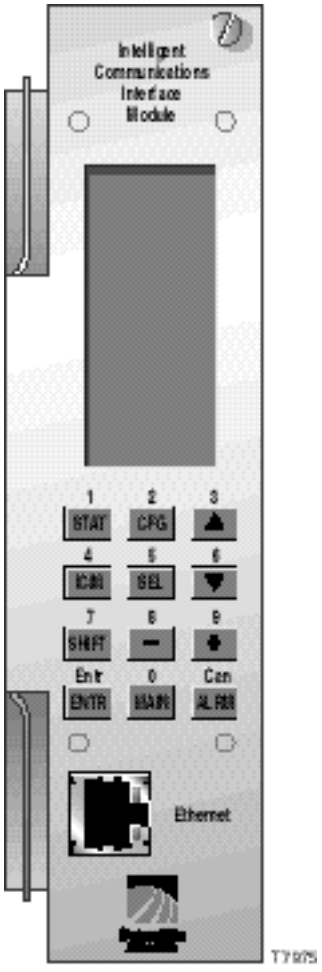
Introduction

This section contains:

- An illustration of the ICIM front panel
- Descriptions of the front panel features

ICIM Front Panel Illustration

The following illustration shows the front panel of the ICIM.

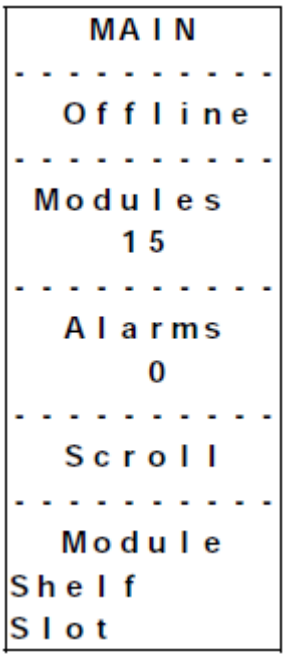


ICIM Front Panel Features

Part	Function
LCD screen	Displays the ICIM menus, alarms, and status information.
12-key numeric keypad	Used to navigate the ICIM's menus and configure the application modules
Ethernet Connector	Directly connects the ICIM to a network (future release)

The 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. The following illustration shows the ICIM's **MAIN** menu.



The ICIM Keypad

The ICIM keypad has twelve keys that allow you to input and monitor operational parameters. The table below lists each key and a brief description of its function.

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
▼	Moves the menu selection area down
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 menu

ICIM Password

Introduction

The ICIM allows you to send configuration commands, check alarms and operating status, and restore factory default settings in Prisma II modules. To ensure that no unauthorized changing of these parameters occurs, you have the option of using a password protection system.

Password authorization only applies to the configurable parameters. Status and alarm information is always available on the ICIM regardless of password implementation.

Password Protection System

The table below shows the ICIM menu options available in the password protection system.

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 that is used by Cisco 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. For more information, refer to the remaining pages in this section.

Accessing the Password Function

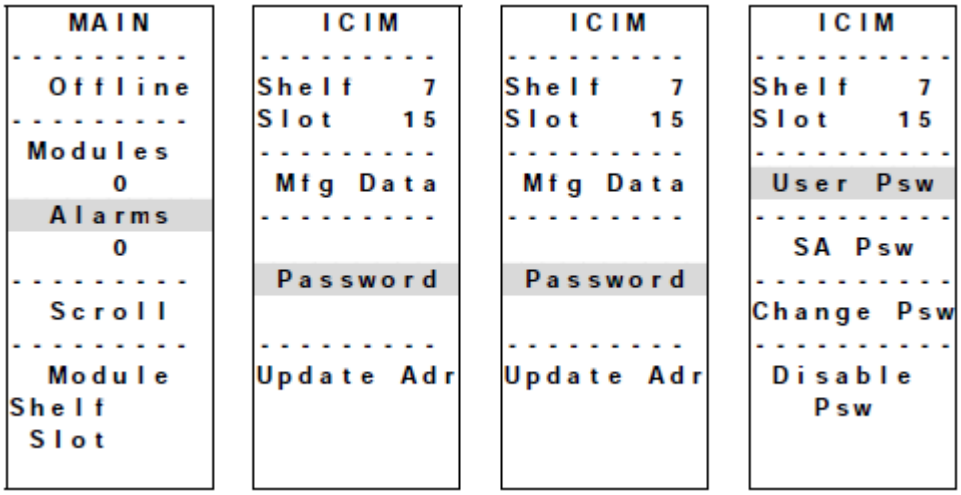
The Password menu allows you to create, enter, change, or disable the user password. It also allows service personnel to use the Cisco (SA) password.

Follow these steps to access the Password menu.

1. Press the ICIM key.
2. Use the ▼ key to scroll down until **Password** is highlighted.
3. Press the SEL key.

   Results:

   - The Password menu is displayed.
   - **User Psw** is highlighted.



Expired Password or Inactive Password Messages

The entry of a valid user or SA password allows changes to system parameters for a period of 10 minutes. If more than 10 minutes have 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 **Re-Entering a User Password** later in this section.

Using Your Password for the First Time

Follow these steps to enter a user password in an ICIM that has never had the user password function implemented.

1. Access the password function as shown in **Accessing the ICIM Password Function** earlier in this section.
2. Use the [▼] key to scroll down until **Change Psw** is highlighted.
3. Press the [SEL] key.

   Result: Change Psw/Shift Off is displayed.
4. Press the [SHIFT] key to display **Shift On.** Then enter 8 digits as your user password, using the 0–9 number keys.

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

   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 password you entered is rejected, press the [SHIFT] key to return to the password function, then re-enter an 8–digit password using only the 0-9 number keys. Press the [ENTER] key.

   Reasons for a user password to be rejected include:
   - Entering more than 8 digits for the password
   - Pressing keys other than the 0–9 number keys
   - Entering an incorrect password if a valid password has been entered

Re-Entering a User Password

If more than 10 minutes have passed since your last keystroke, and you attempt to make any changes to system parameters, the menu displays **Psw Expired.** If you attempt to disable the password, the menu displays **Failed, Password Not Active**. When either of these messages is displayed, you must re-enter the user password.

Follow these steps to re-enter a user password.

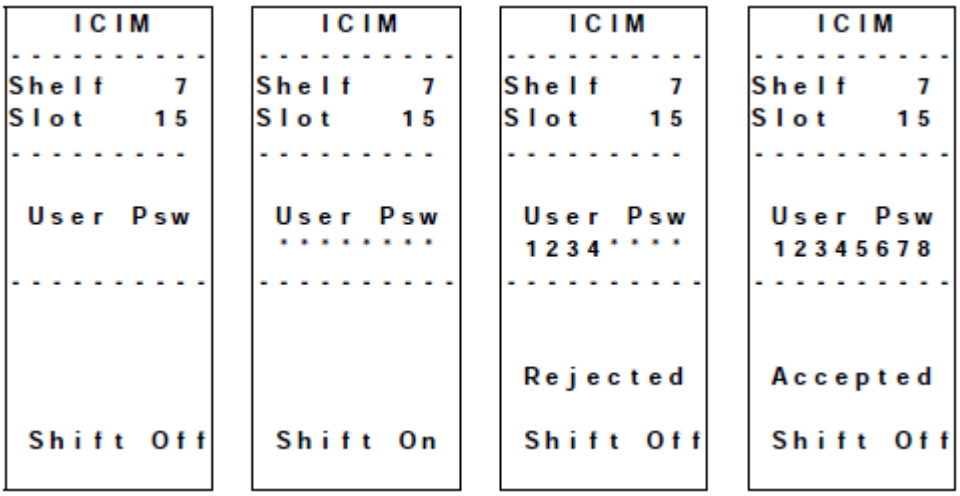
1. Access the password as described in **Accessing the Password Function** earlier in this section.
2. Press the SEL key.

   Result: User Psw/Shift Off is displayed.
3. Press the SHIFT key to display **Shift On.** Then enter the 8 digits of the user password, using the 0–9 number keys.

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

   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.

5. If the password you entered is rejected, press the SHIFT key to return to the password function, then re-enter your password. Press the ENTER key. Reasons for a user password to be rejected include:
   - Entering more than 8 digits for the password
   - Pressing keys other than the 0–9 number keys
   - Entering an incorrect password if a valid password has been entered



Changing the User Password

If the current user 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.

Important: The current user password must be active prior to changing it.

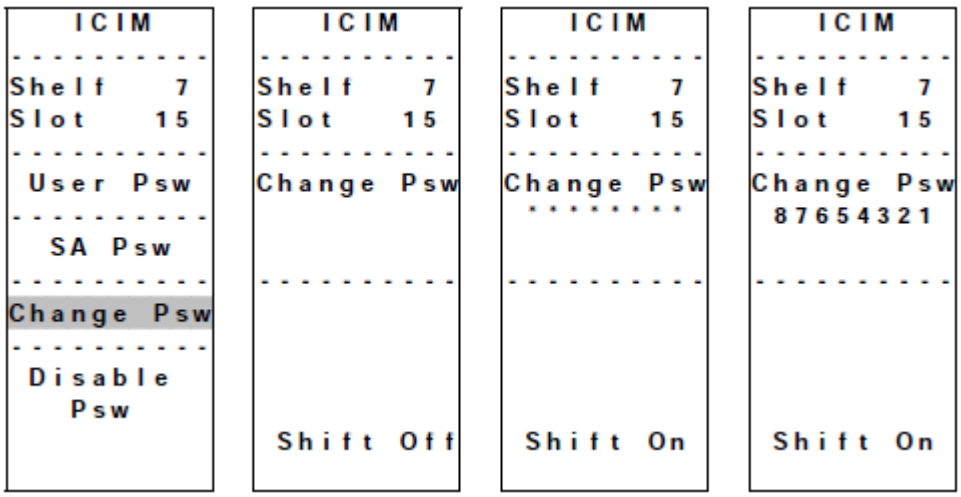
Follow these steps to change the user password.

1. Access the password function as shown in the procedure **Accessing the Password Function** earlier in this section.
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** is displayed, press the [SHIFT] key to display **Shift On.** Then enter the 8 digits of your new password, using the 0–9 number keys.

   If 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.

   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 function, then re-enter the new 8–digit password. Press the ENTER key.



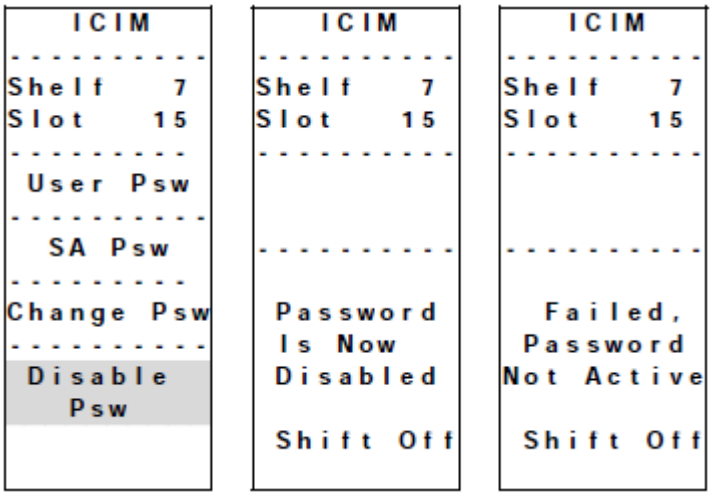
Disabling the User Password

If a user password has been entered, you may disable it at any time.

Important: 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 password before disabling it.

Follow these steps to disable a user password.

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**. You must re-enter the current password and then repeat this procedure.



ICIM Operation

Introduction

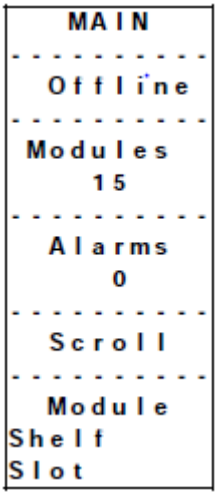
Once the module is installed as described in Chapter 2, **Installation,** it runs without the aid of an operator. Unless alarms are generated or your system configuration changes, you should not need to adjust the module beyond the initial setup.

Accessing 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.

The MAIN Menu

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

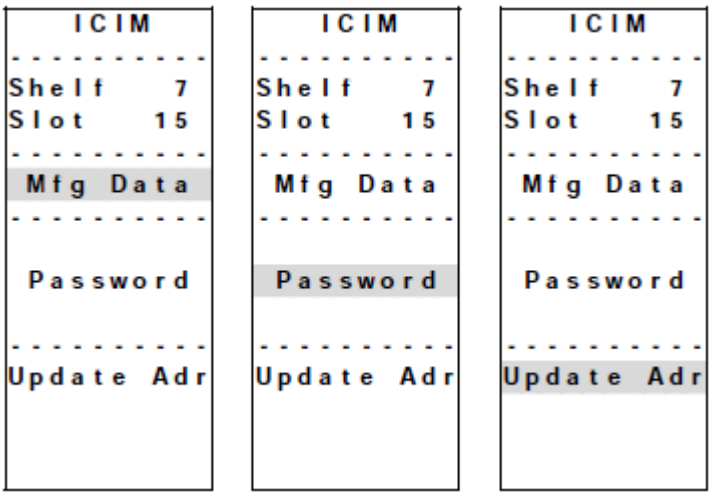


The table below shows descriptions of the menu options.

ICIM Menu Option	Description
Offline	Indicates TNCS 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

Prisma II ICIM Menu

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

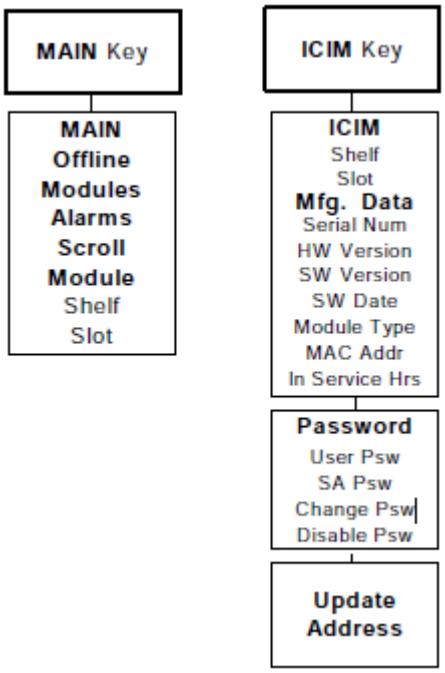


The table below shows descriptions of the menu options.

ICIM Menu Option	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 **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

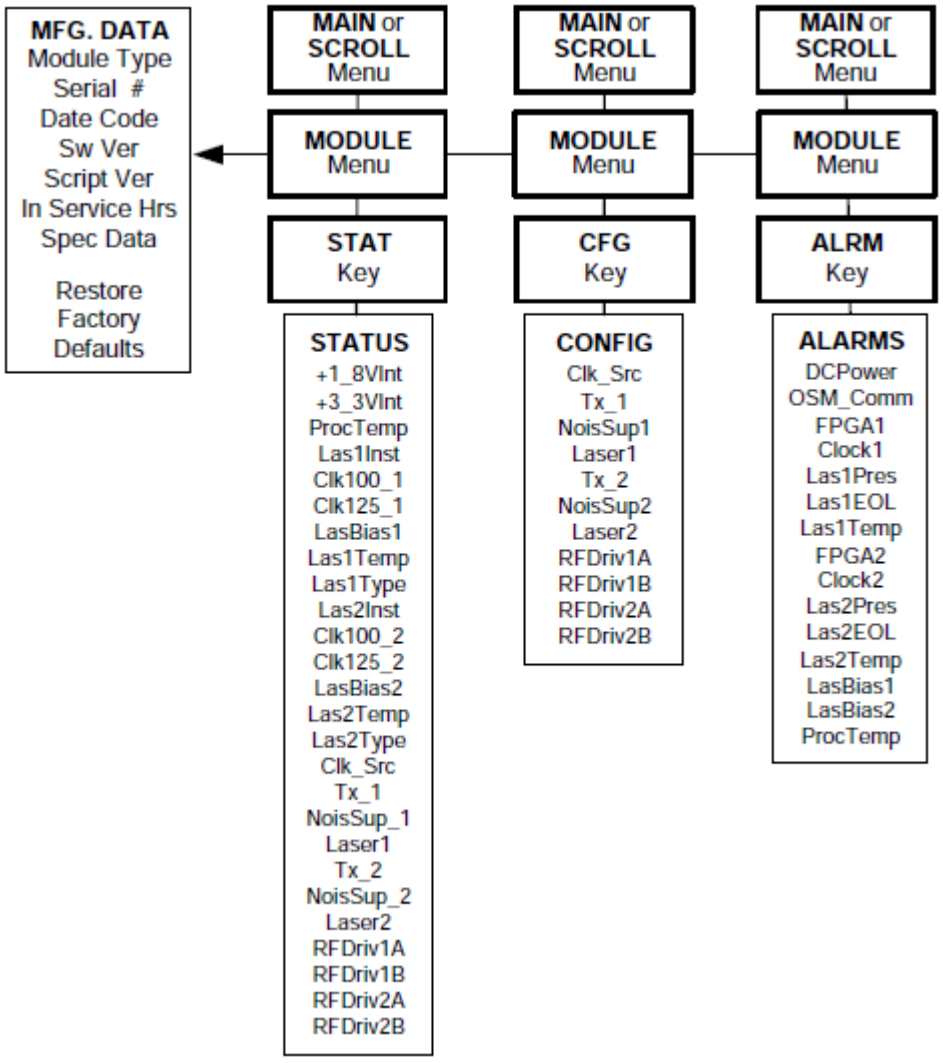
Prisma II MAIN Menu Structure

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.



Processor Software Menu Structure

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



Monitor Processor Status Using the ICIM

Introduction

The ICIM allows you to monitor the operating status of parameters.

STATUS Parameters

The table below describes the monitored status parameters for this processor.

Parameter	Units	Indication
+1_8VInt	V	Internal voltage level-nominal 1.8 V DC.
+3_3VInt	V	Internal voltage level-nominal 3.3 V DC.
ProcTemp	C	Temperature of the processor in degrees C.
Las1Inst	Yes or No	Indicates if transmitter 1 is installed.
Clk100_1	OK or Fault	Indicates if transmitter 1 100 MHz clock is phase locked to the 1 MHz reference.
Clk125_1	OK or Fault	Indicates if transmitter 1 125 MHz clock is phase locked to the 100 MHz clock.
LasBias1	mA	Indicates laser 1 bias current in mA.
Las1Temp	delC	Indicates laser 1 temperature in degrees C relative to its target temperature.
Las1Type	0 or 3	Indicates type of transmitter installed. • **0** = 1550 nm cooled laser transmitter • **3** = Uncooled 1550 nm or 1310 nm laser transmitter
Las2Inst	Yes or No	Indicates if transmitter 2 is installed.
Clk100_2	OK or Fault	Indicates that transmitter 2 100 MHz clock is phase locked to the 1 MHz reference.
Clk125_2	OK or Fault	Indicates if transmitter 2 125 MHz clock is phase locked to the 100 MHz clock.
LasBias2	mA	Indicates laser 2 bias current in mA.
Las2Temp	delC	Indicates laser 2 temperature in degrees C relative to its target temperature.

Parameter	Units	Indication
Las2Type	0 or 3	Indicates type of transmitter installed. • **0** = 1550 nm cooled laser transmitter • **3** = Uncooled 1550 nm or 1310 nm laser transmitter
Clk_Src	Indpend Master Slave	Indicates the reference clock input set in the CONFIG menu.
Tx_1	Active or Idle	Indicates TX_1 status as Active or Idle.
NoisSup_1	On/Off	Indicates if transmitter 1 noise suppression is **On** or **Off.**
Laser1	Enabled/ Disabled	Indicates if transmitter 1 laser is enabled or disabled.
Tx_2	Active or Idle	Indicates TX_2 status as Active or Idle.
NoisSup_2	On/Off	Indicates if transmitter 2 noise suppression is **On** or **Off.**
Laser2	Enabled/ Disabled	Indicates if transmitter 2 laser is enabled or disabled.
RFDriv1A RFDriv1B RFDriv2A RFDriv2B	dB	Indicates the amount of RF attenuation for each channel.

Checking Operating Status

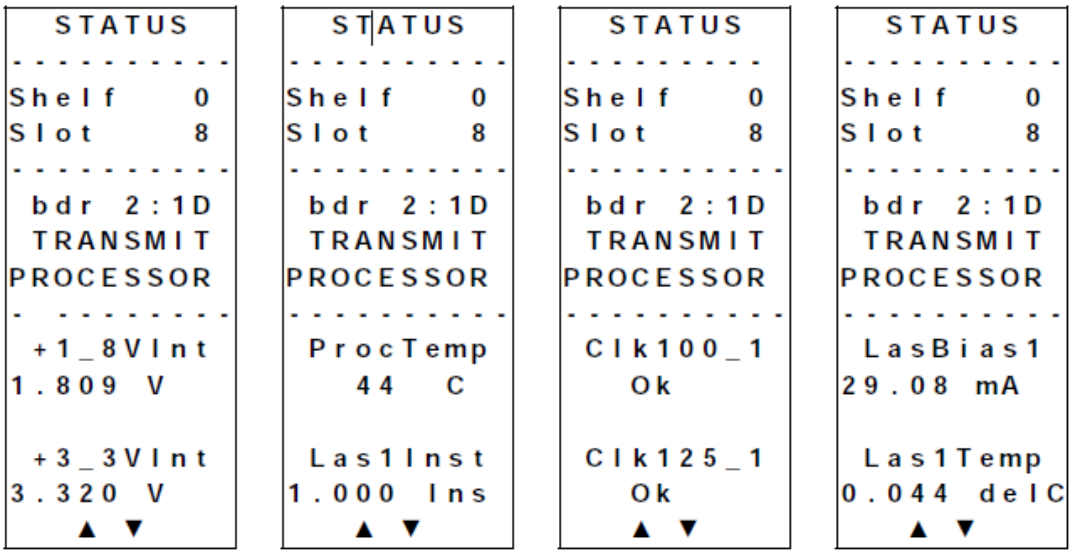
Using the ICIM, you can check the status of all operating parameters of this module. To monitor processor operating parameters, follow these steps.

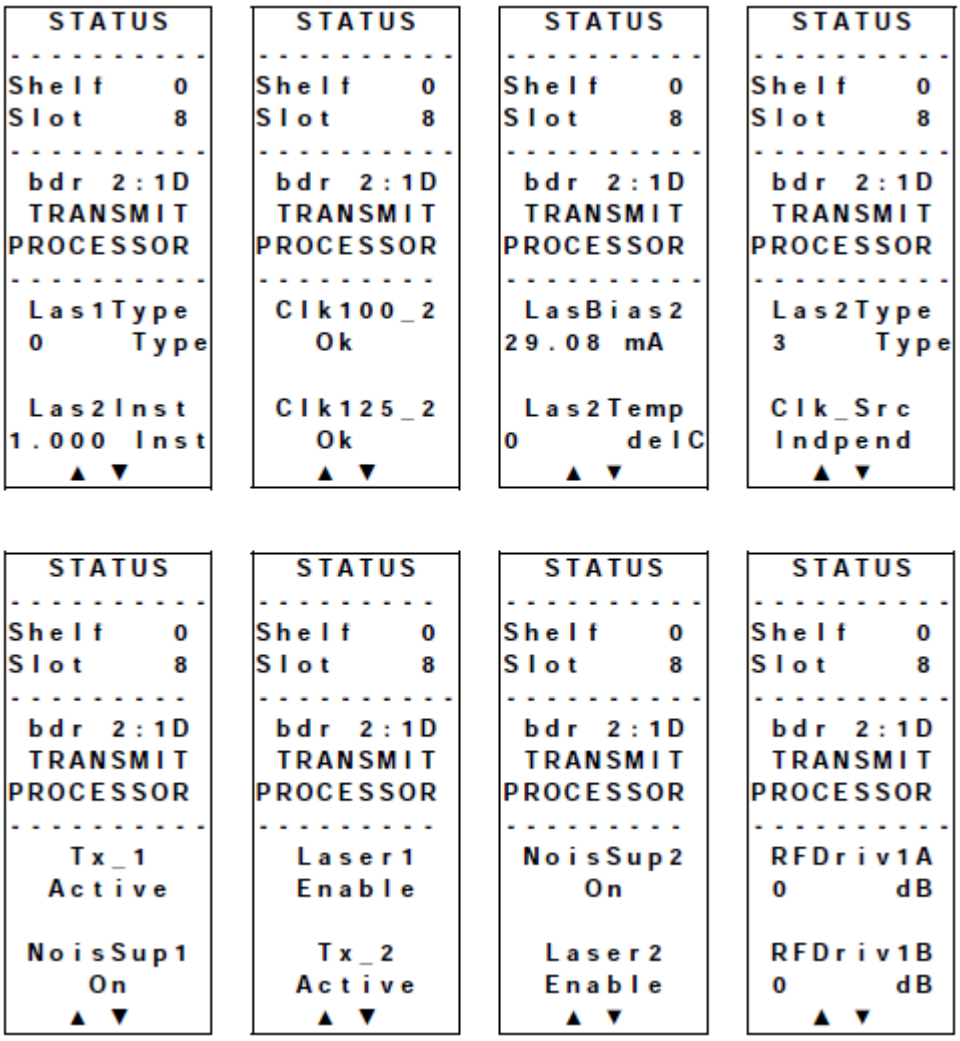
1. From the MAIN menu, press the ▼ key to highlight **Shelf** and **Slot** fields**.**
2. Press the SEL key to address the **Shelf** number. Then press the + key or the − key to scroll to the number of the desired shelf.
3. **Result:** Press the ENTER key. The **Slot** field is highlighted.
4. Press the + key or the − key to scroll to the number of the desired slot.
5. Press the ENTER key.

   Result: The information for the module of interest is displayed on the ICIM menu.
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 STAT to select the **STATUS** menu. Some typical **STATUS** menus are shown below.




STATUS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
Las1Type
0 Type
Las2Inst
1.000 Inst
STATUS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
Clk100_2
Ok
Clk125_2
Ok
STATUS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
LasBias2
29.08 mA
Las2Temp
0 delC
STATUS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
Las2Type
3 Type
Clk_Src
Indpend
STATUS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
Tx_1
Active
NoisSup1
On
STATUS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
Laser1
Enable
Tx_2
Active
STATUS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
NoisSup2
On
Laser2
Enable
STATUS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
RFDriv1A
0 dB
RFDriv1B
0 dB

Configure the Processor Using the ICIM

Introduction

The ICIM allows you to configure parameters for the processor.

CONFIG Parameters

The table below shows configurable parameters for the processor.

Parameter	Function	Values	Default
Clk_Src	Controls the reference clock input. • **Indpend**: The transmitter generates its own clock signal but does not send it outside the processor. • **Master:** The transmitter generates its own clock signal. • **Slave:** Uses the clock from a different processor. If a clock is not present, alarms are generated.	• Indpend • Master • Slave	Indpend
Tx_1	Mutes all alarms except for **Las1Bias** on an idle transmitter. The **Las1Bias** alarm will alert the operator if the transmitter is present but disabled. Should be set to **Idle** only if the module is not being used. Will mute the alarms but will not disable the laser.	Active or Idle	Active
NoisSup1	Controls whether transmitter 1 noise suppression is **On** or **Off.**	On or Off	Off
Laser1	Enables or disables transmitter 1 laser. If **Enable,** the laser is on. If **Disable,** the laser for this transmitter is forced off.	Enable/Disable	Enable

Parameter	Function	Values	Default
Tx_2	Mutes all alarms except for **Las1Bias** on an idle transmitter. The **Las1Bias** alarm will alert the operator if the transmitter is present but disabled. Should be set to **Idle** only if the module is not being used. Will mute alarms but will not disable the laser.	Active or Idle	Active
NoisSup2	Controls whether transmitter 2 noise suppression is **On** or **Off.**	On or Off	On
Laser2	Enables or disables transmitter 2 laser. If **Enable,** the laser is on. If **Disable,** the laser for this transmitter is forced off.	Enable or Disable	Enable
RFDriv1A RFDriv1B RFDriv2A RFDriv2B	Sets the amount of RF attenuation for each channel.	0 to 10 dB in 0.5 dB steps	0 dB

Configuring Parameters

Using the ICIM, you can configure the parameters listed in the previous table.

Follow these steps to configure the parameters.

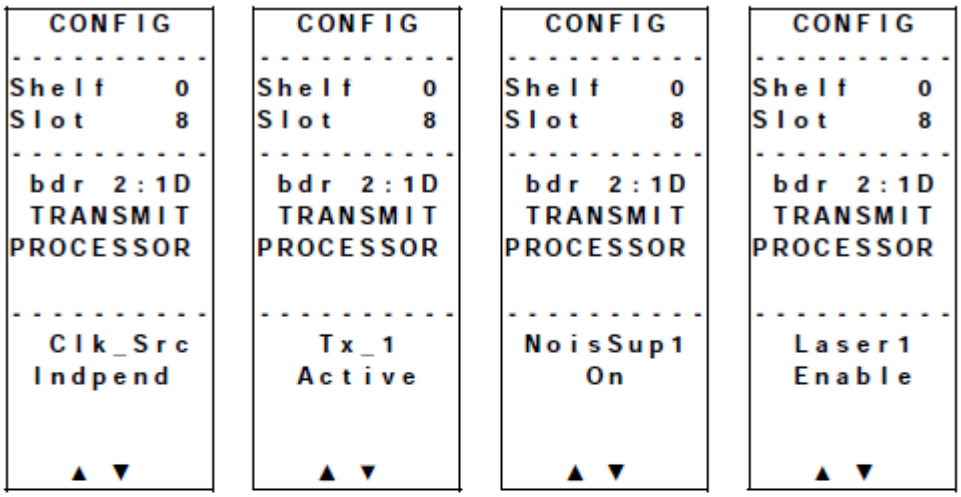
1. From the MAIN menu, press the ▼ key to highlight the **Shelf** and **Slot** fields**.**
2. Press the SEL key to address the **Shelf** number. Then press the + key or the − key to scroll to the number of the desired shelf.
3. Press the ENTER key.

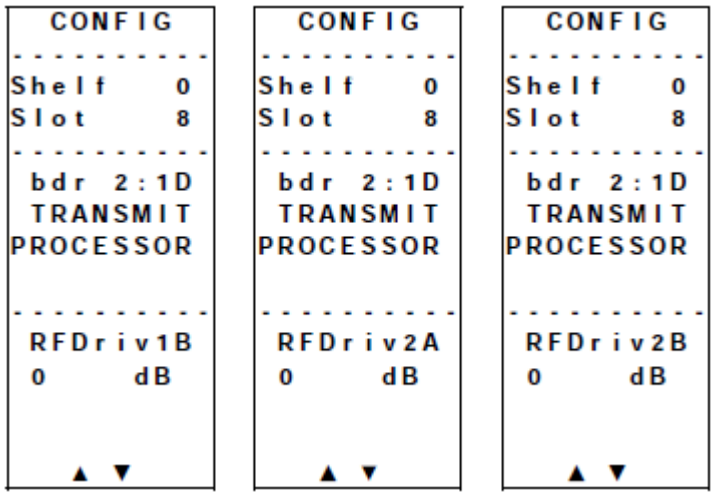
   Result: The **Slot** field is highlighted.
4. Press the + key or the − keys to scroll to the number of the desired slot.
5. Press the ENTER key.

   Result: The initial information for the module of interest displays on the ICIM menu.
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

Some typical processor **CONFIG** menus are shown below.




CONFIG
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
RFDriv1B
0 dB
CONFIG
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
RFDriv2A
0 dB
CONFIG
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
RFDriv2B
0 dB

Check Processor Alarms Using the ICIM

Introduction

The ICIM allows you to check processor alarms.

ALARMS Display

The table below shows the alarm data available for the processor.

Alarm	Alarm Condition	Indication	Possible Cause
DCPower	Status of +24V input, -5V input, 1.8V regulator, and 3.3V regulator.	Fault	Check the fan try to see if the power supplies are working. Make sure the module is fully seated in the chassis. Check VDC1_8 and VDC3_3 monitor to see if either voltage is out of spec. due to a bad regulator.
OSM_Comm	Gets set when it is not possible to read and write to the EEPROM in an installed OSM.	Fault	Ensure transmitter is fully seated. Remove and reinstall transmitter.
FPGA1	Indicates that FPGA1 can be read and written to.	Fault	Hardware failure.
Clock1	Alarms when the 100 MHz or 125 MHz clock has lost lock in transmitter 1.	Fault	Check Clk100_1 and Clk125_1 monitors to see which clock is lost. Ensure module Clk_Src has not been accidentally set to Slave. If in Slave mode, make sure there is a valid 1 MHz reference present.
Las1Pres	Transmitter 1 is missing.	Fault	Ensure transmitter 1 is installed and fully seated.
Las1EOL	Laser 1 is near end of life.	Fault	Time to replace transmitter.

Alarm	Alarm Condition	Indication	Possible Cause
Las1Temp	Laser 1 temperature is out of spec.	Fault	Ensure transmitter is within temperature specs and laser has had a chance to stabilize.
FPGA2	Indicates that FPGA2 can be read and written to.	Fault	Hardware failure.
Clock2	Alarms when the 100 MHz or 125 MHz clock has lost lock in transmitter 2.	Fault	Check Clk100_2 and Clk125_2 monitors to see which clock is lost. Ensure module Clk_Src has not been accidentally set to Slave. If in Slave mode, make sure there is a valid 1 MHz reference present.
Las2Pres	Transmitter 2 is missing.	Fault	Ensure transmitter 2 is installed and fully seated.
Las2EOL	Laser 2 is near end of life.	Fault	Time to replace transmitter 2.
Las2Temp	Laser 2 temperature is out of spec.	Fault	Ensure transmitter 2 is within temperature specs and laser has had a chance to stabilize.
LasBias1	Bias current of the laser in Laser 1 is out of spec.	Minor L or H Major L or H	Re-seat transmitter.
LasBias2	Bias current of the laser in Laser 2 is out of spec.	Fault	Re-seat transmitter.
ProcTemp	Processor temperature.	Minor L or H Major L or H	Check fan tray operation.

Alarm Thresholds

The table below shows alarm thresholds. Only the Processor Temperature threshold is adjustable on the processor.

Alarm	Function	Major Low Thhold	Minor Low Thhold	Minor High Thhold	Major High Thhold	Typical Range
ProcTemp	Processor temperature	-40°C	-35°C	80°C	85°C	-40-75°C
LasBias1	Bias current of the laser in transmitter 1	5.0 mA ITU laser 3.0 mA – uncooled laser	8.0 mA ITU laser 6.0 mA – uncooled laser	32.5 mA ITU laser 70 mA – uncooled laser	40 mA ITU laser 80 mA – uncooled laser	10 to 30 mA
LasBias2	Bias current of the laser in transmitter 2	5.0 mA – ITU laser 3.0 mA – uncooled laser	8.0 mA – ITU laser 6.0 mA – uncooled laser	32.5 mA – ITU laser 70 mA – uncooled laser	40 mA - ITU laser 80 mA – uncooled laser	10 to 30 mA

Checking Alarms

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

Alarms fall into one of the following categories.

- Major low
- Minor low
- Minor high
- Major high

Follow these steps to check alarm conditions.

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.

   Result: 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.

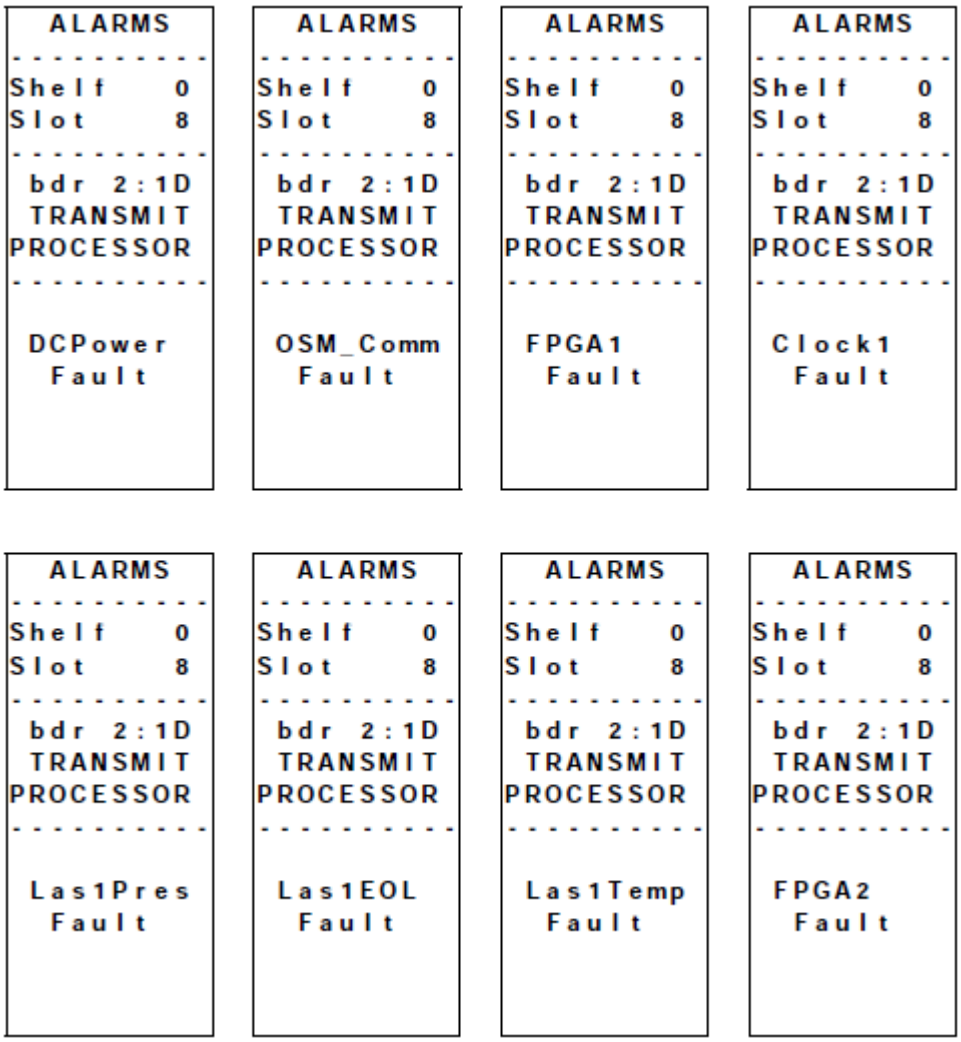
   Result: The **MODULE** menu is displayed on the ICIM.
6. Press the [ALRM] key.

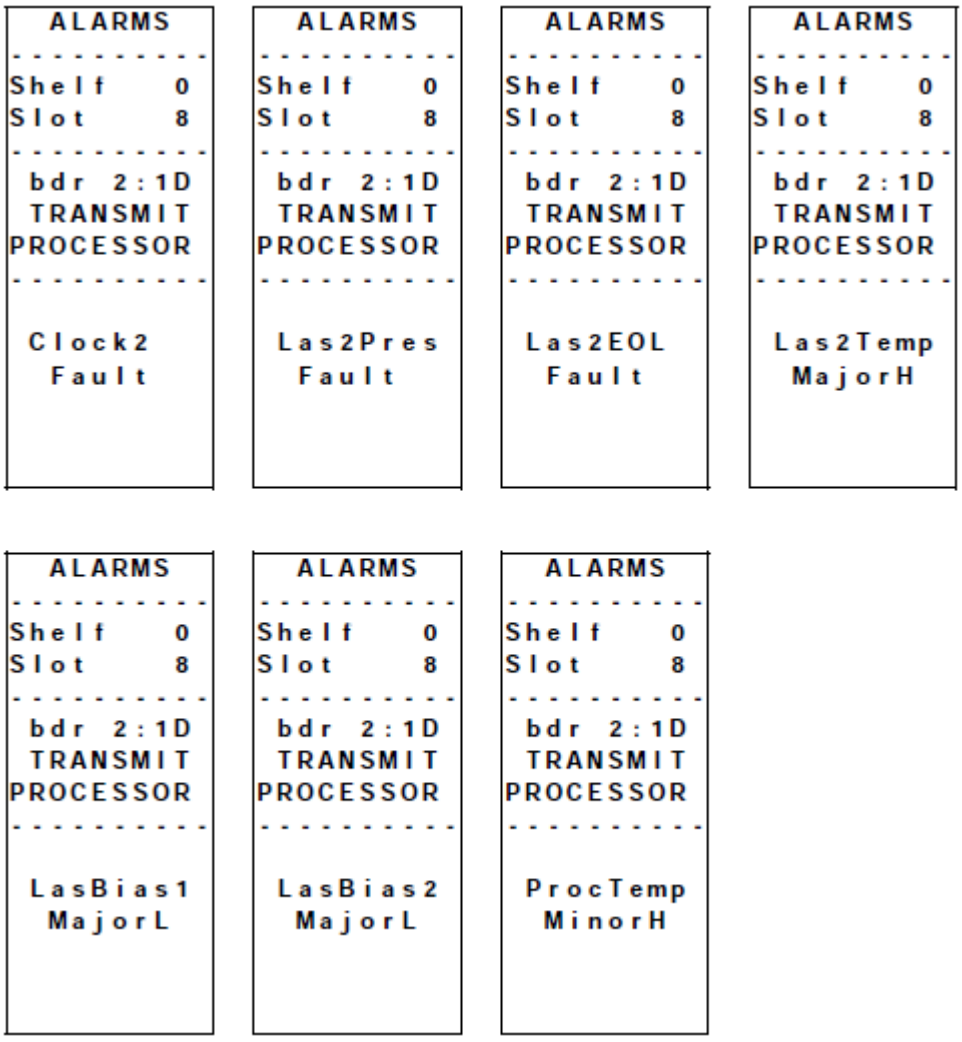
   Result: The module alarm conditions are displayed.
7. Use the [▲] key or the [▼] key to scroll through alarm conditions until the desired alarm is displayed.
8. Monitor the alarm condition(s) and take appropriate action. Verify that all settings and thresholds relating to the alarm indication are set correctly to rule out an unintended alarm.
9. When finished, press the [MAIN] key.

   Result: The display returns to the MAIN menu.

Processor ALARMS Menus

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




ALARMS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
Clock2
Fault
ALARMS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
Las2Pres
Fault
ALARMS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
Las2EOL
Fault
ALARMS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
Las2Temp
MajorH
ALARMS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
LasBias1
MajorL
ALARMS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
LasBias2
MajorL
ALARMS
Shelf 0
Slot 8
bdr 2:1D
TRANSMIT
PROCESSOR
ProcTemp
MinorH

Check Manufacturing Data Using the ICIM

Introduction

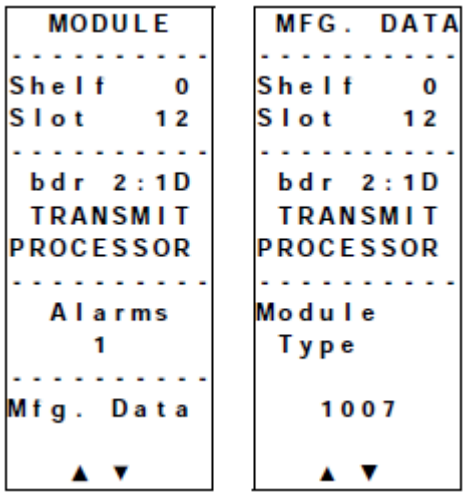
The ICIM allows you to check manufacturing data.

Checking Manufacturing Data

Follow these steps to access the processor's 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 [−] keys to scroll to the number of the desired shelf.
3. Press the [ENTER] key.

   Result: 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 manufacturing data screens, as shown on the right menu below.



6. The [▲] or [▼] keys allow you to scroll through the manufacturing data.

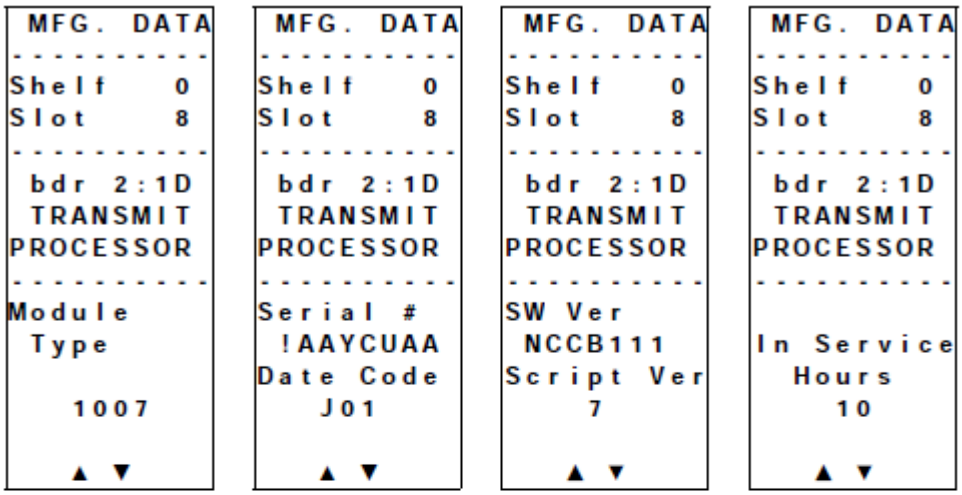
Manufacturing Data Display

The table below describes the manufacturing data available for this module.

Manufacturing Data	Explanation
Module Type	Cisco module type number
Serial #	The alphanumeric device serial number
Date Code	Code describing year and month of module manufacture
Sw Ver (Software Version)	Core code software version
Script Ver (Script Version)	Module software script version
In Service Hours	Number of hours that the module has been used
Spec Data	No special data for this module
Restore Factory Defaults	Restores all factory default configuration settings

MFG. DATA Screens

When the **MFG. DATA** screen is selected, the ▲ key or the ▼ key allows you to scroll through the manufacturing parameters specific to this module. Some typical **MFG. DATA** screens are shown below.



Save the Configuration Using the ICIM

Introduction

The following instructions explain how to save your processor's configuration using ICIM.

Saving the Current Configuration

Follow these steps after every change to save the current module 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

Once you have configured this module to your system's specifications using the ICIM and no alarms are indicated, 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.

Chapter 4
Operation Using LCI

Overview

Introduction

The procedures in this chapter apply if you are using the Local Craft Interface (LCI) software to configure and operate the Prisma II bdr 2:1 Dual Transmit Processor.

Included in this chapter are LCI software installation instructions and detailed descriptions of how to use the LCI software to view and modify information for the processor.

In This Chapter

This chapter contains the following topics.

Topic	See Page
LCI Introduction	4-2
System Requirements	4-3
Install LCI	4-4
Obtain and Install the Prisma II Driver Upgrade	4-7
Connect the Computer to the Chassis	4-8
Start LCI	4-9
LCI Device Tree Overview	4-11
Access the Device Details Window	4-12
Check the Operating Status	4-15
Configure the Processor	4-17
Check Processor Alarms	4-19
Check Device Properties	4-22

⚠ **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.

LCI Introduction

The LCI Software Function

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

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

System Requirements

Introduction

You will need the following computer software and hardware to run the LCI software. Typically, a laptop PC is used for portability.

Computer Requirements

- Pentium II 300 MHz processor or equivalent
- 128 MB RAM
- 10 MB available hard drive space
- 1.44 MB floppy drive
- CD-ROM Drive
- Windows 98 or later operating system software

Cabling Requirements

The cable required for connecting a PC to a chassis is a standard "off the shelf" DB-9 female to DB-9 male serial extension cable. The connectors are a serial 9-pin D-shell (EIA 574/232).

The Cisco part number for a six-foot DB-9 female to DB-9 male extension cable is 180143.

Install LCI

Introduction

This section describes how to install your LCI software.

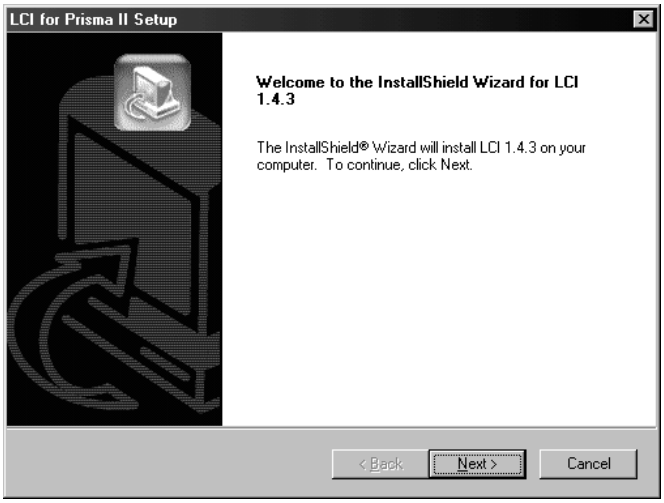
Installing the LCI Software

Follow these steps to install the LCI software.

1. Close all programs that are running on your computer.
2. Insert the LCI CD-ROM into your CD-ROM drive.

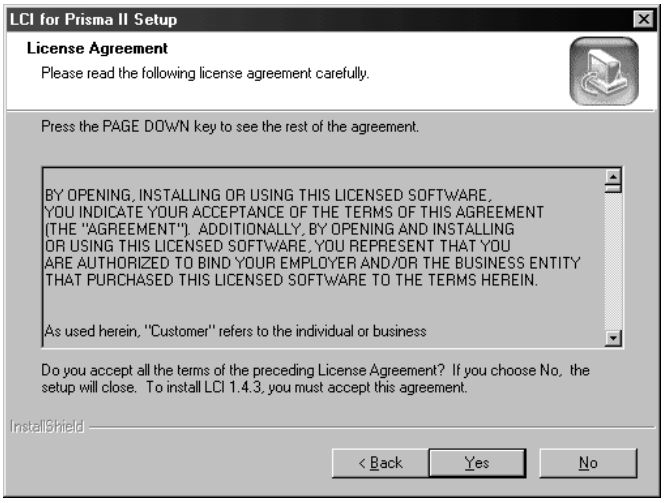
   Results:

   - The LCI software installation program starts automatically. If the installation program does not start automatically, open Windows Explorer and double-click the file **setup.exe** on the LCI CD-ROM.
   - The Welcome screen displays.



3. Click **Next.**

   Result: The License Agreement screen displays.

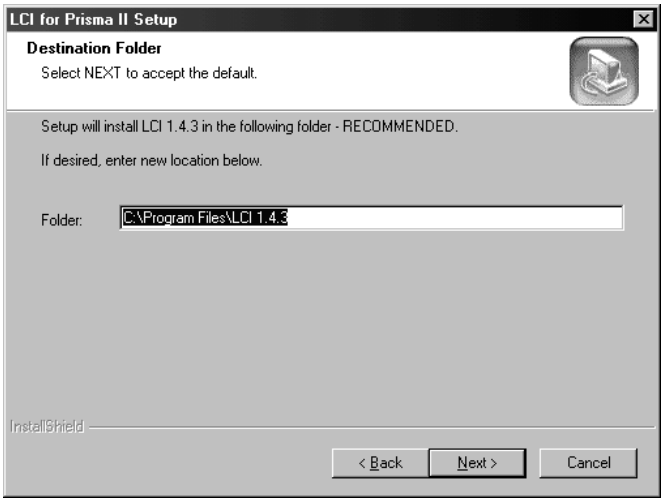


4. Click **Yes** to accept the license agreement.

   Result: The **License Agreement** dialog box displays.

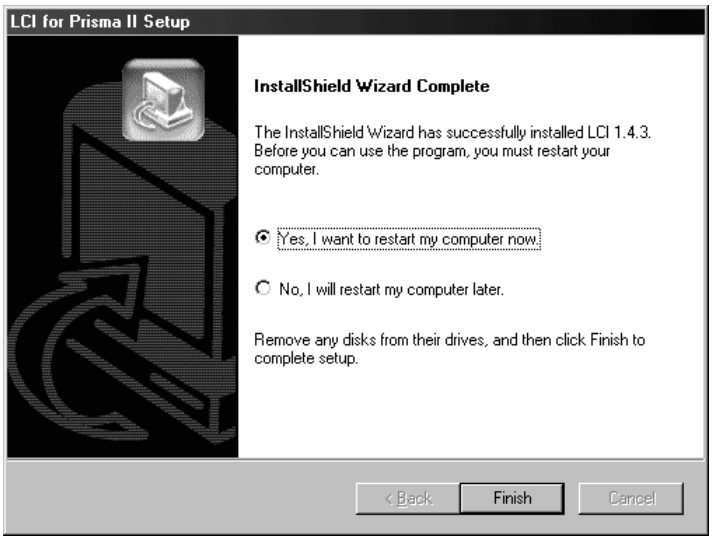
5. Click **Yes.**

   Result: The Destination Folder window displays.



6. Do you want to install the LCI software in the folder displayed in the **Folder** box?
   - If **yes,** click **Next** to begin the installation, and proceed to step 9.
   - If **no,** proceed to step 7.
7. To specify where you want the LCI software to be installed, type the path in the **Folder** box.
8. Click **Next** to begin the installation.

   Result: The last installation wizard window displays after the installation is complete.



9. Before you can use the LCI software, you must restart your computer. Choose whether to restart your computer now or later by selecting the appropriate option button.
10. Click **Finish.** After your computer is restarted, you can use the LCI software.

Obtain and Install the Prisma II Driver Upgrade

Introduction

A Prisma II driver upgrade is needed to operate the processor using LCI software version 1.4.3.

Important: This upgrade is *not* required to operate the processor if you are using an ICIM or any LCI software later than 1.4.3.

Required Software

To operate the processor using LCI, you must have (in addition to Windows) the following Cisco software installed on your PC.

- LCI software, version 1.4.3 or later
- Prisma II driver upgrade (if using LCI version 1.4.3)

Important: If you are using LCI software version 1.4.3, it must be installed on your PC prior to installing the driver upgrade. LCI software version 1.4.3 was shipped on CD-ROM with the 56-connector chassis and is also available on the Web site: http://www.scientificatlanta.com/tncs/upgrades/upgrades.htm.

Obtaining the Driver Upgrade

Internet access is required in order to obtain this software. To obtain the driver upgrade, you must download it from the Web site. The address is:

http://www.scientificatlanta.com/tncs/upgrades/upgrades.htm

Downloads may be made to any computer but must ultimately be installed on the PC running the LCI software.

Downloading and Installing the Driver Upgrade (LCI Software Version 1.4.3 ONLY)

Follow these steps to install the upgrade.

1. Ensure that LCI software version 1.4.3 is installed on your system. If it is not, refer to **Install LCI** earlier in this chapter for instructions.
2. Access the Web site shown above.
3. Click the **Prisma II Driver Upgrade** link.
4. At the prompt, save the file to a location of your choice on your system.
5. In Windows Explorer, double-click the saved file.
6. Follow the prompts of the installation program. The driver upgrade is installed in the proper location on your system. The LCI software is now ready to use with the processor.

Connect the Computer to the Chassis

Introduction

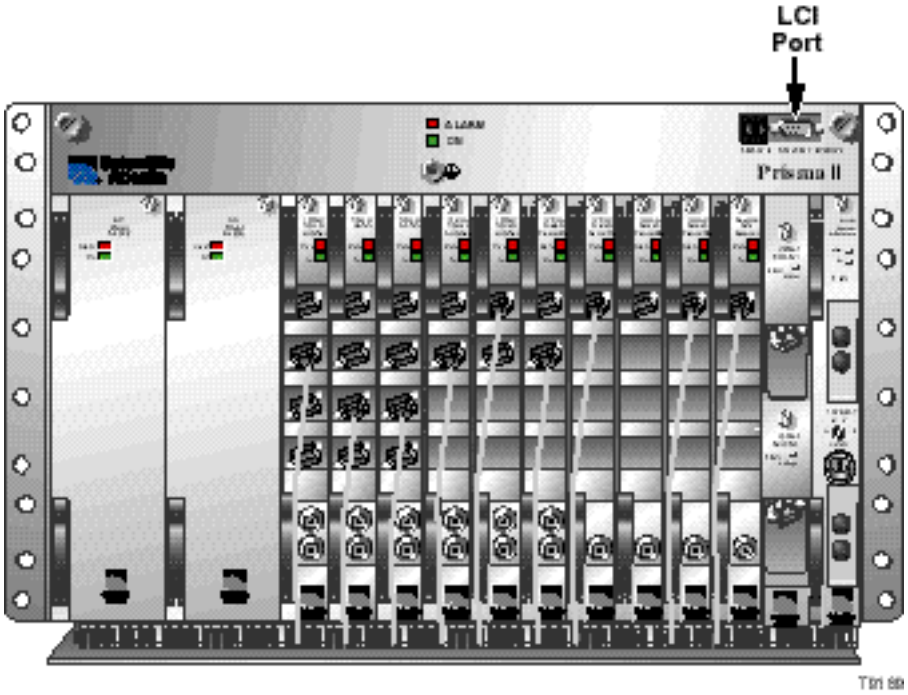
Before you start the LCI software, you must first connect your computer to the chassis that contains the module(s) you want to check.

Important: The LCI software communicates only with those modules located in the chassis your computer is attached to. To check other modules, you must connect your computer to the chassis where the modules reside.

Connecting to the Chassis

Follow these steps to connect your PC to the chassis.

1. Plug the female end of a 9-pin serial extension cable into your computer.
2. Plug the male end of the cable into the **Local Craft Interface** port.



Start LCI

Introduction

When you start the LCI software, it queries the devices (modules) located in the chassis that is connected to your computer. After this query process (referred to as the learn mode), the LCI software does the following for each device it finds.

- Represents the device in the device 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 the LCI software. For instructions, refer to **Connect the Computer to the Chassis** earlier in this chapter.

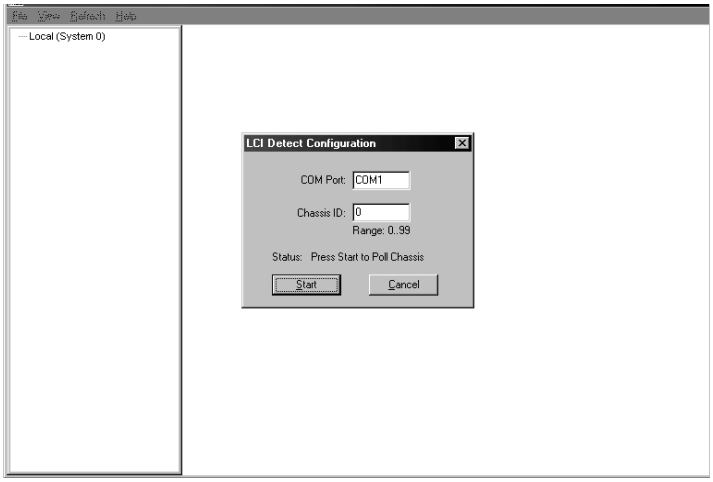
Starting the LCI Software

Follow these steps to start the software.

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

LCI

Result: The LCI Main window opens and the **LCI Detect Configuration** dialog box displays.



2. Verify the communication port displayed in the **COM Port** box. This is the port on your computer that the chassis is connected to.

   To change the COM port, type the word "COM" and then the port number.

   Example: To specify COM port 2, type **COM2.**

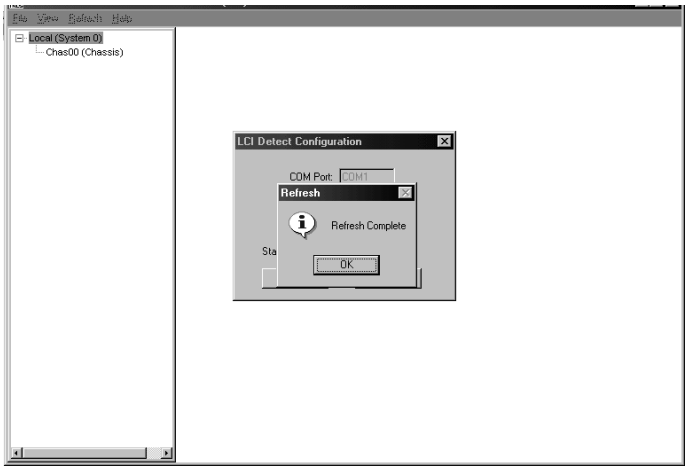
3. Verify that the chassis ID displayed in the **Chassis ID** box is the same number that is dialed in on the chassis ID switch on the front of the Prisma II Chassis that you are connected to.

   To change the chassis ID, type the number in the box.

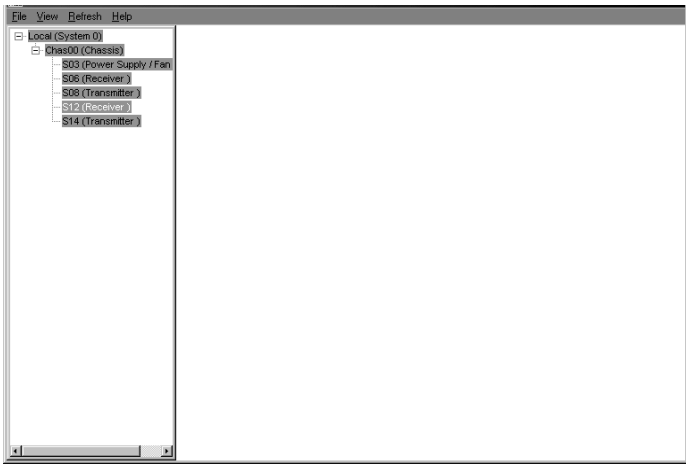
4. Click **Start.**

   Result: The LCI software polls the chassis.

5. When the refresh is complete, click **OK**.



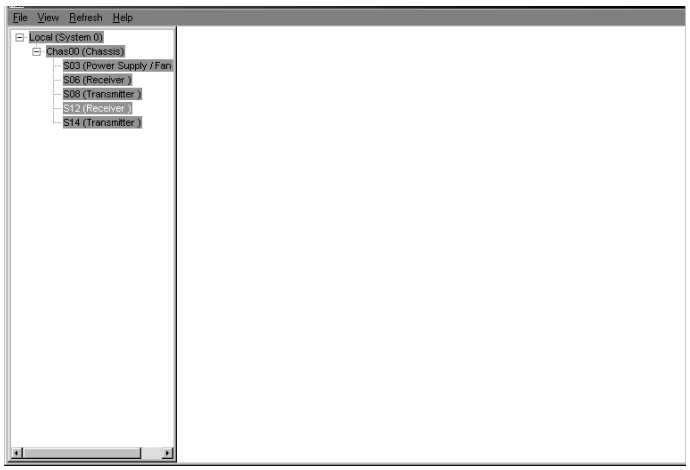
Result: The chassis and modules appear in the device tree of the main window of the LCI software.



LCI Device Tree Overview

Introduction

The main window of the LCI software contains a tree that represents your system in a hierarchical manner.



Device Tree

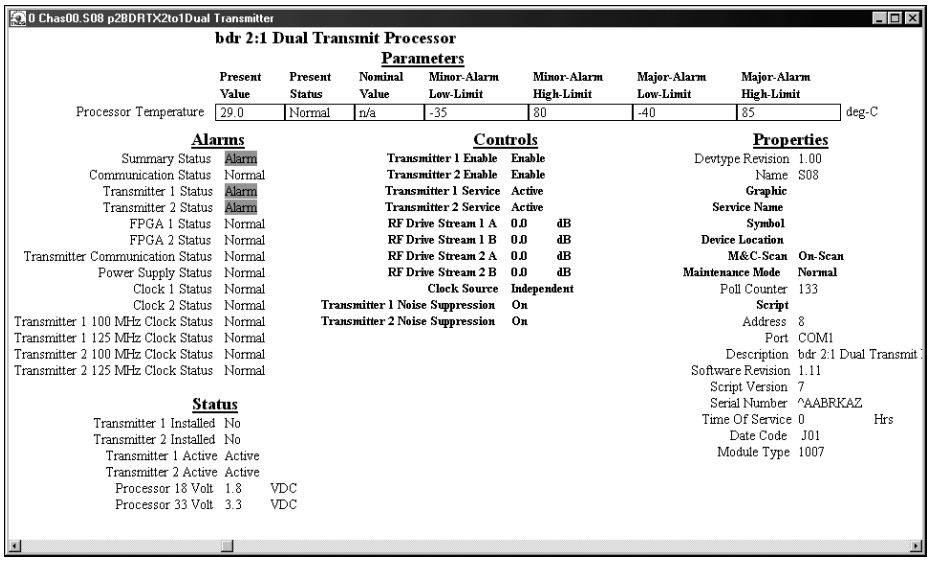
In the graphic above, the device tree represents a PC connected to a chassis that contains five modules. The three tree levels are described in the following table.

Device Tree Level	Description
Local (System 0)	PC being used
Chass00 (Chassis)	Chassis the computer is connected to
Sxx (Device name)	Module(s) located within the chassis. Each device is of the format *chassis slot location (device name).* **Example:** In the graphic above, **S10 (Transmitter)** represents a bdr 2:1 Dual Transmit Processor that is located in slot 10 of the chassis.

Access the Device Details Window

Introduction

Information about a device (its parameters, alarms, and status) is located in the Device Details window. The graphic below shows the Device Details window for a Prisma II bdr Dual Transmit Processor.



Within the LCI device tree, you can access this window using one of the following four methods:

- Double-click the chassis and select the device in the graphic that displays
- Right-click the chassis and select **Open** from the menu that displays
- Double-click the module
- Right-click the device and select **Details** from the menu that displays

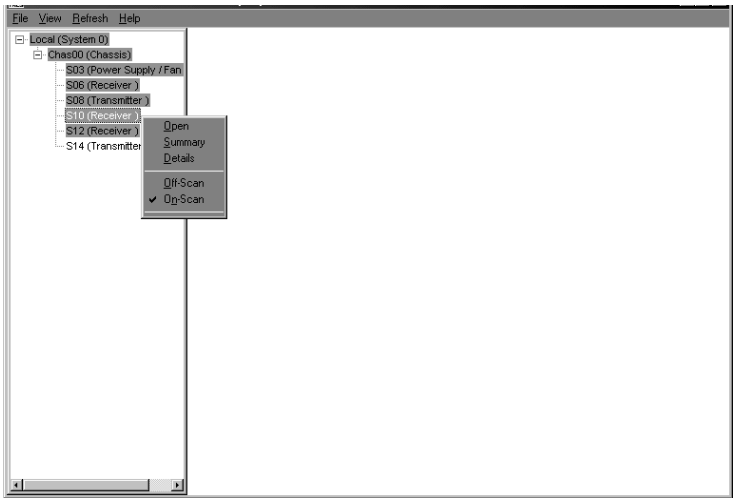
Note: Although you can use the method that is most convenient for you, the procedures throughout this chapter are described using the right-click device technique.

For more information about the device tree, refer to **LCI Device Tree Overview** earlier in this chapter.

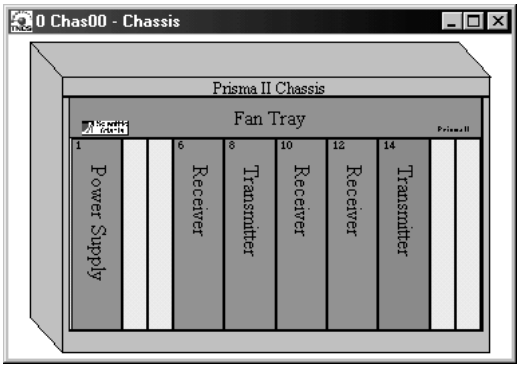
Right-Click the Chassis

Follow these steps to access the Device Details window.

1. Right-click the chassis, and click **Open.**

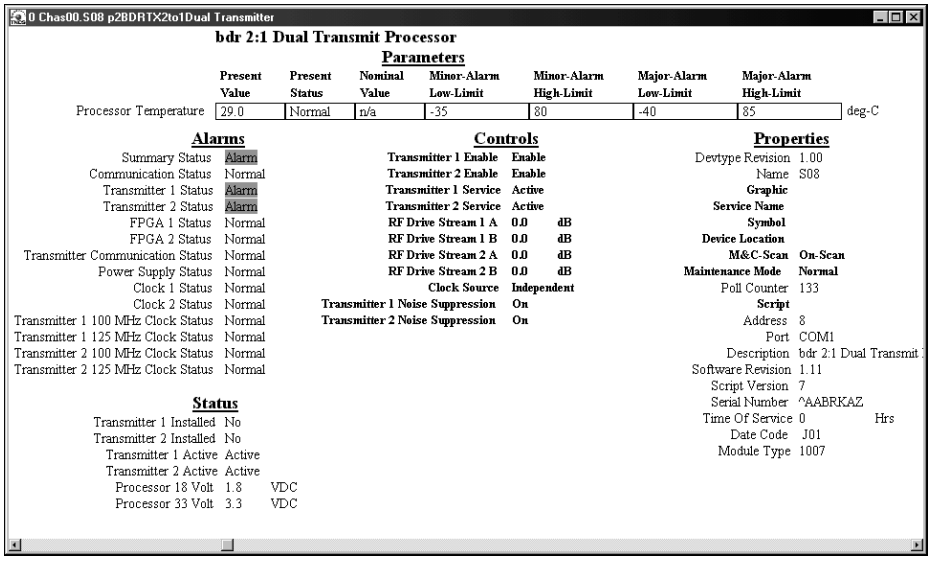


Result: A graphic representation of the chassis displays.



2. Double-click the device whose information you want to view and/or configure.

   Result: The Device Details window displays.



3. Proceed with viewing and/or configuring information.

Check the Operating Status

Introduction

Using LCI, you can check the status of all operating parameters of the processor.

Monitored Parameters

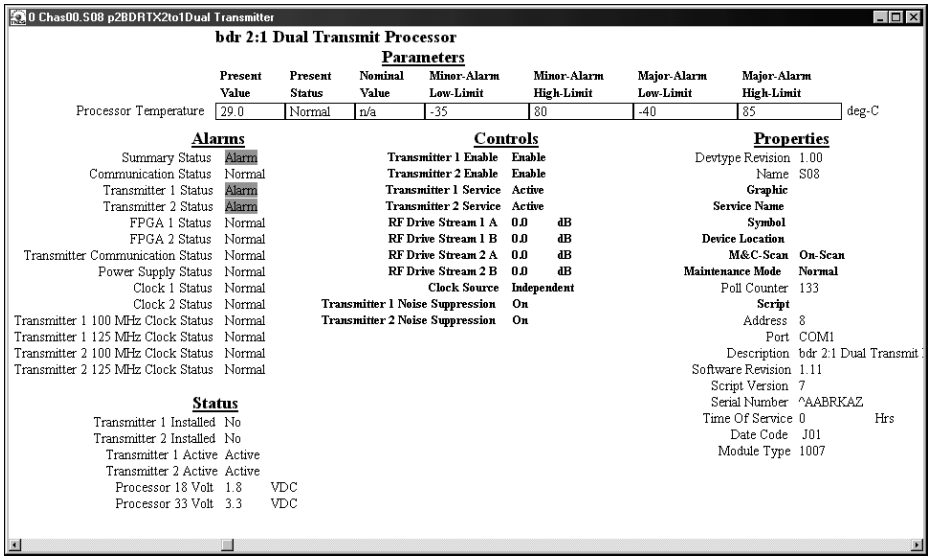
The table below describes the monitored parameters for the processor.

Parameter	Units	Function
Processor Temperature	C	Temperature of the transmit processor in degrees C.
Transmitter 1 Installed	Yes or No	Indicates if transmitter 1 is installed.
Transmitter 2 Installed	Yes or No	Indicates if transmitter 2 is installed.
Transmitter 1 Active	Yes or No	Indicates if transmitter 1 is active.
Transmitter 2 Active	Yes or No	Indicates if transmitter 2 is active.
Processor 18 Volt	V DC	Internal voltage level-nominal 1.8 V DC.
Processor 33 Volt	V DC	Internal voltage level-nominal 3.3 V DC.

Checking the Operating Status

To monitor the processor operating parameters, follow these steps.

1. Access the Device Details window. The monitored parameters are displayed under **Parameters** and **Status**.



2. Proceed with checking the operating parameters.

Configure the Processor

Introduction

Using LCI, you can configure several parameters.

Configurable Parameters

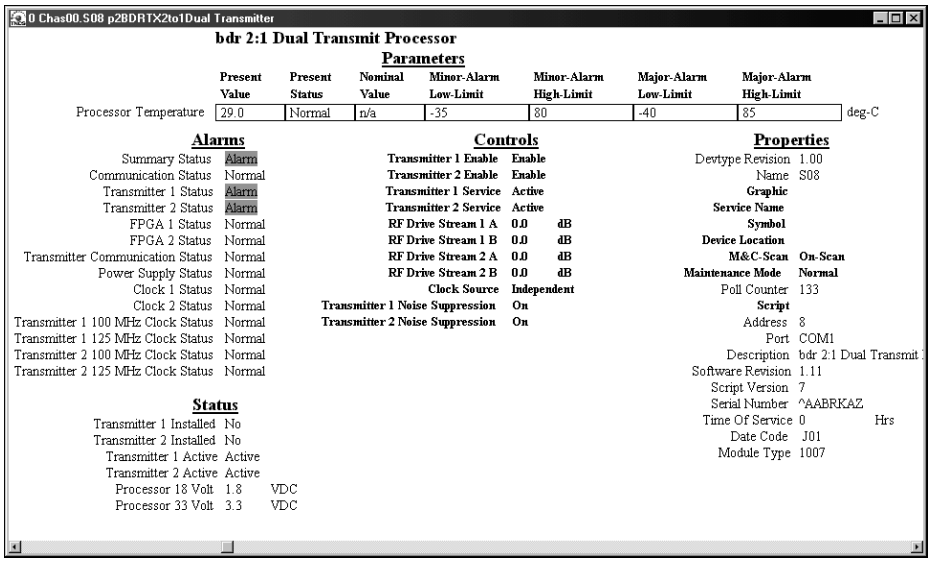
The table below lists the configurable parameters of the processor.

Parameter	Function	Values	Default
Transmitter 1 Enable	Controls whether transmitter 1 is enabled or disabled.	Enable or Disable	Enable
Transmitter 2 Enable	Controls whether transmitter 2 is enabled or disabled.	Enable or Disable	Enable
Transmitter 1 Service	Controls whether transmitter 1 is active or idle.	Active or Idle	Active
Transmitter 2 Service	Controls whether transmitter 2 is active or idle.	Active or Idle	Active
RF Drive Stream 1A RF Drive Stream 1B RF Drive Stream 2A RF Drive Stream 2B	Attenuates the RF input channels.	0 dB to 10 dB in 0.1 dB steps	0 dB
Clock Source	Selects the 1 MHz reference clock source.	Independent Master Slave	Independent
Transmitter 1 Noise Suppression	When set to **On,** a small amount of dithering is added, which suppresses spurious signals.	On or Off	On
Transmitter 2 Noise Suppression	When set to **On,** a small amount of dithering is added, which suppresses spurious signals.	On or Off	On

Configuring Parameters

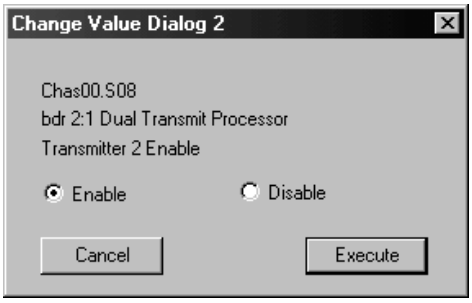
Follow these steps to configure the parameters.

1. Access the Device Details window.



2. Under **Controls,** double-click the parameter you want to configure.

   Result: The **Change Value** dialog box opens. The graphic below shows the dialog box for the **Transmitter 2 Enable** parameter of the processor.



3. Depending on the parameter you chose, select or type a new value.

4. Click **Execute.**

   Result: The new value displays next to the parameter.

Check Processor Alarms

Introduction

Using LCI, you can check the alarm status of various parameters. Alarms that you can check are listed below.

Alarm	Alarm Condition	Indication	Possible Cause
Summary Status	Normal or Alarm	Alarm	Any alarm in the device.
Communication Status	Communication fault	Alarm	Communication alarm.
Transmitter 1 Status	Transmitter 1 not present	Alarm	Transmitter 1 not present.
Transmitter 2 Status	Transmitter 2 not present	Alarm	Transmitter 2 not present.
FPGA 1 Status	FPGA 1 operation	Alarm	Indicates the FPGA 1 failure. Unit needs repair.
FPGA 2 Status	FPGA 2 operation	Alarm	Indicates the FPGA 2 failure. Unit needs repair.
Transmitter Communication Status	Communication fault	Alarm	Communication alarm.
Power Supply Status	Power supply indicates a fault	Alarm	Check power cord. Make sure power supply is fully seated.
Clock 1 Status	Transmitter 1 clock operation	Alarm	Hardware failure. Unit needs repair.
Clock 2 Status	Transmitter 2 clock operation	Alarm	Hardware failure. Unit needs repair.
Framing Status	The signal cannot be framed	Alarm	Check fiber connection path and bdr transmitter.

Alarm	Alarm Condition	Indication	Possible Cause
Transmitter 1 100 MHz Clock Status	Transmit processor 1 100 MHz clock will not lock	Alarm	Check cables. Re-seat module.
Transmitter 1 125 MHz Clock Status	Transmit processor 1 125 MHz clock will not lock	Alarm	Check cables. Re-seat module.
Transmitter 2 100 MHz Clock Status	Transmit processor 2 100 MHz clock will not lock	Alarm	Check cables. Re-seat module.
Transmitter 2 125 MHz Clock Status	Transmit processor 2 125 MHz clock will not lock	Alarm	Check cables. Re-seat module.

Alarms Limits

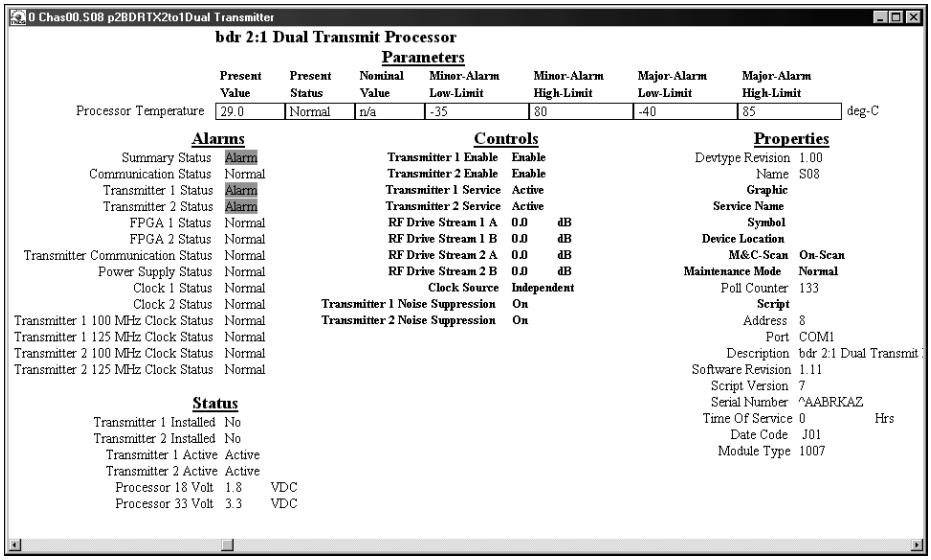
Alarm limits fall into one of the following categories.

- Major low
- Minor low
- Minor high
- Major high

Checking Alarms

Follow these steps to check a parameter's alarm status.

1. Access the Device Details window. Device alarms are shown under **Parameters** and **Alarms.**



2. If any of the parameters are in alarm, take the corrective action you deem necessary.

Check Device Properties

Introduction

Using the LCI software, you can check the device properties of the processor.

Device Properties

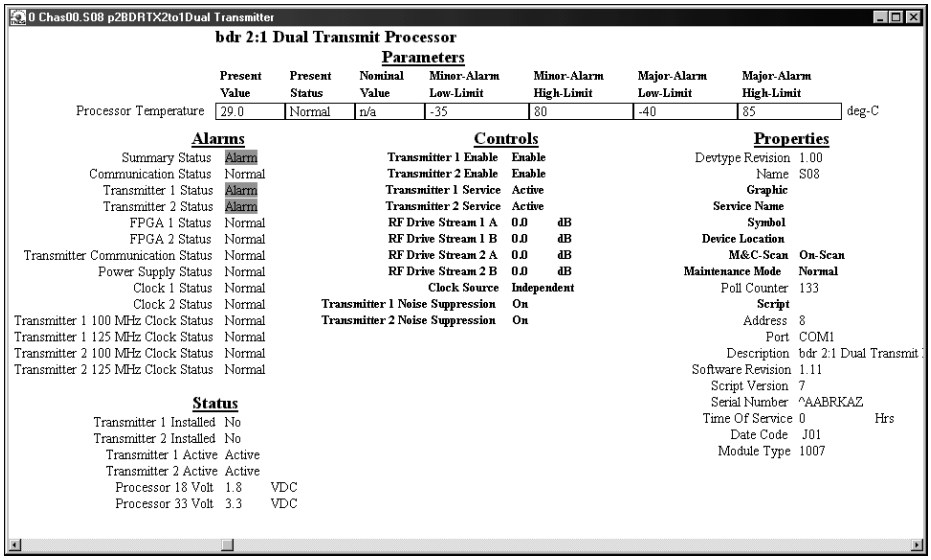
The table below describes the device properties available for the processor.

Properties	Description
Description	Device description
Software Revision	Core code software revision
Script Version	Module software script version
Serial number	Alphanumeric device serial number
Time of Service	Number of hours that the device has been used
Date Code	Code describing year and month of manufacture
Module Type	Cisco device type number

Checking Device Properties

Follow these steps to access the Device Properties,

1. Access the Device Details window. The device properties are displayed under **Properties.**



2. Proceed with viewing the device properties.

Chapter 5
Maintenance and Troubleshooting

Overview

Introduction

This chapter provides information to assist you in maintaining and troubleshooting the Prisma II bdr 2:1 Dual Transmit Processor.

Qualified Personnel

Only appropriately qualified and trained personnel should attempt to troubleshoot this product.

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

In This Chapter

This chapter contains the following topics.

Topic	See Page
Module Maintenance	5-2
General Troubleshooting Information	5-3
Troubleshoot Alarm Conditions	5-4
Troubleshoot LCI	5-6
Clean Fiber-Optic Connectors	5-13

Module Maintenance

Introduction

Regular maintenance is required to extend the life of the module and ensure optimal performance.

Required Maintenance

The following table describes the recommended maintenance.

Frequency	Maintenance Required
Weekly	• Check all parameters and test points • Record data • Make repairs and adjustments as needed
Quarterly	• Make sure all cables are mated properly • Inspect cables for stress and chafing • Make sure all retaining screws are tight
When needed	Carefully clean the module with a soft cloth that is dampened with mild detergent

General Troubleshooting Information

Introduction

This troubleshooting information describes the most common alarms and gives typical symptoms, causes, and items to check before consulting US.

Required Equipment

Fiber connector cleaning materials are required to clean fiber connectors.

Additional Assistance

If you need additional assistance, telephone one of our Technical Service Centers or your local sales subsidiary. The Customer Support section in Chapter 6, **Customer Information** contains a list of telephone numbers.

Troubleshooting

> ⚠ **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 service personnel.**

Refer to the following section, **Troubleshoot Alarm Conditions**, to identify and correct module faults.

Troubleshoot Alarm Conditions

Introduction

If the red ALARM indicator is illuminated or blinking, check the ICIM to determine the cause of the alarm. Blinking = minor alarm, steady illumination = major alarm.

ICIM Alarm Conditions

The table below shows the alarm conditions and possible causes.

Alarm	Alarm Condition	Indication	Possible Cause
DCPower	Status of +24V input, -5V input, 1.8V regulator, and 3.3V regulator.	Fault	Check the fan try to see if the power supplies are working. Make sure the module is fully seated in the chassis. Check VDC1_8 and VDC3_3 monitor to see if either voltage is out of spec. due to a bad regulator.
OSM_Comm	Gets set when it is not possible to read and write to the EEPROM in an installed OSM.	Fault	Ensure transmitter is fully seated. Remove and reinstall transmitter.
FPGA1	Indicates that FPGA1 can be read and written to.	Fault	Hardware failure.
Clock1	Alarms when the 100 MHz or 125 MHz clock has lost lock in transmitter 1.	Fault	Check Clk100_1 and Clk125_1 monitors to see which clock is lost. Ensure module Clk_Src has not been accidentally set to Slave. If in Slave mode, make sure there is a valid 1 MHz reference present.
Las1Pres	Transmitter 1 is missing.	Fault	Ensure transmitter 1 is installed and fully seated.
Las1EOL	Laser 1 is near end of life.	Fault	Time to replace transmitter.

Alarm	Alarm Condition	Indication	Possible Cause
Las1Temp	Laser 1 temperature is out of spec.	Fault	Ensure transmitter is within temperature specs and laser has had a chance to stabilize.
FPGA2	Indicates that FPGA2 can be read and written to.	Fault	Hardware failure.
Clock2	Alarms when the 100 MHz or 125 MHz clock has lost lock in transmitter 2.	Fault	Check Clk100_2 and Clk125_2 monitors to see which clock is lost. Ensure module Clk_Src has not been accidentally set to Slave. If in Slave mode, make sure there is a valid 1 MHz reference present.
Las2Pres	Transmitter 2 is missing.	Fault	Ensure transmitter 2 is installed and fully seated.
Las2EOL	Laser 2 is near end of life.	Fault	Time to replace transmitter 2.
Las2Temp	Laser 2 temperature is out of spec.	Fault	Ensure transmitter 2 is within temperature specs and laser has had a chance to stabilize.
LasBias1	Bias current of the laser in Laser 1 is out of spec.	Minor L or H Major L or H	Re-seat transmitter.
LasBias2	Bias current of the laser in Laser 2 is out of spec.	Fault	Re-seat transmitter.
ProcTemp	Processor temperature.	Minor L or H Major L or H	Check fan tray operation.

Troubleshoot LCI

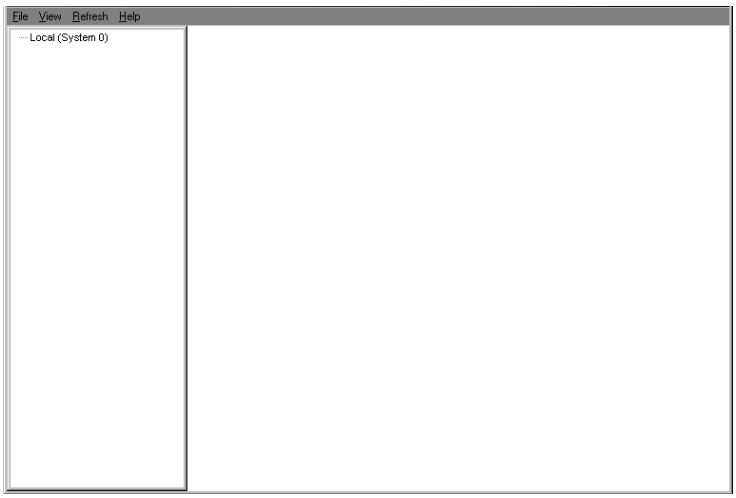
Introduction

When you start the LCI software, it queries the modules located in the chassis that is connected to your laptop computer. After this query process (referred to as Detect Configuration), the LCI software displays the modules in its module tree.

This section describes the steps to take if the chassis and installed devices do not display.

If the Chassis Does Not Display in the Module Tree

When the chassis does not display in the module tree, the LCI main window will display as shown here:



If the chassis is powered-up and properly connected to the PC and the LCI software is operating, but is not displayed in the module tree, the cause may be the result of one of the following two conditions:

- The cable that connects the chassis to your computer is plugged in to a different communications port than the one specified in the **LCI Detect Configuration** dialog box. See **Specifying the Correct Communications Port** later in this chapter.
- The chassis ID number entered in the **LCI Detect Configuration** dialog box does not agree with the number dialed in to the chassis ID switch located on the front of the chassis. See **Specifying the Correct Chassis ID** later in this chapter.

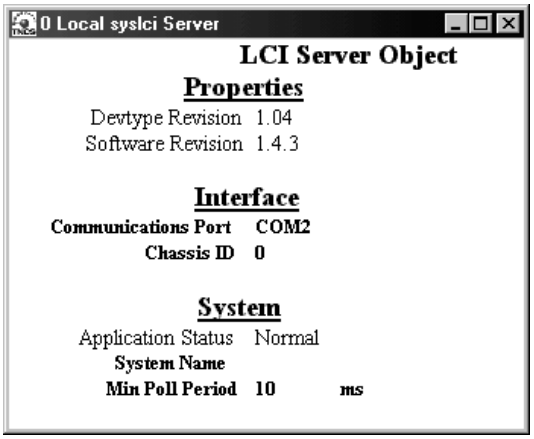
Either of the above conditions result in the LCI software not being able to communicate with the chassis.

Specifying the Correct Communications Port

Follow these steps to specify the correct communications port.

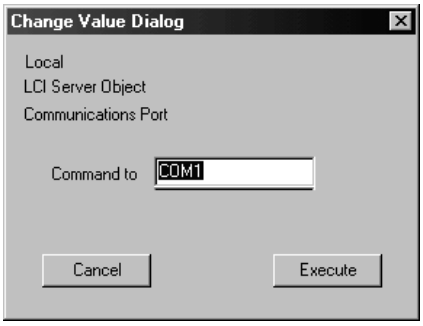
1. In the module tree, right-click **Local (System 0).** Click **Open** on menu that displays.

   Result: The LCI Server Object window displays.



2. Verify that the **Communications Port** setting is the port on the PC actually used to connect to the chassis.
   - If the correct port is shown, proceed to **Specifying the Correct Chassis ID**.
   - If the correct port is not shown, proceed to step 3.

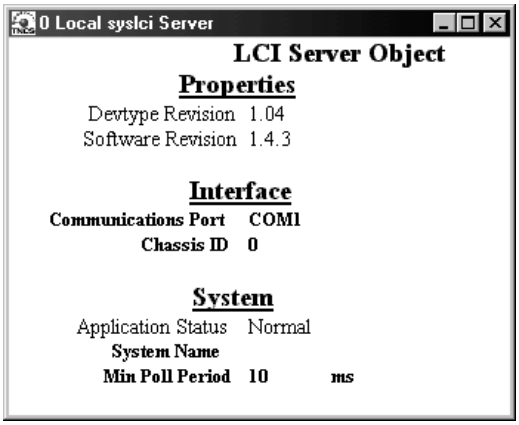
3. Under **Interface**, double-click **Communications Port**. In the **Command to** box, type the number of the COM port actually in use connecting the PC to the chassis.



   Example: To specify COM port 1, type **COM1**.

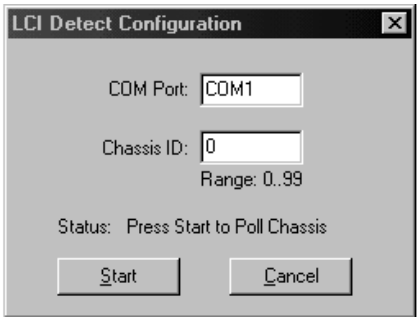
4. Click **Execute.**

   Result: The **Communication Port** field displays the correct COM port.



5. Click **Refresh.**

   Result: The **LCI Detect Configuration** dialog box displays.

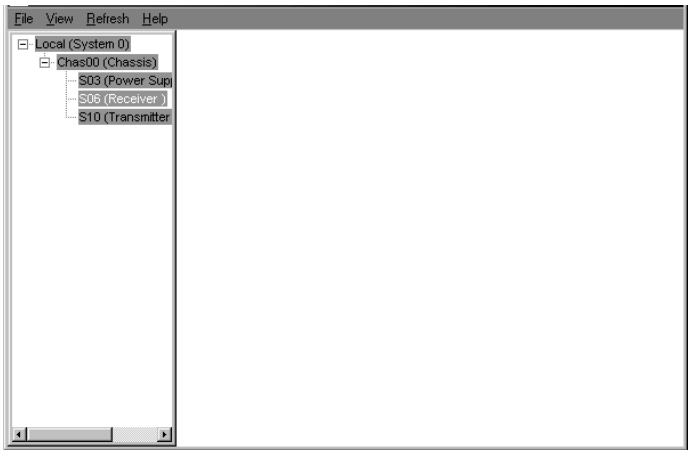


6. Click **Start.**

   Result: The Refresh window displays when the chassis polling is complete.

7. Click **OK,** and then return to the main window.

8. The chassis should now display in the module tree as shown below. If not, proceed to **Specifying the Correct Chassis ID.**



Specifying the Correct Chassis ID

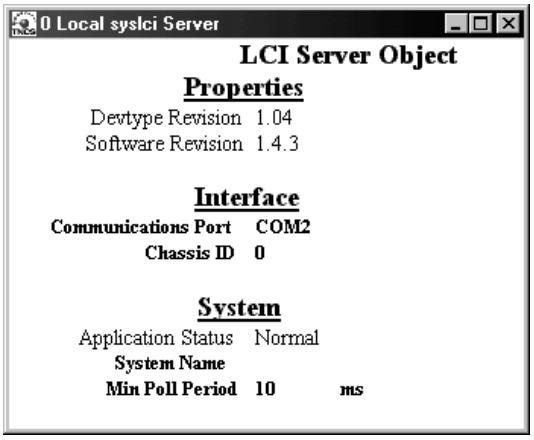
If the chassis ID in the **Chassis ID** field of the Local Server Object window does not agree with the number set in the chassis ID switch on the front of the chassis, the software will not recognize the chassis.

In this case, you must change the chassis ID displayed in the Local Server Object window for LCI to recognize the chassis.

Follow these steps to specify the correct chassis ID.

1. In the module tree, right-click **Local (System 0).** Click **Open** on the menu that displays.

   Result: The LCI Server Object window displays.



2. Verify that the **Chassis ID** field matches the number on the chassis ID switch on the front of the chassis.
   - If the chassis IDs do not match, double-click the **Chassis ID** field, enter the number that is dialed in on the chassis ID switch, and click **Execute**.
   - If the chassis IDs match, re-initiate power to the chassis by doing one of the following:
     – If the chassis ID switch was changed after the chassis was powered up, you will need to power-down, then power-up the chassis.
     – If an ICIM is installed in the chassis, you can implement the **Update Address** command using the ICIM key. This allows the modules to identify their correct location to the LCI software and the ICIM.

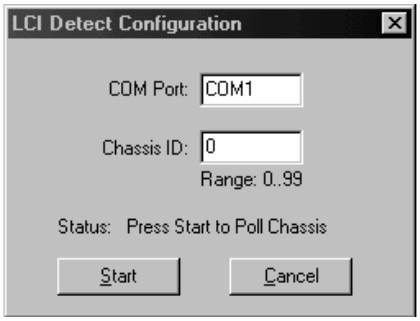
Only Some of the Modules Display in the Module Tree

If only some of your modules display in the module tree, the cause may be that a device has been added since the software last polled the chassis.

Follow these steps to refresh the display.

1. Click **Refresh.**

   Result: The **LCI Detect Configuration** dialog box displays.

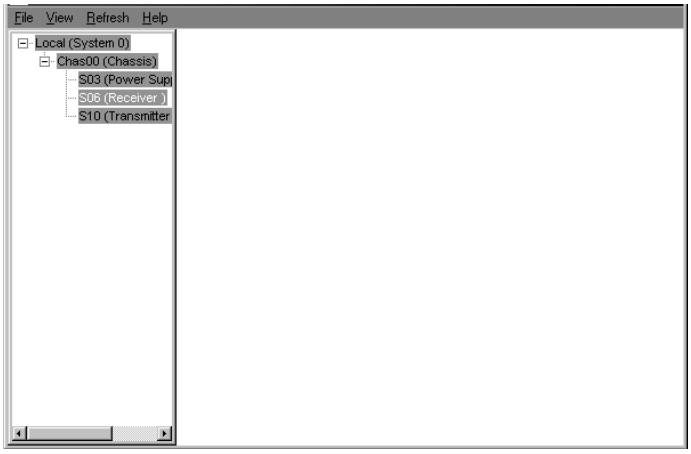


2. Do both the **COM Port** and **Chassis ID** boxes display correct values?
   - If **yes,** proceed to step 3.
   - If **no,** do the following:
     – Perform the steps in **Specifying the Correct Communications Port** and **Specifying the Correct Chassis ID,** depending on which value was incorrect
     – Click **Refresh** to poll the chassis
3. Click **Start.**

   Result: The Refresh window displays.

4. Click **OK.**
5. Exit LCI and then restart it for all changes to take effect.

   Result: All of the installed modules should now display in the module tree.



Clean Fiber-Optic Connectors

Introduction

Clean fiber-optic connectors can help prevent interconnect problems and therefore aid system performance. When optical connectors are disconnected and reconnected, the fiber surface can become dirty or scratched. The goal of cleaning the fiber-optic connectors is to remove all dust and contaminants without leaving any residue behind.

Required Equipment

The following equipment is required to clean the ends of fiber-optic connectors.

- Optical-grade (91%) isopropyl alcohol
- Lint-free wipes
- Compressed air (also called "canned air")

Tips for Optimal Fiber-Optic Connector Performance

Follow these guidelines to ensure optimal connector performance.

- Connect or disconnect optical connectors only when necessary.
- Always use compressed air before cleaning the fiber-optic connectors.
- Use end caps on connectors when they are not in use.
- Always use compressed air to clean the end caps.
- Use optical-grade isopropyl alcohol of at least 91% or greater. Anything less than 91% isopropyl may leave a film on the fiber surface, creating more problems.
- Do not contaminate your alcohol supply.
  - Use a sprayer (a fountain pump is also adequate)
  - Do not put used alcohol back into the main container
- Use only lint-free wipes. Never use "Kleenex-type" tissues.
- If you have any degraded signal problems, clean the fiber-optic connector.

Cleaning Optical Connectors

Follow these steps to clean an optical connector.

1. Remove loose dirt or dust from the end of the connector by using compressed air to blow dirt off the fiber and the connector.
2. Dampen a lint-free wipe with optical-grade (91%) isopropyl alcohol. If no wipes are available, use Cisco's ferrule cleaner, part number 468517.
3. Wipe the end of the connector with the lint-free wipe.
4. Inspect the end of the connector for obvious contamination.
5. Mate the connector with an adapter or cover with an end cap.

Chapter 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.

Glossary

Term, Acronym, Abbreviation	Meaning
A	Ampere (amp) is the unit of measure for electrical current.
AC	Alternating current
ADC	Analog to digital
Addressable	The ability to control an individual unit in a system of many similar units.
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
AM	Amplitude Modulation
Amplifier Cascade	Two or more amplifiers in a series, the output of one feeding the input of another.
APC	Automatic phase control
APD	Avalanche Photodiode. Avalanche refers to the gain mechanism internal to the photodiode, where 1 photon results in many electrons, as opposed to a PIN photodiode where 1 photon results in 1 electron.
ASIC	Application Specific Integrated Circuit
Attenuation	A decrease in signal magnitude occurring in transmission from one point to another or in passing through a loss medium.
Attenuator	A device designed to reduce signal strength by an amount specified in dB.
ATX	Addressable transmitter
AUX	Auxiliary
Baseband	The total signal before it is modified for transmission or otherwise manipulated.
Baud (Bd)	A measure of signaling rate based on the number of signaling events per unit of time.
Beamwidth	The included angle between two rays (usually the half-power points) on the radiation pattern, which includes the maximum lobe, of an antenna.

BER	Bit error rate
BERT	Bit error rate test
BIG	Broadband Integrated Gateway
BIOS	Basic Input/Output System
BIST	Built-in self-test
Bit	Short for Binary Digit. Can be either a "one" or a "zero."
Blanking level	The amplitude of the front and back porches of the composite video signal.
BNC	A coaxial connector that uses a bayonet type attachment to secure the cable. It is also known as Baby N connector.
BPF	Bandpass filter
Bps	Bits per second - The total number of bits sent in a second of time.
BPSK	Binary Phase Shift Keying
BW	Bandwidth
Byte	A group of bits treated as a unit
CF	Continuous feed
Circuit switching	The type of signal switching traditionally used by telephone companies to create a physical connection between a caller and a called party.
CIRD	Commercial Integrated Receiver Decoder
CIM	Communications Interface Module
CISC	Complex Instruction Set Computer. A computer that uses many different types of instructions to conduct its operations, i.e., IBM PCs, Apple Macintosh's, IBM 370 mainframes.
CIU	Customer Interface Unit
C/N or CNR	Carrier-to-noise ratio

Compression	The non-linear change of gain at one level of a signal with respect to the change of gain at another level for the same signal. Also, the elimination of redundant information from an audio, data, or video signal to reduce transmission requirements.
CSO	Composite Second Order
CTB	Composite Triple Beat
C/T	Carrier-to-noise temperature ratio
CW	Continuous Wave
dB	Decibel
dBc	Decibels relative to a reference carrier
DBDS	Digital Broadband Delivery System
dBm	Decibels relative to 1 milliwatt
dBi	Decibels of gain relative to an isotropic radiator
dBuV	Decibels relative to 1 microvolt
dBW	Decibels relative to 1 watt
dBmV	Decibels relative to 1 millivolt
DC	Direct current
DC	Directional coupler
DES	Data Encryption Standard
Deviation	The peak difference between the instantaneous frequency of the modulated wave and the carrier frequency, in an FM system.
DFB	Distributed feed back laser
Differential gain	The difference in amplification of a signal (superimposed on a carrier) between two different levels of carrier.
Diplex filter	A filter which divides the frequency spectrum into a high frequency segment and a low frequency segment so that two different signals can be sent down the same transmission path.

Distribution System	Part of a cable system consisting of trunk and feeder cables used to carry signals from headend to subscriber terminals.
Downconverter	A device that converts an input signal to a lower frequency output signal.
Down link	A transmission path carrying information from a satellite or spacecraft to earth.
DP	Data processing
DPU	Digital processing unit
DSP	Digital signal processor
DSR	Digital Storage and Retrieval System
D to U	Desired to undesired signal ratio
DTMF	Dual Tone Multiple Frequency
Duplexer	A device which permits the connection of both a receiver and a transmitter to a common antenna.
DVM	Digital voltmeter
DWDM	Dense Wave Division Multiplexing
ECL	Emitter coupled logic
ECM	Entitlement Control Message
EDFA	Erbium Doped Fiber Amplifier
EPROM	Erasable Programmable Read-Only Memory
EEPROM	Electrically Erasable Programmable Read-Only Memory
EIA	Electronics Industry Association
EMI	Electromagnetic interference
Emission designer	An FCC or CCIR code that defines the format of radiation from a transmitter.
EQ	Equalizer

Equalization	The process of compensating for an undesired result. For example, equalizing tilt in a distribution system.
ERP	Effective radiated power
FAOC	Frequency agile output converters
FET	Field-effect transistor
FIFO	First in, first out
FM	Frequency modulation
Forward path	Signal direction from the headend to the set-top terminal.
FP	Fabry-Perot laser
FPGA	Field Programmable Gate Array. A flexible logic device with thousands of gates
Fiber	A single strand of glass used as an optical transmission medium; or a bundle of glass strands in a CATV system.
Frequency	The number of similar shapes in a unit of time. For example, the number of sine waves moving past a fixed point in a second.
Frequency Agile	The ability to change from one frequency to another without changing components.
Frequency Modulation	A system of modulation where the instantaneous radio frequency of the carrier varies in proportion to the instantaneous amplitude of the modulating signal while the amplitude of the radio frequency carrier is independent of the amplitude of the modulating signal.
Frequency Response	The effect that changing the frequency has on the magnitude of a signal.
Frequency Stability	A measure of the departure from nominal frequency value of a signal, with respect to time, temperature, or other influence.
FSM	Field strength meter
FSK	Frequency-shift keying

ft-lb	Foot-pound. A unit of work equal to lifting one pound of weight, one foot in distance.
FTP	File Transfer Protocol
Gain	An increase in signal relative to a reference
Gbps	Gigabits per second
Headend	Location and equipment that receives data from a satellite (or other) source and reformats that data for input to a broadband distribution network.
HEDA	Headend Driver Amplifier
HGD	High Gain Dual
Hertz	A unit of frequency equal to one cycle per second.
Hetrodyne	Changing the frequency of a signal by mixing it with another signal to get the sum and difference of the two.
I/O	Input/output
IC	Integrated circuit
ICIM	Intelligent Communications Interface Module
ICP	Internal Control Program. A series of policies to protect company sensitive and export controlled information.
IDR	Intermediate Data Rate
IEC	International Electro-technical Commission
IF	Intermediate frequency
IFL	Interfacility link
IP	Internet protocol
ITU	International Telecommunications Union
Kbps	Kilobits per second
in-lb	Inch-pound
LCD	Liquid crystal display

LCI	Local craft interface
LED	Light-emitting diode
LIFO	Last-in, first-out
LNA	Low-noise amplifier
LNB	Low-noise block converter
LNC	Low-noise converter
Mbps	Megabits per second
MCU	Master Control Unit
Multipath (multipath transmission)	The phenomenon which results from a signal traveling from point to point by more than one path so that several copies of the signal arrive at the destination at different times or at different angles.
mux	multiplexed
Nanosecond	1 thousandth of a microsecond
Nm	Newton meter
NIU	Network Interface Unit
Node	A branching or exchange point.
OEM	Original equipment manufacturer
OOB	Out of band
OIM	Optical interface module
OSM	Optical-Sub module
PCB	Printed circuit board
PCM	Pulse code modulation
PDI	Pressure differential indicator
PDU	Power distribution unit
PIN	PIN Photodiode - A standard photodiode. (PIN stands for Positive doped - Intrinsic region - Negative doped and has to do with the chip architecture)

PLL	Phase Lock Loop. An electronic servo system controlling an oscillator to maintain a constant phase angle relative to a reference signal.
PROM	Programmable Read Only Memory
PWB	Printed wiring board
QAM	Quadrature Amplitude Modulation
QPR	Quadrature Partial Response
QPSK	Quadrature Phase-Shift Keying
RC	Reverse conditioner
Redundant	A secondary or backup (electronic) system
Reverse path	Signal flow direction toward the headend.
RF	Radio frequency
RF Bypass	A bypass feature that allows subscribers to view a clear analog channel while recording a digital or analog channel on a VCR.
RFI	Radio frequency interference
RMA	Return material authorization
RMS	Root Mean Square
Router	A data communications device which examines a packet and routes the packet to an output port appropriate to the packet destination.
RS	Remote Sensing
RX	Receive or receiver
SAM	Signal analysis meter
SAT	Site acceptance test
S-band	The group of frequencies between 2 and 4 GHz.
SET	Secure electronic transaction

Scattering	Random directional change of a wave or part of a wave caused by an irregular reflecting surface or by passing through an inhomogeneous transmission medium.
SLM	Signal level meter
SM	Status monitor
SMC	Status monitoring and control
SMIU	Status Monitor Interface Unit
SMU	Server Management Unit
S/N or SNR	Signal-to-noise ratio
SNMP	Simple Network Management Protocol
SONET	Synchronous optical network
SP	Splitter. It is a device that divides power from an input to deliver multiple outputs or combines multiple input into one output.
Spread Spectrum	A modulation technique to spread a narrow band signal over a wide band of frequencies.
Spurious	Anything other than the desired result
SSPA	Solid-state power amplifier
Sweep generator	A signal source which can automatically vary its frequency continuously from one frequency to another.
Synchronous transmission	A method of sending information over a path and separating discrete characters and symbols by a precise separation in time.
TEC	Thermo-electric cooler
TCP/IP	Transmission control protocol/internet protocol
TDM	Time division multiplexing
TNCS	Transmission Network Control System
Torque	Twisting force applied to a device.
TS	Transport Stream

TTCN	True tilt correction network
Tx	Transmit or transmitter
UBT	Unbalanced triple
UPS	Un-interruptible power supply
Upstream	Signal transmission toward the headend
UTP	Unshielded twisted pair
uV	One millionth of a volt (microvolt**)**
V	Volt
V AC	Volts alternating current
VBR	Variable bit rate
VCA	Voltage controlled attenuator
V DC	Volts direct current
VOD	Video-on-demand
VOM	Volt ohm meter
W	Watts
WDM	Wave Division Multiplexing
YEDFA	Ytterbium/erbium doped fiber amplifier

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