Prisma II Forward and Reverse Headend Driver Amplifiers

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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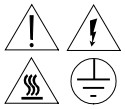
Contents

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.

Safety Symbols



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.

Factory Service

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

Compliance

Electrical Safety

CSA C22.2 No. 1:1994: A sample of this equipment has been tested and found to meet the requirements of CSA C22.2 No. 1:1994.

Electromagnetic Compatibility

> ⚠ **CAUTION:**
>
> **Any changes or modification to this equipment not expressly approved by Cisco can void the user's authority to operate this equipment.**

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.

Chapter 1
Introduction

Overview

Introduction

This chapter presents a general introduction to both the Prisma® II Forward Headend Driver Amplifiers and Prisma II Reverse Headend Driver Amplifiers (HEDA). Descriptions of the front and rear panels are included with block diagrams.

The Prisma II Forward Headend Driver Amplifier and the Prisma II Reverse Headend Driver Amplifier are separate modules with different part numbers. However, with the exception of their application and a few important signal adjustments, they are installed and function in almost exactly the same manner. Therefore, except in the few places where their operation differs, the two HEDA modules are referred to as one module for the purposes of this guide.

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.

HEDA Description

Overview

The Prisma II Forward and Reverse Headend Driver Amplifiers are two of a family of products in the Prisma II product line.

Both the Prisma II Forward and Reverse Headend Driver Amplifier modules are designed to boost the RF signal level to meet the input requirements of headend/hub equipment including the Prisma optical transmitters. The forward unit is used in forward frequency (46–870 MHz) transmissions. The reverse unit is used in reverse frequency (5–200 MHz) transmissions and in the reverse combining process to amplify the return path signals to meet the input requirements of the service devices.

The Headend Driver Amplifier as Part of the Prisma Platform

Both the Forward and Reverse Headend Driver Amplifiers are single-width modules. Once installed in a Prisma II Chassis, they communicate with the chassis only for electrical power and operational signal amplification.

Important: While the Prisma II Forward and Reverse Headend Driver Amplifiers are installed and operate in conjunction with other modules in the Prisma II Chassis, they do not report status or alarm information to the ICIM, LCI, or TNCS software. **All HEDA alarm indications and operating adjustments are performed at the front panel of the HEDA module.**

HEDA Features

The Prisma II Headend Driver Amplifiers have the following features.

- Front panel green LED to indicate operating status
- Front panel red LED to indicate alarm status
- -20 dB test point
- PIN attenuator adjustment
- Selectable Equalizer adjustment
- Plug-and-play capability
- Blind mate RF connections

HEDA Function

The Prisma II HEDA is designed for indoor applications, such as headend, hub, remote terminal, and central office environments. The Prisma II HEDA may be used to boost either broadcast or new media signals to meet the requirements of the Prisma II optical transmitters or other devices.

The Prisma II HEDA has a selectable pad settings and a selectable equalizer steps to control the RF input level and correct for cable tilt. These adjustments are both made on the front panel of the module. The HEDA also provides a contact closure,back through to the chassis ALARM OUT connector, for external alarm purposes.

Headend Driver Amplifier Theory of Operation

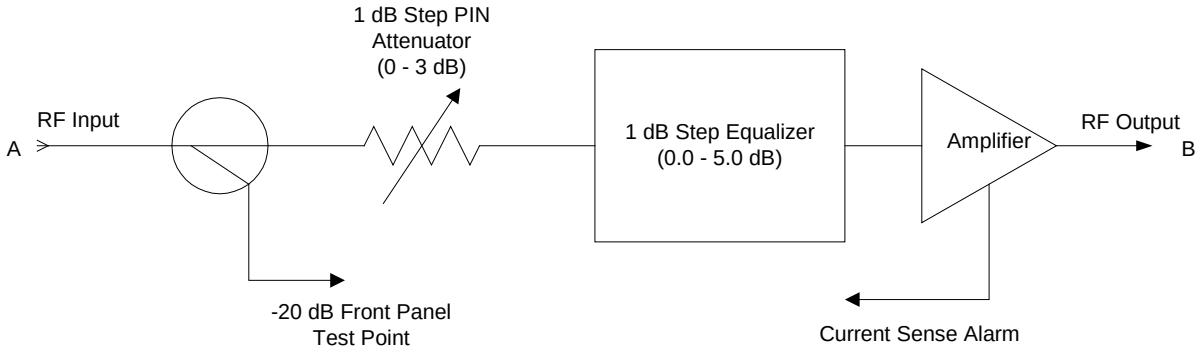
A modulated signal is input to the Headend Driver Amplifier at the rear panel RF input connector "A". A - 20 dB test point is available for checking the RF input level. The RF input signal is sent through a pin attenuator. The pin attenuator has 3 dB of range, from 0.0 dB to 3.0 dB in 1 dB steps. Stepping this control labeled **PAD** on the front panel with a small flat head screwdriver will adjust the pin attenuator.

The RF signal is then sent to the selectable equalizer. By adjusting the selectable equalizer you may compensate for cable roll off or roll off from a previous module. This control is labeled **TILT** on the front panel.

Next, the signal is amplified and sent to the RF output connector on the rear panel.

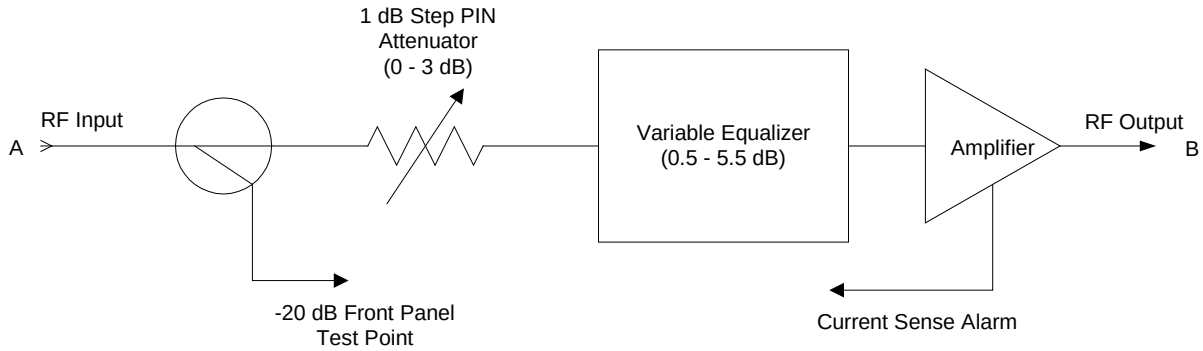
Forward HEDA Block Diagram

A block diagram of the Prisma II Forward Headend Driver Amplifier is shown below.



Reverse HEDA Block Diagram

A block diagram of the Prisma II Reverse Headend Driver Amplifier is shown below.



The HEDA Front Panel

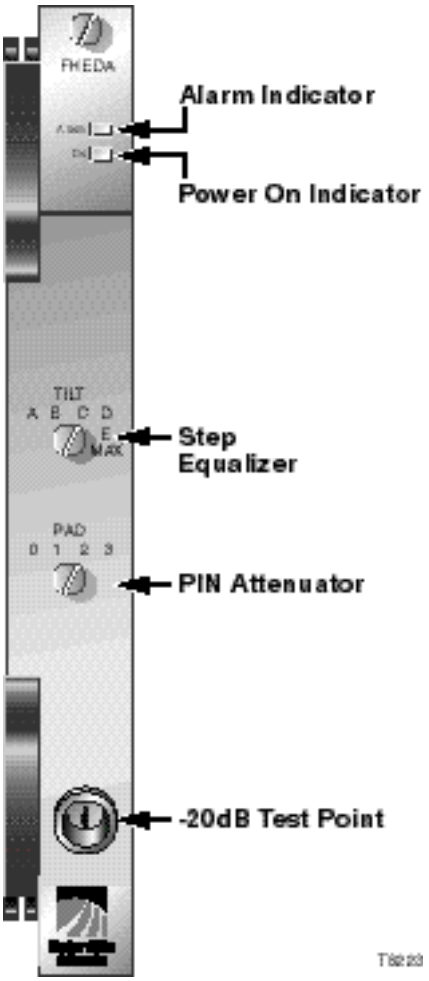
Front Panel Description

The front panel of both the Forward and the Reverse Headend Driver Amplifiers are designed for easy adjustment and quick monitoring. The HEDA front panel has the following easily accessible features.

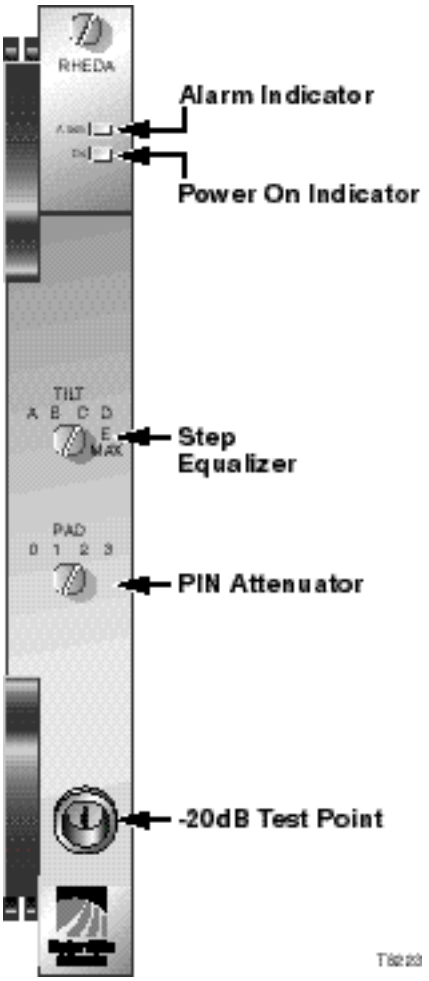
- PIN Attenuator
- Selectable Equalizer
- Alarm Indicator (red)
- Power ON Indicator (green)
- -20 dB Input Test Point

With identical indicators, adjusters, and test points on the front panel, you can quickly install and balance both the forward and reverse amplifiers.

Prisma II Forward HEDA



Prisma II Reverse HEDA



Power and Alarm Indicators

Two indicators give you the status of the HEDA.

- The green POWER ON indicator turns on and stays on as long as power is applied to the HEDA.
- The red ALARM indicator blinks when either of the following conditions occurs.
  - High current draw through the HEDA
  - Low current draw through the HEDA
- The red ALARM indicator illuminates continuously when there is a loss of RF signal or loss of current through the HEDA.

Pad and Equalizer Adjustment

You can quickly balance the HEDA by inserting a 1/8-in. flatblade screwdriver into the open slots labeled **PAD** and **TILT**. Two recessed adjusters just inside the front panel allow adjustment of the pad and tilt settings to values shown in the following tables.

Pad Setting	Loss Introduced
0	0 dB
1	1 dB
2	2 dB
3	3 dB

Tilt Setting	Amount of Signal Equalization	
	Forward Model (46-870 MHz)	**Reverse Model (5-200 MHz)**
A	0.0 dB	0.5 dB
B	1.0 dB	1.5 dB
C	2.0 dB	2.5 dB
D	3.0 dB	3.5 dB
E	4.0 dB	4.5 dB
MAX	5.0 dB	5.5 dB

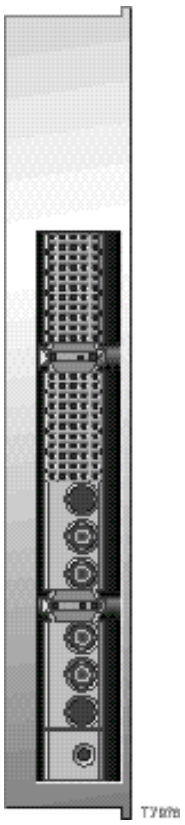
-20 dB Test Point

The connector labeled **"1"** provides a sample of the RF drive signal going directly into the amplifier. Since this signal feeds off a -20 dB RF directional coupler in line with the amplifier, you must add 20 dB to the reading you get at this test point to determine the actual RF input level.

The HEDA Rear Panel

HEDA Rear Panel Connectors

Blind-mate connectors make it easy to install this module. The connector on the back of the module mates with a like connector on the inside of the chassis. The 110-pin connector provides the electrical power connection to the module



Power and Communications Connector

The 110-pin power and communications connector on the back of the HEDA mates with corresponding connectors inside of the Prisma II Chassis and supplies power from the chassis to the HEDA.

Chapter 2
Installation

Overview

Introduction

This chapter contains instructions, site requirements, equipment, and tools needed to install the Prisma II Headend Driver Amplifiers (HEDA).

The Prisma II Forward Headend Driver Amplifier and the Prisma II Reverse Headend Driver Amplifier are separate modules with different part numbers. However, with the exception of their application and a few important signal adjustments, they are installed and function in almost exactly the same manner and are refered to as one module for the purposes of this guide.

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 gives step-by-step instructions on installing the Prisma II HEDA.

Preparing for Installation

Overview

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

Unpacking and Inspecting the Module

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

Equipment and Tools Needed

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

You need . . .	**To . . .**
a Prisma II Chassis with power supply	provide housing, power and input/output connections to the HEDA.
3/8-in. flat-blade screwdriver	secure the HEDA in the chassis.
1/8-in. flat blade screwdriver	make **PAD** and **TILT** adjustments
two RF cables with connectors	carry RF input and output signals.

Site Requirements

Overview

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 will properly house the Prisma II chassis with proper spacing for air circulation. For instructions on installing the chassis in the rack, refer to the guide that was shipped with the chassis.

Operating Environment

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

Follow these recommendations to maintain an acceptable operating temperature.

- Chassis air inlet temperature 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

The Prisma II HEDA receives its electrical power from the Prisma II Chassis. The module may be installed with the chassis powered-up.

Space Requirements

The Prisma II Headend Driver Amplifier is a single-width module. It is usually installed in slots five through sixteen. Slots one through four are usually reserved for the power supplies. Slots fifteen and sixteen may or may not be used with the Intelligent Communications Interface Module (ICIM).

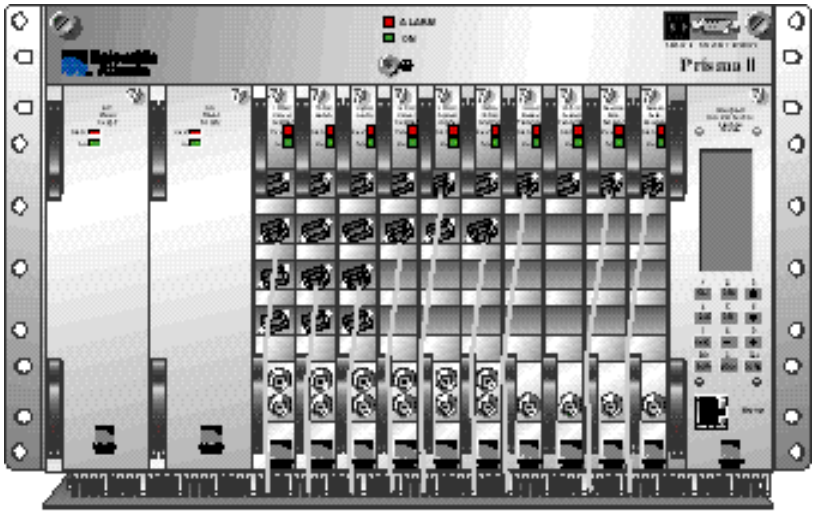
If an ICIM is not installed, any other module could be installed in these slots. Slot 2 and slot 4 are reserved for an internal power supply if installed. If an internal power supply is not installed here, any other module could be installed in these slots.

Chassis Style

The Prisma II Chassis may be ordered as front access or rear access depending on the system you have purchased. Power inlets, RF inputs, RF outputs, and other connectors may be located on either the front or rear of the Prisma II Chassis. Connections to the chassis serve the same purpose and are made in the same manner regardless of the location of the connectors or chassis configuration.

Rear Access Chassis

The Prisma II Chassis may be configured with front or rear connectors depending on the system you have purchased. The rear access chassis is shown here.



Front Access Chassis illustration

The front access chassis is shown here.

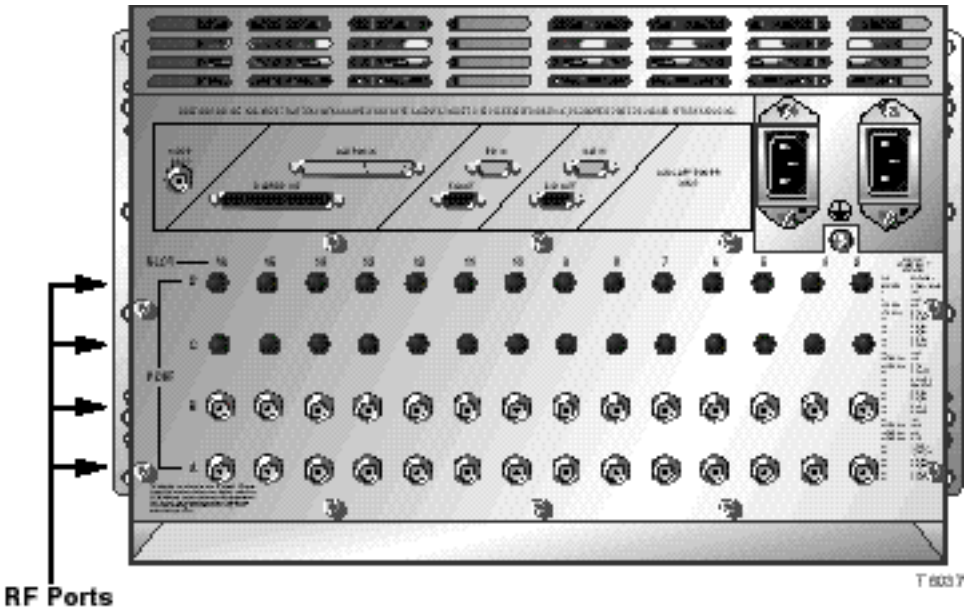
Connecting the RF Cables to the Chassis

RF Cable Connection Procedure

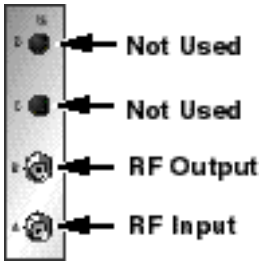
Important: The following procedure assumes the Prisma II Chassis is mounted in a rack.

Follow this procedure to make the RF cable connections for each HEDA to be installed. The HEDA is usually installed in slots five through sixteen.

1. Locate one 75 ohm RF cable and connect it to the appropriate RF source.
2. At the rear of the Prisma II Chassis, attach the other end of the RF source cable to Port A (RF Input) of the slot where the HEDA is to be installed. This is the RF input connection.



3. Connect another RF cable from Port B (RF Output) of the slot where the HEDA is to be installed. Hand-tighten the connector.



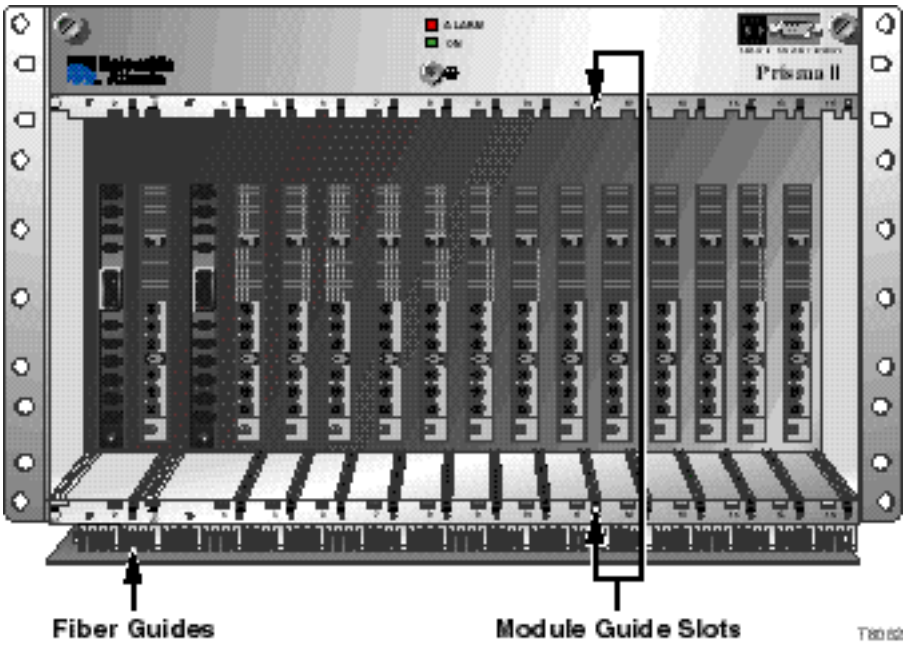
4. Route the RF cable from Port B (RF Output) to the appropriate destination.
5. If F-connectors are installed, use a 7/16-in. open-end wrench to secure both cables to the threaded F-connectors at the chassis.

Installing the HEDA Module

Important: The following procedure assumes the chassis is mounted in a rack.

To install the HEDA module in the chassis, follow these steps.

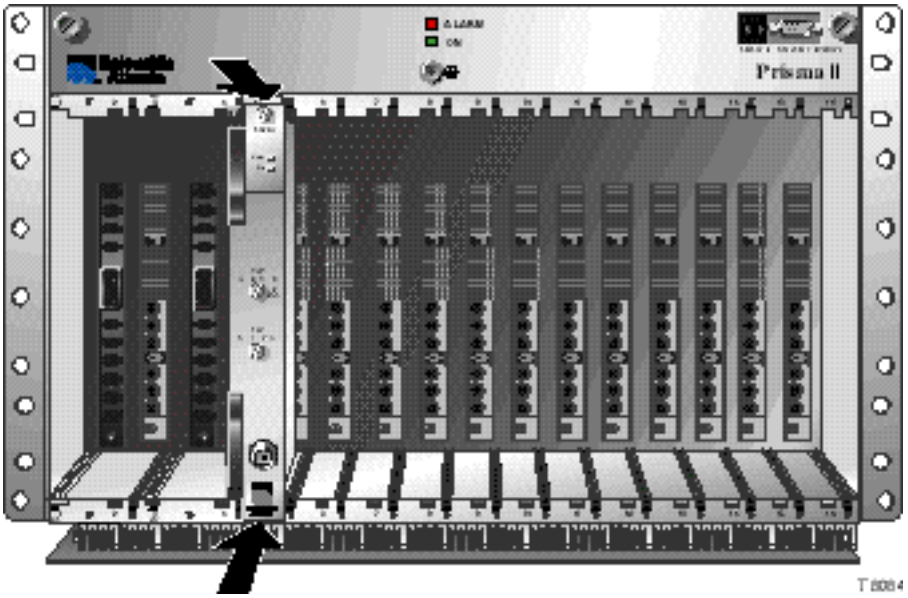
1. Locate the module guide slots inside the chassis as shown in the following illustration.



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

3. Gently slide the module into the chassis until you feel the connectors on the back of the module join the receptacles at the back of the slot. Use the module ejector to lock the module in place.

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



4. Secure the module by pressing the two ejectors located on the left side of the module until they lay flat. When the levers are flat, the power and communications connections at the rear of the module mates with the communications connectors at the back of the chassis slot.

5. Hand-tighten the screw at the top of the module, to secure it in the chassis. Use a 3/8-in. flat-blade screwdriver to secure. **Do not overtighten**.

Chapter 3
Operation

Overview

Introduction

This chapter gives operating instructions for the Prisma II Forward Headend Driver Amplifier and the Prisma II Reverse Headend Driver Amplifier.

Qualified Personnel

Only appropriately qualified and trained personnel should attempt to operate this equipment.

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

In This Chapter

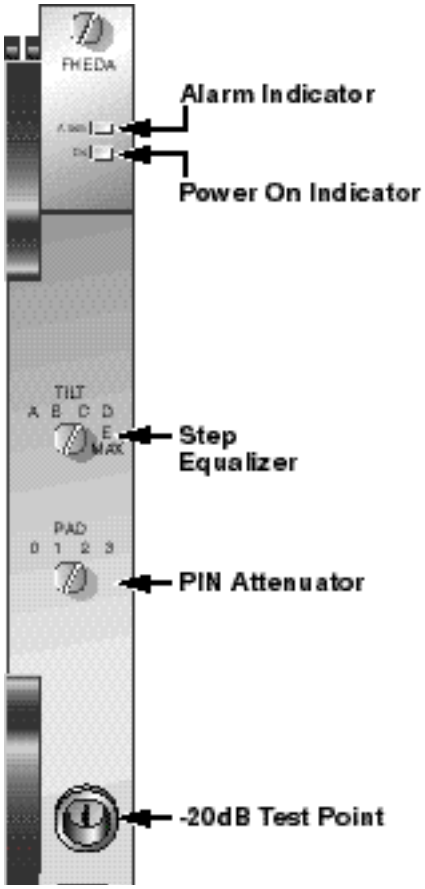
This chapter contains the following topics.

Operation

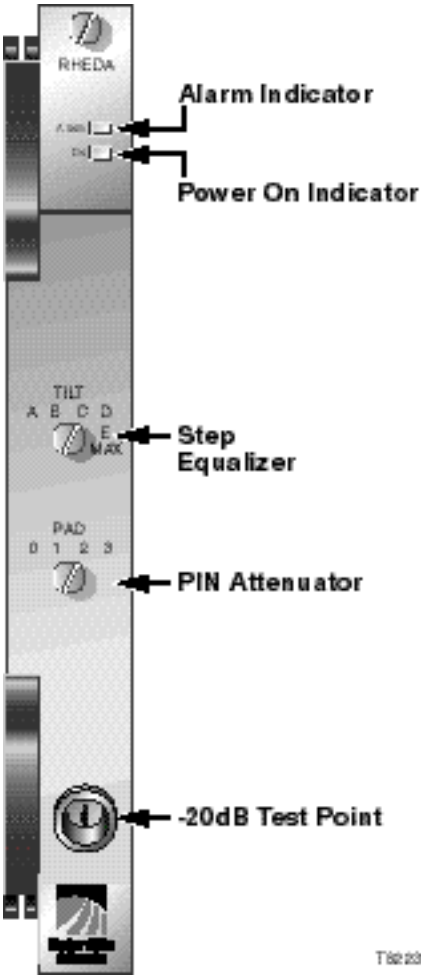
Once the HEDA is installed as described in Chapter 2, it runs without the aid of an operator. During normal operation, the amplifier indicators function in this manner.

- The green ON indicator is illuminated
- The red ALARM indicator is off

Forward HEDA



Reverse HEDA



Verifying RF Output

It is important to make sure that RF output is within the desired range before you adjust the variable pad and equalizer. Otherwise, the HEDA will not operate properly.

Follow the procedure below to verify the RF output of the HEDA.

1. On the back of the chassis, locate the port for RF output used by the amplifier.

   Note: Output connectors are on Port B row.

2. Using a 7/16-in. open-end wrench, disconnect the RF cable designated for the RF output of the amplifier and connect a test cable from the RF output connector to a spectrum analyzer. Torque the connector to the specifications given by the connector manufacturer. **Do not over tighten**.

3. Measure output level of the amplifier for the lowest carrier level.

4. Verify that when the variable pad is set to 0, the RF output level of the amplifier is within +3 dBmV of the desired input level of the device being fed.

IF the amplifier RF output is . . .	**THEN . . .**
within +3 dBmV of the desired transmitter input level	record this value in your Maintenance Log. Refer to the sample **Maintenance Log** in appendix A.
more than +3 dBmV of the desired transmitter input level	refer to the appropriate section in Chapter 4 for assistance in troubleshooting.
less than the desired input level	refer to the appropriate section in Chapter 4 for assistance in troubleshooting.

5. Go to the next procedure, **Ensuring Proper Signal Strength and Adjusting the Selectable Pad**.

Ensuring Proper Signal Strength and Adjusting the Selectable Pad

Variable Pad Adjustment Procedure

Important: The following procedure assumes that you have verified the RF output and that the selectable pad is set to 0.

To adjust the HEDA signal strength so that it meets the input requirements of the device being fed, you may need to add attenuation to the input signal. Otherwise, the amplifier will not operate properly. To ensure proper signal strength, follow these steps.

1. Check that the selectable pad is set to 0.

2. Compare the actual RF output level obtained in the previous procedure to the optimal input level required by the device to which the signal is being routed.

If the actual level is . . .	**Then . . .**
within ±0.5 dB of the optimal level	go to the next procedure, **Ensuring a Flat Output Signal by Adjusting the Variable Equalizer.**
more than 0.5 dB of the optimal level	increase the input attenuator pad. Refer to the next step.
less than 0.5 dB of the optimal level	refer to the appropriate section in Chapter 5 for assistance in troubleshooting.

3. Using a 1/8-in. flat-blade screwdriver, turn the pad setting on the front panel of the amplifier so the attenuation is correct for your operation. Refer to the following table.

Pad Setting	**Amount of Attenuation**
0	0 dB
1	1 dB
2	2 dB
3	3 dB

4. Once you have set the pad correctly, adjust the step equalizer to ensure a flat output signal. Refer to the following procedure, **Ensuring a Flat Output Signal by Adjusting the Step Equalizer**.

Ensuring a Flat Output Signal by Adjusting the Step Equalizer

Variable Equalizer Adjustment Procedure

Important: The following procedure assumes that you have adjusted the variable pad, if necessary, to ensure that the signal strength is correct.

For your system to operate properly, the output signal must remain flat across all channels. To use the step equalizer to ensure that the output signal is flat, follow these steps.

1. On the back of the chassis, locate the amplifier's RF output port.

   Note: HEDA output connectors are on Port B row.

2. Using a 7/16-in. open-end wrench, disconnect the RF cable designated for the RF output of the amplifier and connect a test cable from the RF output connector to a spectrum analyzer. Torque the connector to the specifications given by the connector manufacturer. **Do not over tighten**.

3. Measure the output level at the highest system frequency and lowest system frequency.

4. Use the following formula to determine output tilt.

$$\text{Tilt} = L_{High} - L_{Low}$$

   Where:
   Tilt = amplitude difference between the highest and lowest frequency
   L_{High} = signal level of the highest frequency

   L_{Low} = signal level of the lowest frequency

5. Using a 1/8-in. flat-blade screwdriver, turn the tilt setting on the front panel of the amplifier so the signal is flat across all channels. Refer to the following table:

	Amount of Signal Equalization	
Tilt Setting	**Forward**	**Reverse**
A	0.0 dB	0.5 dB
B	1.0 dB	1.5 dB
C	2.0 dB	2.5 dB
D	3.0 dB	3.5 dB
E	4.0 dB	4.5 dB
MAX	5.0 dB	5.5 dB

6. Using a 7/16-in. open-end wrench, disconnect the test cable and connect the RF cable to the RF output connector. Torque the connector to the specifications given by the connector manufacturer. **Do not overtighten**.
7. The amplifier is ready for normal operation.

Checking the Operating Settings

Preparing to Record Operating Data

To ensure that the amplifier is operating properly, it is recommended to periodically monitor and record operating data. Having a record of operating data also establishes a baseline of unit performance for use in maintenance and troubleshooting.

Before you begin, gather the equipment and tools listed in the following table:

You Need . . .	**To . . .**
a Maintenance Log	record new data and compare it against data recorded earlier.
a spectrum analyzer	verify proper HEDA operation.
a 75 ohm coax cable with an F-connector	connect to the spectrum analyzer to the amplifier test point.
1/8-in. flat-blade screwdriver	adjust the **PAD** and **TILT** settings, as needed.

Check the RF Input

Complete the following steps to verify that the input level is within ±1.0 dB of the value most recently recorded.

1. Connect an RF cable from the **-20 dB RF TEST** point on the front of the amplifier to the spectrum analyzer.
2. Set the spectrum analyzer for the frequency span of your band of operation.
3. Measure the signal level of the RF input test point.
4. Check that the input level to the amplifier is within ±1.0 dB of the proper value. Remember to add 20 dB back to the measured **RF TEST** level to get the correct reading.

   Note: If the reading is not within the proper range, refer to Chapter 4 for assistance in troubleshooting.
5. To complete weekly maintenance, go to the next procedure**, Checking RF Output**.

Checking RF Output

Complete the following steps to verify that the output level is within ±1.0 dB of the value most recently recorded.

Note: To check the RF output without taking the amplifier out of service, check the input test point of the module that the amplifier is feeding.

1. Connect an RF cable from the **RF TEST** point on the next inline module to the spectrum analyzer.
2. Set the spectrum analyzer for the frequency span of your bandwidth.
3. Measure the signal level and tilt and correct for the loss of that module's RF test point.
4. Check that the output level is within ±1.0 dB of the value most recently recorded.

   Note: If the reading is not within the proper range, refer to Chapter 4 for assistance in troubleshooting.
5. This portion of maintenance is complete. Record the reading.
6. To complete weekly maintenance, go to the next procedure, **Checking Pad and Tilt Settings**.

Checking Pad and Tilt Settings

Important: The input and output levels must be verified before any adjustments are made to pad and tilt settings.

Complete the following steps to verify that the settings for pad and tilt are correct.

1. Refer to your Maintenance Log to determine the most recently recorded settings for pad and tilt.
2. Compare the recorded settings to the current settings. If either setting does not match, use a 1/8-in. flat-blade screwdriver and adjust the setting to the value most recently recorded. Or, refer to the appropriate procedure given earlier in this chapter.
   - **Ensuring Proper Signal Strength and Adjusting the Variable Pad**
   - **Ensuring a Flat Output Signal by Adjusting the Variable Equalizer**
3. Weekly maintenance is complete. Record the reading.

Chapter 4
Maintenance and Troubleshooting

Overview

Introduction

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

Qualified Personnel

Only appropriately qualified and trained personnel should attempt to maintain or troubleshoot these products.

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

In This Chapter

This chapter contains the following topics.

HEDA Maintenance

Maintaining the HEDA

To ensure optimal performance, the following maintenance is recommended.

Frequency	**Maintenance Required**
Weekly	• Check all parameters and test points • Record data • Make 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

Maintenance Record

It may be helpful to establish a maintenance record or log for this module. You may want to record step equalizer, the PIN attenuator settings, and alarm indication information.

General Troubleshooting Information

Introduction

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

Equipment Needed

You may need the following equipment to troubleshoot these modules.

- Digital voltmeter
- Spectrum analyzer

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 5 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, **Troubleshooting Alarm Conditions**, to identify and correct HEDA faults.

Headend Driver Amplifier Alarm Conditions

If the red ALARM indicator is illuminated or is blinking, check the table below to determine the cause of the alarm.

Alarm	Status	Possible Causes	Possible Solutions
ALARM Indicator Illuminated	Current Failure	Hybrid amplifier failure.	The module is faulty and should be replaced.
ALARM Indicator Blinking	Current too High or Low	Hybrid amplifier problem.	The module may be faulty and should be repaired or replaced.

Power Supply Related Alarms

Power Supply Related Alarms Solutions

Use the following table to locate the cause of a power supply related alarm.

Alarm	Status	Possible Causes	Possible Solutions
No Power Indication	No electrical power to HEDA	Loose, unplugged, or damaged chassis power cords.	Check the power supply, power cord, and connections.
		No AC at receptacle.	Check receptacle for AC power.
		A blown fuse on the power supply.	Check the power supply fuse. Repair or replace as needed.
		A faulty power supply module.	Verify proper power supply module operation. Repair or replace as needed.
		The HEDA is not seated properly in the chassis.	Check that the HEDA is securely connected to the chassis. Refer to the procedure in Chapter 2, **Installation**.
		A faulty module.	The module may be faulty and should be replaced.
		No power within chassis.	The chassis may have a problem. Contact Cisco Services for assistance.

Chapter 5
Customer Information

Overview

Introduction

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
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.
ATC	Automotive fuse
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
bdr™	Baseband digital reverse
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
ECM	Entitlement Control Message
EDFA	Erbium Doped Fiber Amplifier
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.
EPROM	Erasable Programmable Read-Only Memory
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
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 Reuse	A technique in which independent information is transmitted on orthogonal polarizations to "reuse" a given band of frequencies.
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
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 Electrotechnical Commission
IF	Intermediate frequency
IFL	Interfacility link
IP	Internet protocol
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
LOCATE(TM)	Systems for monitoring, analyzing, or reporting electric power outages
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
PCB	Printed circuit board
PCM	Pulse code modulation
PDI	Pressure differential indicator
PDU	Power distribution unit
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
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 reciever
SA	Spectrum analyzer
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
SP	Splitter. It is a device which divides power from an input to deliver multiple outputs or combines multiple inputs 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.
TCP/IP	Transmission control protocol/internet protocol
TDM	Time division multiplexing
TNCS	Transmission Network Control System
Torque	Force applied to bolt or screw to tighten the 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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