



PA-2FEISL 100BASE-T Fast Ethernet/ISL Port Adapter Installation and Configuration

Product Number: PA-2FEISL-TX(=) and PA-2FEISL-FX(=)

Platforms Supported: Cisco 7100 Series, Cisco 7200 Series, Cisco uBR7200
Series, VIP2 in the Cisco 7000 Series and Cisco 7500 Series

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Preface

This preface describes the objectives and organization of this document and explains how to find additional information on related products and services. This preface contains the following sections:

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- [Organization, page vi](#)
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Objectives

This document describes how to install and configure the PA-2FEISL 100BASE-T Fast Ethernet/ISL port adapter (PA-2FEISL-TX[=] and PA-2FEISL-FX[=]), hereafter referred to as the PA-2FEISL, which is used in the following platforms:

- Cisco 7100 series routers, consisting of the Cisco 7120 series and Cisco 7140 series
- Cisco 7200 series routers, consisting of the two-slot Cisco 7202, four-slot Cisco 7204 and Cisco 7204VXR, and the six-slot Cisco 7206 and the Cisco 7206VXR
- Cisco uBR7200 series universal broadband routers, consisting of the six-slot Cisco uBR7223 and Cisco uBR7246 VXR, and the three-slot Cisco uBR7246
- VIP2 in Cisco 7000 series and Cisco 7500 series routers with the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI)

Organization

This document contains the following chapters:

Section	Title	Description
Chapter 1	Overview	Describes the PA-2FEISL and its LED displays, cables, and receptacles.
Chapter 2	Preparing for Installation	Describes safety considerations, tools required, and procedures you should perform before the actual installation.
Chapter 3	Removing and Installing Port Adapters	Describes the procedures for installing and removing PA-2FEISL port adapters in the supported platforms.
Chapter 4	Configuring the PA-2FEISL	Provides instructions for configuring your port adapter on the supported platforms.

Related Documentation

Your router and the Cisco IOS software running on it contain extensive features and functionality, which are documented in the following resources:

- Cisco IOS software:

For configuration information and support, refer to the modular configuration and modular command reference publications in the Cisco IOS software configuration documentation set that corresponds to the software release installed on your Cisco hardware. For software advisor and other helpful links, go to the following URL:

<http://www.cisco.com/univercd/cc/td/doc/product/core/7202/7200link.htm>

- Cisco 7100 series routers:
 - For hardware installation and maintenance information, refer to the *Cisco 7100 Series VPN Router Installation and Configuration Guide*.
 - For information on setting up a Virtual Private Network, refer to the *Cisco 7100 Series VPN Configuration Guide*.
- Cisco 7200 series routers:
 - For port adapter hardware and memory configuration guidelines, refer to the *Cisco 7200 Series Port Adapter Hardware Configuration Guidelines*.
 - For hardware installation and maintenance information (including the Cisco 7206 or Cisco 7206VXR as a router shelf in a Cisco AS5800 Universal Access Server), refer to the *Cisco 7200 Series Router Hardware Installation and COnfiguration Guide*.
- Cisco 7200 VXR routers:

For hardware installation and maintenance information, refer to the *Cisco 7200 VXR Installation and Configuration Guide*.
- Cisco uBR7200 series routers:

For hardware installation and maintenance information, refer to the *Cisco uBR7200 Series Universal Broadband Router Hardware Installation Guide t*.

- VIP2 in Cisco 7000 series and Cisco 7500 series routers:

For hardware installation and maintenance information, refer to the following publications:

- The installation and configuration guides for the Cisco 7000 series or Cisco 7500 series router
 - *Second-Generation Versatile Interface Processor (VIP2) Installation and Configuration*
- For International agency compliance, safety, and statutory information for WAN interfaces:
 - *Site Preparation and Safety Guide*
 - *Regulatory Compliance and Safety Information for the Cisco 7000 Series Routers*
 - *Regulatory Compliance and Safety Information for Cisco 7100 Series VPN Routers*
 - *Regulatory Compliance and Safety Information for the Cisco 7200 Series Routers*
 - *Regulatory Compliance and Safety Information for Cisco uBR7200 Series Universal Broadband Routers*
 - *Regulatory Compliance and Safety Information for the Cisco 7500 Series Routers*

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

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<http://www.cisco.com/univercd/home/home.htm>

You can access the Cisco website at this URL:

<http://www.cisco.com>

International Cisco websites can be accessed from this URL:

http://www.cisco.com/public/countries_languages.shtml

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You can find instructions for ordering documentation at this URL:

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You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:

<http://www.cisco.com/en/US/partner/ordering/index.shtml>

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

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You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, the Cisco Technical Assistance Center (TAC) provides 24-hour-a-day, award-winning technical support services, online and over the phone. Cisco.com features the Cisco TAC website as an online starting point for technical assistance. If you do not hold a valid Cisco service contract, please contact your reseller.

Cisco TAC Website

The Cisco TAC website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The Cisco TAC website is available 24 hours a day, 365 days a year. The Cisco TAC website is located at this URL:

<http://www.cisco.com/tac>

Accessing all the tools on the Cisco TAC website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a login ID or password, register at this URL:

<http://tools.cisco.com/RPF/register/register.do>

Opening a TAC Case

Using the online TAC Case Open Tool is the fastest way to open P3 and P4 cases. (P3 and P4 cases are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Case Open Tool automatically recommends resources for an immediate solution. If your issue is not resolved using the recommended resources, your case will be assigned to a Cisco TAC engineer. The online TAC Case Open Tool is located at this URL:

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

For P1 or P2 cases (P1 and P2 cases are those in which your production network is down or severely degraded) or if you do not have Internet access, contact Cisco TAC by telephone. Cisco TAC engineers are assigned immediately to P1 and P2 cases to help keep your business operations running smoothly.

To open a case by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553-2447

For a complete listing of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

TAC Case Priority Definitions

To ensure that all cases are reported in a standard format, Cisco has established case priority definitions.

Priority 1 (P1)—Your network is “down” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Priority 2 (P2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Priority 3 (P3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Priority 4 (P4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Go to this URL to visit the company store:
<http://www.cisco.com/go/marketplace/>
- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:
<http://cisco.com/univercd/cc/td/doc/pcat/>
- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press online at this URL:
<http://www.ciscopress.com>
- *Packet* magazine is the Cisco quarterly publication that provides the latest networking trends, technology breakthroughs, and Cisco products and solutions to help industry professionals get the most from their networking investment. Included are networking deployment and troubleshooting tips, configuration examples, customer case studies, tutorials and training, certification information, and links to numerous in-depth online resources. You can access Packet magazine at this URL:
<http://www.cisco.com/packet>
- *iQ Magazine* is the Cisco bimonthly publication that delivers the latest information about Internet business strategies for executives. You can access iQ Magazine at this URL:
<http://www.cisco.com/go/iqmagazine>

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

<http://www.cisco.com/ipj>

- Training—Cisco offers world-class networking training. Current offerings in network training are listed at this URL:

<http://www.cisco.com/en/US/learning/index.html>



Overview

This chapter describes the PA-2FEISL port adapter and contains the following sections:

- [Port Adapter Overview, page 1-1](#)
- [Fast Ethernet Overview, page 1-2](#)
- [IEEE 802.3u 100BASE-T Specifications, page 1-3](#)
- [LEDs, page 1-4](#)
- [Cables, Connectors, and Pinouts, page 1-5](#)
- [Port Adapter Slot Locations on the Supported Platforms, page 1-7](#)
- [Identifying Interface Addresses, page 1-9](#)

Port Adapter Overview

The PA-2FEISL, shown in [Figure 1-1](#), provides two 100-Mbps, 100BASE-T Fast Ethernet/ISL interfaces for the VLAN transport over switch-to-switch backbone connections or switch-to-server data center attachments. These port adapters provide an inter-VLAN bridging and routing functionality that network administrators can use to deploy 100-Mbps Token Ring VLAN transport, 100-Mbps Ethernet VLAN transport, and bridging or routing between the mixed LAN types using the same physical ISL trunk links. Both full-duplex and half-duplex operation are supported for the PA-2FEISL. See the “[Fast Ethernet Overview](#)” section on [page 1-2](#) for additional information.

Both models of the PA-2FEISL (PA-2FEISL-TX and PA-2FEISL-FX) are shown in [Figure 1-1](#) and [Figure 1-2](#).



Note

Although the VIP2, and Catalyst RSM/VIP2 support online insertion and removal (OIR), individual port adapters do not. To replace port adapters, you must first remove the VIP2 or Catalyst RSM/VIP2 from the chassis, and then replace port adapters as required.

Cisco 7100 series, Cisco 7200 series, and Cisco uBR7200 series routers support OIR of all port adapter types.

Figure 1-1 PA-2FEISL-TX—Faceplate View**Figure 1-2 PA-2FEISL-FX—Faceplate View**

You can install the PA-2FEISL in the following slots on the hardware platforms described in this document:

- Cisco 7100 series routers—Port adapter slot 3 for the Cisco 7120 series and port adapter slot 4 for the Cisco 7140 series
- VIP2-15, VIP2-20, and VIP2-40—Port adapter slot 0 and port adapter slot 1
- Cisco 7200 series routers—Any of the port adapter slots: 1 through 6 for the Cisco 7206 and the Cisco 7206VXR, or 1 through 4 for the Cisco 7204
- Cisco uBR7200 series routers—Any of the port adapter slots: 1 and 2 for the Cisco uBR7246 and Cisco uBR7246 VXR, or 1 for the Cisco uBR7223

**Note**

Port adapters have a handle attached, but this handle is occasionally not shown in figures to allow a full view of detail on the port adapter's faceplate.

Fast Ethernet Overview

Each Fast Ethernet port on the PA-2FEISL-TX has an RJ-45 connector to attach to Category 5 unshielded twisted-pair (UTP) cable for 100BASE-TX. Each Fast Ethernet port on the PA-2FEISL-FX has an SC-type fiber-optic connector for 100BASE-FX.

The term *Ethernet* is commonly used for all carrier sense multiple access/collision detection (CSMA/CD) LANs that generally conform to Ethernet specifications, including Fast Ethernet under IEEE 802.3u.

**Note**

100BASE-TX is intended for Environment A, and 100BASE-FX is intended for Environment B. Both are described in the IEEE 802.3u standard.

IEEE 802.3u is well suited to applications where a local communication medium must carry sporadic, occasionally heavy traffic at peak data rates. Stations on a CSMA/CD LAN can access the network at any time. Before sending data, the station *listens* to the network to see if it is already in use. If it is in use, the station waits until the network is not in use, then transmits. This process is known as half-duplex operation. A collision occurs when two stations listen for network traffic, hear none, and transmit almost simultaneously. When simultaneous transmission occurs, both transmissions are damaged and the

stations must retransmit. The stations detect the collision and use backoff algorithms to determine when they should retransmit.

Both Ethernet and IEEE 802.3u are broadcast networks, which means that all stations see all transmissions. Each station must examine received frames to determine whether it is the intended destination and, if it is, pass the frame to a higher protocol layer for processing.

IEEE 802.3u specifies the following different physical layers for 100BASE-T:

- 100BASE-TX—100BASE-T, half- and full-duplex over Category 5 UTP, Electronics Industry Association/Telecommunications Industry Association (EIA/TIA)–568-compliant cable
- 100BASE-FX—100BASE-T, half- and full-duplex over optical fiber

Each physical layer protocol has a name that summarizes its characteristics in the format speed/signaling method/segment length, where speed is the LAN speed in megabits per second (Mbps), signaling method is the signaling method used (either *baseband* or *broadband*), and segment length is the maximum length between stations in hundreds of meters. Therefore, 100BASE-T specifies a 100-Mbps, baseband LAN with maximum network segments.

IEEE 802.3u 100BASE-T Specifications

This section provides specifications for IEEE 802.3u 100BASE-T. Table 1-1 provides cabling specifications for 100BASE-TX Fast Ethernet transmission over UTP and foil twisted-pair (FTP), and 100BASE-FX Fast Ethernet over fiber-optic cables. It also summarizes IEEE 802.3u 100BASE-TX and 100BASE-FX physical characteristics. Also see [Figure 1-3](#).

Table 1-1 Specifications and Connection Limits for 100BASE-TX and 100BASE-FX Transmission

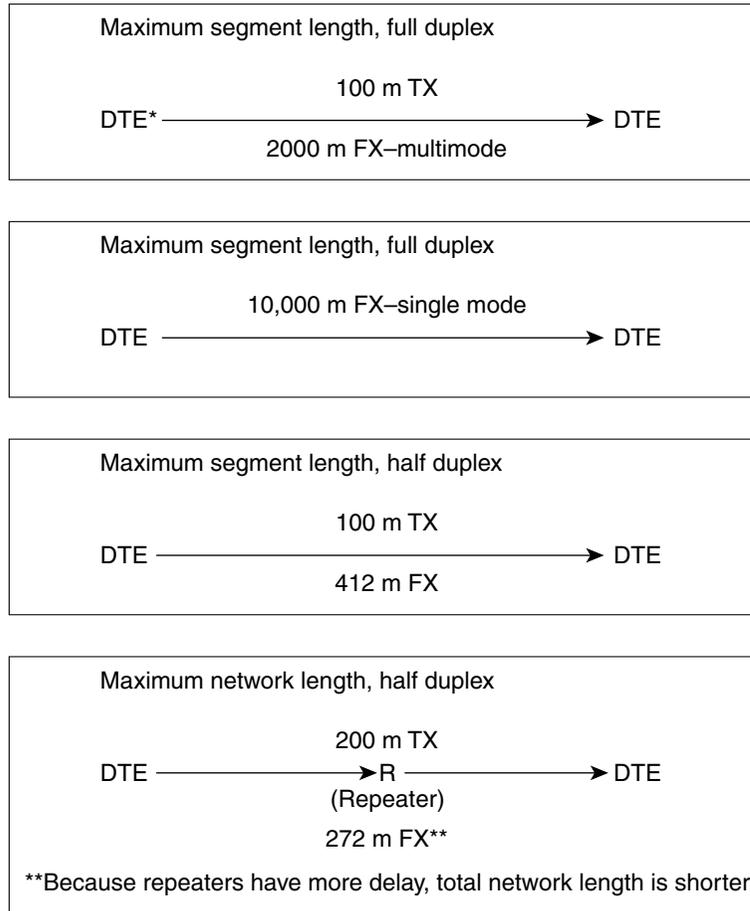
Parameter	100BASE-TX	100BASE-FX Multi-Mode	100BASE-FX Single Mode
Cable specification	Category 5 ¹ UTP ² , 22 to 24 AWG	62.5/125 multimode optical fiber	9/125 micron single mode optical fiber
Maximum segment length ³ (half-duplex)	100 m	412 m	N/A
Maximum segment length (full-duplex) ³	100 m	2000 m	10,000 m
Maximum network length (half-duplex, one repeater) ⁴	200 m	272 m	N/A
Data rate	100 Mbps	100 Mbps	100 Mbps
Signaling method	4B/5B block coded, scrambled, with MLT-3 line coding	4B/5B block coded, with NRZI line coding	4B/5B block coded, with NRZI line coding
Connector	RJ-45 (ISO/IEC 60603-7:-1990)	SC-type: dual simplex or single duplex for RX and TX	SC-type: dual simplex or single duplex for RX and TX
Topology	Star/hub	Star/hub	Star/hub

1. EIA/TIA-568 or EIA-TIA-568 TSB-36 compliant.

2. Cisco does not supply Category 5 UTP RJ-45 cables. However, they are available commercially.

3. Data Terminal Equipment (DTE to DTE), see [Figure 1-3](#).

4. DTE to Repeater to DTE, see [Figure 1-3](#).

Figure 1-3 Maximum Segment and Network Lengths—100BASE--FX and 100BASE--TX

*DTE = Data Terminal Equipment

LEDs

The PA-2FEISL has an ENABLED LED, which is standard on all port adapters, and a LINK LED for each of the ports. (See [Figure 1-4](#).)

Figure 1-4 LEDs on the PA-2FEISL—Horizontal Orientation

After system initialization, the ENABLED LED goes on to indicate that the port adapter has been enabled for operation.

The following conditions must be met before the PA-2FEISL is enabled:

- The PA-2FEISL is correctly connected and is receiving power.

- A valid system software image for the port adapter has been downloaded successfully.
- The system recognizes the PA-2FEISL or a VIP2 with a PA-2FEISL.

If any of the above conditions are not met, or if the initialization fails for other reasons, the enabled LED does not go on.

Table 1-2 lists port LED colors and indications.

Table 1-2 PA-2FEISL LEDs

LED Label	Color	State	Meaning
ENABLED	Green	On	Port adapter is enabled for operation.
LINK	Green	Blinking	Port adapter is receiving a carrier signal from the network ¹

1. When an RJ-45 or SC port is active.

Cables, Connectors, and Pinouts

The two interface receptacles on the PA-2FEISL are a single RJ-45 connection (on the PA-2FEISL-TX) or a SC-type optical-fiber connection (on the PA-2FEISL-FX). Each connection supports IEEE 802.3u interfaces compliant with the 100BASE-X and 100BASE-T standards. The RJ-45 connection does not require an external transceiver.

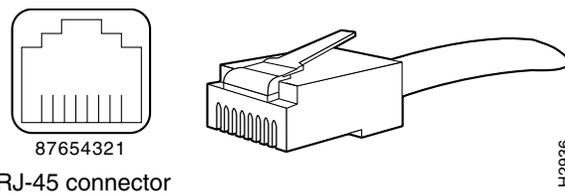
Figure 1-5 shows the RJ-45 cable connectors. Cisco does not supply Category 5 UTP RJ-45 cables; these cables are available commercially. lists the pinouts and signals for the 2FEISL-TX RJ-45 connectors.



Tip

Ports labeled “Ethernet,” “10BASE-T,” “Token Ring,” “Console,” and “AUX” are safety extra-low voltage (SELV) circuits. SELV circuits should only be connected to other SELV circuits. Because the Basic Rate Interface (BRI) circuits are treated like telephone-network voltage, avoid connecting the SELV circuit to the telephone network voltage circuits.

Figure 1-5 PA-2FEISL-TX RJ-45 Connections—Plug and Receptacle



RJ-45 connector



Warning

To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables. Statement 1021

Table 1-3 FE-TX RJ-45 Connector Pinouts

Pin	Description	Pin	Description
1	Receive Data + (RxD+)	3	Transmit Data + (TxD+)
2	RxD–	6	TxD–

**Note**

Referring to the RJ-45 pinout in [Table 1-3](#), proper common-mode line terminations should be used for the unused Category 5, unshielded twisted-pair (UTP) cable pairs 4/5 and 7/8. Common-mode termination reduces the contributions to electromagnetic interference (EMI) and susceptibility to common-mode sources. Wire pairs 4/5 and 7/8 are actively terminated in the RJ-45, 100BASE-TX port circuitry in the PA-2FEISL-TX.

Depending on your RJ-45 interface cabling requirements, use the pinouts in [Figure 1-6](#) and [Figure 1-7](#).

Figure 1-6 Straight-Through Cable Pinout—PA-2FEISL-TX RJ-45 Connection to a Hub or Repeater

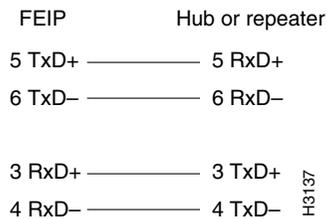
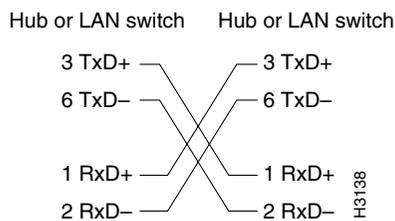


Figure 1-7 Crossover Cable Pinout—PA-2FEISL-TX RJ-45 Connections Between Hubs and Switches



[Figure 1-8](#) shows the duplex SC connector (one required for both transmit and receive), and shows the simplex SC connector (two required, one for each transmit and receive) used for PA-2FEISL-FX optical-fiber connections. These multimode optical-fiber cables are commercially available, and are not available from Cisco.

Figure 1-8 PA-2FEISL-FX Duplex SC Connector

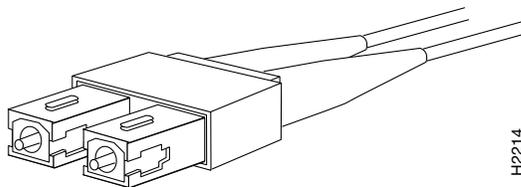
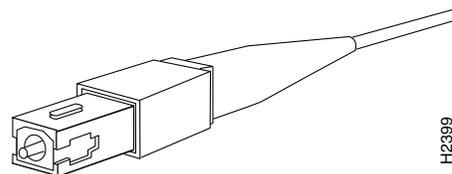


Figure 1-9 PA-2FEISL-FX Simplex SC Connector



Port Adapter Slot Locations on the Supported Platforms

Cisco 7100 Series Routers Slot Numbering

The PA-2FEISL can be installed in port adapter slot 3 in Cisco 7120 series routers, and in port adapter slot 4 in Cisco 7140 series routers. [Figure 1-10](#) shows a Cisco 7120 with a port adapter installed in slot 3. [Figure 1-11](#) shows a Cisco 7140 with a port adapter installed in slot 4.

Figure 1-10 Port Adapter Slots in the Cisco 7100 Series Router – Cisco 7120 Series

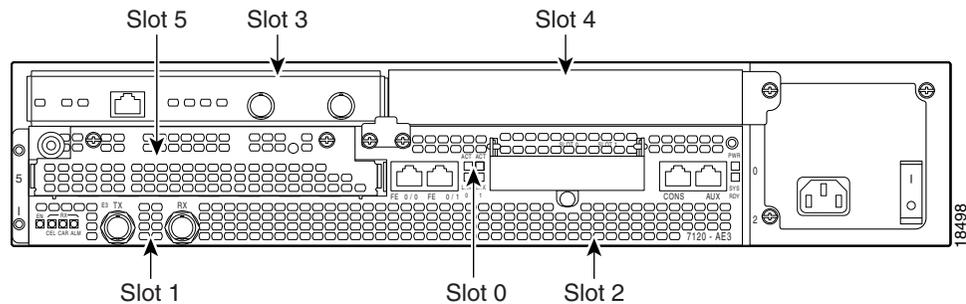
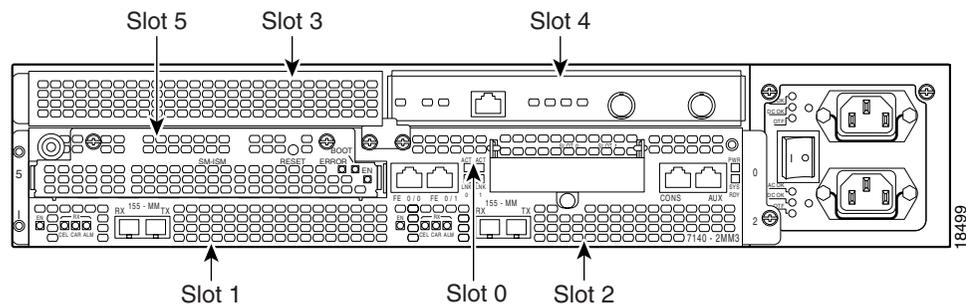


Figure 1-11 Port Adapter Slots in the Cisco 7100 Series Router – Cisco 7140 Series



Cisco 7200 Series and Cisco uBR7200 Series Routers Slot Numbering

[Figure 1-12](#) shows a Cisco 7206 with port adapters installed. In the Cisco 7206 (including the Cisco 7206 and Cisco 7206VXR as router shelves in a Cisco AS5800 Universal Access Server), port adapter slot 1 is in the lower left position, and port adapter slot 6 is in the upper right position. (The Cisco 7202 and Cisco 7204 are not shown; however, the PA-2FEISL can be installed in any available port adapter slot.)

Figure 1-12 Port Adapter Slots in the Cisco 7206

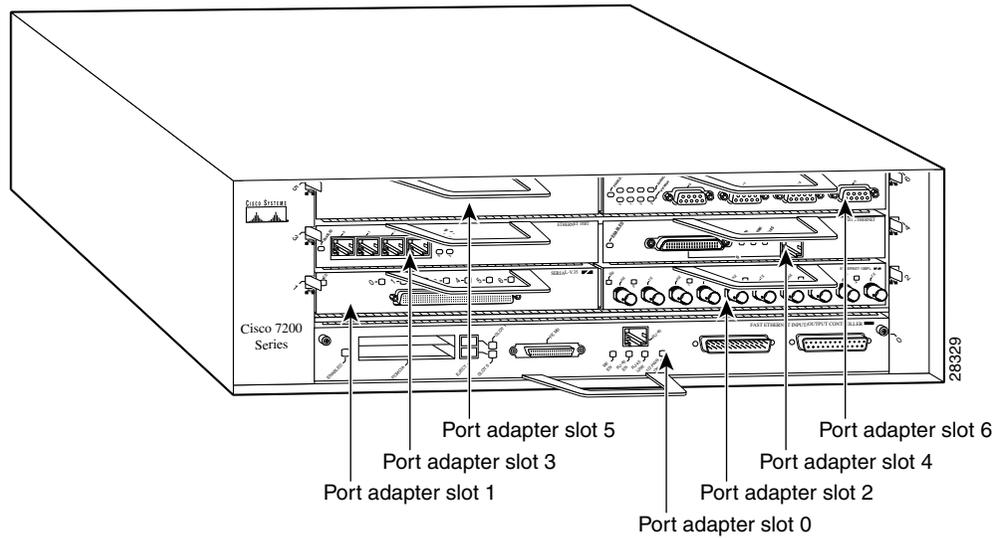
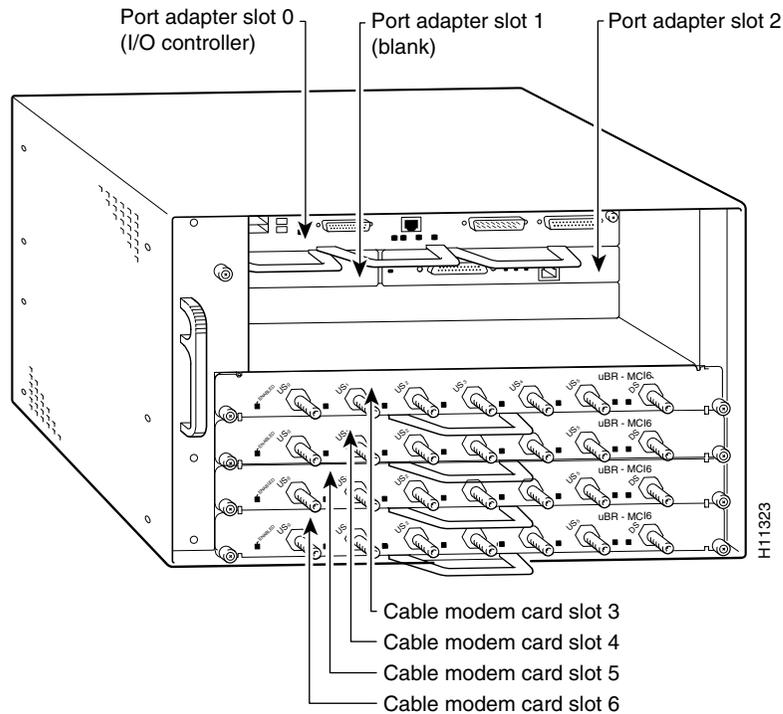


Figure 1-13 shows the slot numbering of port adapters in a Cisco uBR7246 series router. The port adapter slots are numbered slot 1 and slot 2 for the Cisco uBR7246 and slot 1 for the Cisco uBR7223. (Slot 0 is always reserved for the Fast Ethernet port on the I/O controller—if present.)

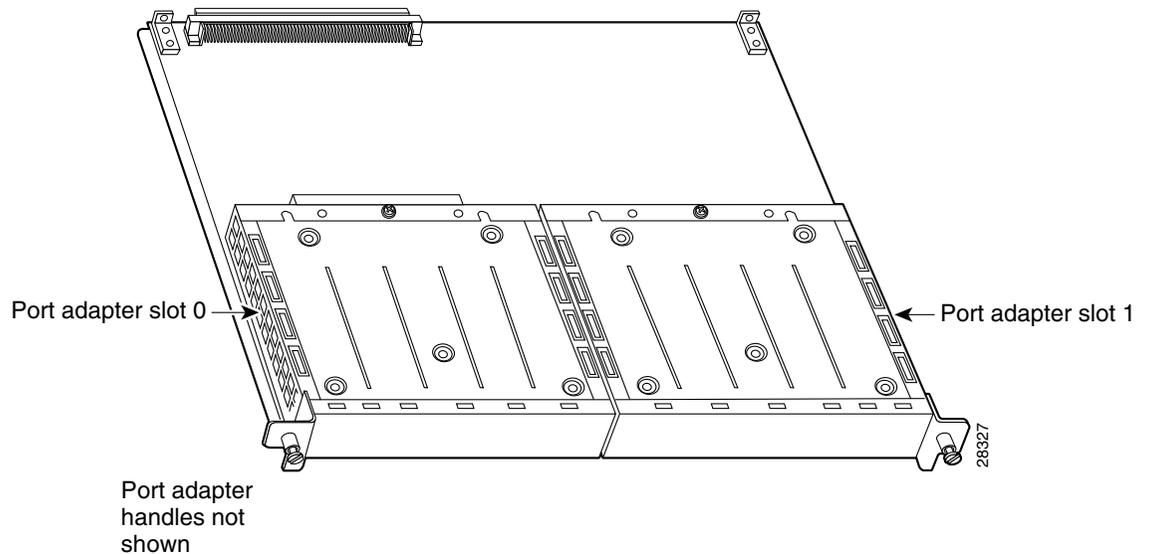
Figure 1-13 Port Adapter Slots in the Cisco uBR7246



Cisco VIP2 Slot Numbering

Figure 1-14 shows a VIP motherboard with installed port adapters. With the motherboard oriented as shown in Figure 1-14, the left port adapter is in port adapter slot 0, and the right port adapter is in port adapter slot 1. The slot numbering is the same for the Catalyst RSM/VIP2-15 or VIP2-40. The slots are always numbered 0 and 1.

Figure 1-14 VIP Motherboard with Two Port Adapters Installed—Horizontal Orientation



Identifying Interface Addresses

This section describes how to identify interface addresses for the PA-2FEISL in supported platforms. Interface addresses specify the actual physical location of each interface on a router or switch.

Interfaces on the PA-2FEISL installed in a router maintain the same address regardless of whether other port adapters are installed or removed. However, when you move a port adapter to a different slot, the first number in the interface address changes to reflect the new port adapter slot number.

Interfaces on a PA-2FEISL installed in a VIP2 maintain the same address regardless of whether other interface processors are installed or removed. However, when you move a VIP2 to a different slot, the interface processor slot number changes to reflect the new interface processor slot.



Note

Interface ports are numbered from left to right starting with 0.

Table 1-4 explains how to identify interface addresses.

Table 1-4 Identifying Interface Addresses

Platform	Interface Address Format	Numbers	Syntax
Cisco 7120 series routers	Port-adapter-slot-number/interface-port-number	Port adapter slot—always 3 Interface port—0 through 1	3/0
Cisco 7140 series routers	Port-adapter-slot-number/interface-port-number	Port adapter slot—always 4 Interface port—0 through 1	4/0
Cisco 7200 series routers	Port-adapter-slot-number/interface-port-number	Port adapter slot—0 through 6 (depends on the number of slots in the router) ¹ Interface port—0 through 1	1/0
Cisco uBR7223 router	Port-adapter-slot-number/interface-port-number	Port adapter slot—always 1 ¹ Interface port—0 through 1	1/0
Cisco uBR7246 router	Port-adapter-slot-number/interface-port-number	Port adapter slot—always 1 or 2 ¹ Interface port—0 through 1	1/0
VIP2 in Cisco 7000 series or Cisco 7500 series routers	Interface-processor-slot-number/port-adapter-slot- number/interface-port-number	Interface processor slot—0 through 12 (depends on the number of slots in the router) Port adapter slot—always 0 or 1 Interface port—0 through 1	1/1/0

1. Port adapter slot 0 is reserved for the Fast Ethernet port on the I/O controller (if present).

Cisco 7100 Series Addresses

This section describes how to identify the interface addresses used for the PA-2FEISL in Cisco 7100 series routers. The interface address is composed of a two-part number in the format *port-adapter-slot-number/interface-port-number*. See [Table 1-4](#) for the interface address format.

Cisco 7200 Series and Cisco uBR7200 Series Addresses

This section describes how to identify the interface addresses used for the PA-2FEISL in Cisco 7200 series routers or Cisco uBR7200 series routers. The interface address is composed of a two-part number in the format *port-adapter-slot-number/interface-port-number*. See [Table 1-4](#) for the interface address format.

In Cisco 7200 series routers, port adapter slots are numbered from the lower left to the upper right, beginning with port adapter slot 1 and continuing through port adapter slot 2 for the Cisco 7202, slot 4 for the Cisco 7204 and Cisco 7204VXR, and slot 6 for the Cisco 7206 and Cisco 7206VXR. (Port adapter slot 0 is reserved for the optional Fast Ethernet port on the I/O controller—if present.)

[Figure 1-12](#) shows the interfaces of a PA-2FEISL port adapter in port adapter slot 1 of the Cisco 7206 router.

The interface addresses of the interfaces on the PA-2FEISL in port adapter slot 1 are 1/0 through 1/1 (port adapter slot 1 and interfaces 0 through 1). If the PA-2FEISL was in port adapter slot 4, these same interfaces would be numbered 4/0 through 4/1 (port adapter slot 4 and interfaces 0 through 1).

Figure 1-13 shows port adapters installed in slot 1 and slot 2 of a Cisco uBR7246 router. The port adapter slots are numbered slot 1 and slot 2 for the Cisco uBR7246, and slot 1 for the Cisco uBR7223 and the Cisco uBR7246 VXR. (Slot 0 is always reserved for the Fast Ethernet port on the I/O controller—if present.) The individual interfaces always begin with 0. The number of additional interfaces depends on the number of interface ports on a port adapter.

The interface addresses of the interfaces on a PA-2FEISL in port adapter slot 2 are 2/0 and 2/1 (port adapter slot 2 and interfaces 0 and 1). If the PA-2FEISL was in port adapter slot 1, these same interfaces would be numbered 1/0 and 1/1 (port adapter slot 1 and interfaces 0 and 1).

VIP2 Interface Addresses

This section describes how to identify the interface addresses used for the PA-2FEISL on a VIP2 in Cisco 7000 series and Cisco 7500 series routers.



Note

Although the processor slots in the 7-slot Cisco 7000 and Cisco 7507 and 13-slot Cisco 7513 and Cisco 7576 are vertically oriented and those in the 5-slot Cisco 7010 and Cisco 7505 are horizontally oriented, all Cisco 7000 series and Cisco 7500 series routers use the same method for slot and port numbering.

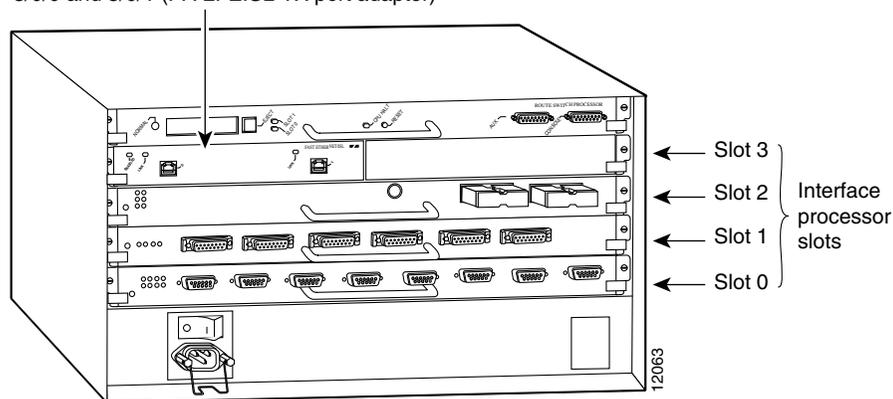
See Table 1-4 for the interface address format. The interface address is composed of a three-part number in the format *interface-processor-slot number/port-adapter-slot-number/interface-port-number*.

Figure 1-15 shows a sample Cisco 7505 system. The interface addresses of the PA-2FEISL are 3/1/0 through 3/1/1. If the port adapter was in port adapter slot 0 on the VIP2, these same interface addresses would be numbered 3/0/0 through 3/0/1.

If you remove the VIP2 with the PA-2FEISL (shown in Figure 1-15) from interface processor slot 3 and install it in interface processor slot 2, the interface addresses become 2/1/0 through 2/1/1.

Figure 1-15 Fast Ethernet/ISL Interface Port Number Example—Cisco 7505

3/0/0 and 3/0/1 (PA-2FEISL-TX port adapter)



Note

If you remove the PA-2FEISL-equipped VIP2 (shown in Figure 1-15) from interface processor slot 3 and install it in interface processor slot 2, the interface addresses become 2/1/0 through 2/1/1.



Preparing for Installation

This chapter describes the general equipment, safety, and site preparation requirements for installing the PA-2FEISL port adapter. This chapter contains the following sections:

- [Required Tools and Equipment, page 2-1](#)
- [Software and Hardware Requirements, page 2-1](#)
- [Safety Guidelines, page 2-3](#)
- [FCC Class A Compliance, page 2-10](#)

Required Tools and Equipment

You need the following tools and parts to install a port adapter. If you need additional equipment, contact a service representative for ordering information.

- PA-2FEISL-TX(=) or PA-2FEISL-FX(=) port adapter.
- VIP2 (for installation in the Cisco 7000 series or Cisco 7500 series chassis only). (For information about the specific VIP model that supports the PA-2FEISL, see the [“Software and Hardware Requirements” section on page 2-1.](#))
- Cables appropriate for the port adapter’s interfaces (RJ-45 and multimode optical-fiber cables are not available from Cisco; they are available from commercial cable vendors).
- Number 1 Phillips and a 3/16-inch, flat-blade screwdriver (for VIP2 installation only).
- Number 2 Phillips screwdriver.
- Your own ESD-prevention equipment or the disposable grounding wrist strap included with all upgrade kits, field-replaceable units (FRUs), and spares.
- Antistatic mat.
- Antistatic container.

Software and Hardware Requirements

[Table 2-1](#) lists the recommended minimum Cisco IOS software release required to use the PA-2FEISL in supported router platforms.

**Note**

Inter-Switch Link (ISL) features are not currently supported on the Cisco uBR7200 series. This restriction is subject to change without notice.

Table 2-1 PA-2FEISL Software Requirements

Platform	Recommended Minimum Cisco IOS Release
Cisco 7000 series and Cisco 7500 series <ul style="list-style-type: none"> With VIP2-15(=), VIP2-20, or VIP2-40(=) 	Cisco IOS Release 11.3(4)T or a later release of Cisco IOS Release 11.3 T
Cisco 7100 series <ul style="list-style-type: none"> Cisco 7120 series and Cisco 7140 series 	Cisco IOS Release 12.0(4)XE or a later release of Cisco IOS Release 12.0 XE Cisco IOS Release 12.0(5)T or a later release of Cisco IOS Release 12.0 T
Cisco 7200 series <ul style="list-style-type: none"> Cisco 7204VXR and Cisco 7206VXR Cisco 7204 and Cisco 7206 Cisco 7202 Cisco 7206 router shelf 	Cisco IOS Release 11.3(4)T or a later release of Cisco IOS Release 11.3 T Cisco IOS Release 11.3(4)T or a later release of Cisco IOS Release 11.3 T Cisco IOS Release 11.3(4)T or a later release of Cisco IOS Release 11.3 T Cisco IOS Release 11.3(2)AA or a later release of Cisco IOS Release 11.3AA
Cisco uBR7200 series <ul style="list-style-type: none"> Cisco uBR7246, Cisco uBR7246 VXR, and Cisco uBR7223 	Cisco IOS Release 12.0(5)T or a later release of Cisco IOS Release 12.0 T Cisco IOS Release 12.0(7)SC or a later release of Cisco IOS Release 12.0T Cisco IOS Release 12.0(7)XR or a later release of Cisco IOS Release 12.0T

For release note information on the PA-2FEISL, refer to the Cisco IOS software release note for the version of Cisco IOS software that you are running.

Ensure that the following hardware requirements are met for your PA-2FEISL:

The PA-2FEISL-FX requires the following Network Processing Engine (NPE) models:

- NPE-150 (150-MHz network processor)—up to 128 MB of DRAM
- NPE-175 (200-MHz network processor)—up to 128 MB of DRAM
- NPE-200 (200-MHz network processor)—up to 128 MB of DRAM
- NPE-225 (262-MHz network processor)—up to 128 MB of DRAM

**Note**

The NPE-100 *does not* support the PA-2FEISL in Cisco 7200 series routers.

- In Cisco 7000 series or Cisco 7500 series routers, the PA-2FEISL requires the following VIP2 models:
 - VIP2-15 (1 MB of SRAM, 8 MB of DRAM)
 - VIP2-20 (1 MB of SRAM, 16 MB of DRAM)
 - VIP2-40 (2 MB of SRAM, 32 MB of DRAM)

**Note**

This release of the PA-2FEISL is not supported on the VIP2-50. (This restriction is subject to change without notice.)

**Note**

The minimum recommended VIP2 model is a VIP2-15. The maximum transmission unit (MTU) sizes available for two PA-2FEISL port adapters on a VIP2 require the additional VIP2 SRAM available on VIP2-15 models, or greater, to ensure adequate packet buffers. The VIP2-15 can also be used if you only have one Fast Ethernet port adapter on a VIP2.

The VIP2-10 has certain configuration constraints because of its limited SRAM for packet buffers; therefore, we do not recommend you use VIP2-10 with Fast Ethernet port adapters.

**Caution**

The VIP2 requires that Cisco 7000 series routers have the RSP7000 and RSP7000CI installed. The VIP2 will *not* operate properly with the Route Processor (RP), Switch Processor (SP), or Silicon Switch Processor (SSP) installed in the Cisco 7000 series routers.

Checking Hardware and Software Compatibility

To check the minimum software requirements of Cisco IOS software with the hardware installed on your router, Cisco maintains the Software Advisor tool on Cisco.com. This tool does not verify whether modules within a system are compatible, but it does provide the minimum IOS requirements for individual hardware modules or components.

**Note**

Access to this tool is limited to users with Cisco.com login accounts.

To access Software Advisor, go to the following URL:

<http://www.cisco.com/cgi-bin/Support/CompNav/Index.pl>

Safety Guidelines

This section provides safety guidelines that you should follow when working with any equipment that connects to electrical power or telephone wiring.

Safety Warnings

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, might harm you. A warning symbol precedes each warning statement.

**Warning****IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS**Waarschuwing****BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES**Varoitus****TÄRKEITÄ TURVALLISUUSOHJEITA**

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET**Attention****IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS**Warnung****WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI**Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE**Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES**¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES**Varning! VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Figyelem **FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelte biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение **ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告 重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의 중요 안전 지침

이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다. 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는 번역된 안전 경고문에서 해당 번역문을 찾으십시오.

이 지시 사항을 보관하십시오.

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES**Advarsel VIGTIGE SIKKERHEDSANVISNINGER**

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemeskadedigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER**تحذير****إرشادات الأمان الهامة**

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض للإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالاجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في آخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز. قم بحفظ هذه الإرشادات

Upozorenje VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE**Upozornění DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY**

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνηθισμένες πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה

הוראות בטיחות חשובות

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כדי לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Opomena

ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА

Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.

ЧУВАЈТЕ ГИ ОБИЕ НАПАТСТВИЈА

Ostrzeżenie

WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie

DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Electrical Equipment Guidelines

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before moving a chassis; do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe; carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

Telephone Wiring Guidelines

Use the following guidelines when working with any equipment that is connected to telephone wiring or to other network cabling:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. Port adapters and processor modules comprise printed circuit boards that are fixed in metal carriers. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the board from ESD, use a preventive antistatic strap during handling.

Following are guidelines for preventing ESD damage:

- Always use an ESD wrist or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to an unfinished chassis surface.
- When installing a component, use any available ejector levers or captive installation screws to properly seat the bus connectors in the backplane or midplane. These devices prevent accidental removal, provide proper grounding for the system, and help to ensure that bus connectors are properly seated.
- When removing a component, use any available ejector levers or captive installation screws to release the bus connectors from the backplane or midplane.
- Handle carriers by available handles or edges only; avoid touching the printed circuit boards or connectors.
- Place a removed board component-side-up on an antistatic surface or in a static shielding container. If you plan to return the component to the factory, immediately place it in a static shielding container.

- Avoid contact between the printed circuit boards and clothing. The wrist strap only protects components from ESD voltages on the body; ESD voltages on clothing can still cause damage.
- Never attempt to remove the printed circuit board from the metal carrier.

**Caution**

For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms (Mohm).

FCC Class A Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when 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 users will be required to correct the interference at their own expense.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the Cisco equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the equipment to one side or the other of the television or radio.
- Move the equipment farther away from the television or radio.
- Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

**Note**

The *PA-2FEISL* port adapter has been designed to meet these requirements. Modifications to this product that are not authorized by Cisco Systems, Inc., could void the various approvals and negate your authority to operate the product.



Removing and Installing Port Adapters

This chapter describes how to remove the PA-2FEISL port adapter from supported platforms and also how to install a new or replacement port adapter. This chapter contains the following sections:

- [Handling Port Adapters, page 3-2](#)
- [Online Insertion and Removal, page 3-2](#)
- [Warnings and Cautions, page 3-3](#)
- [Port Adapter Removal and Installation, page 3-4](#)
- [Connecting a PA-2FEISL RJ-45 or SC Cable, page 3-10](#)

Each port adapter circuit board is mounted to a metal carrier and is sensitive to electrostatic discharge (ESD) damage.



Note

When a port adapter slot is not in use, a blank port adapter must fill the empty slot to allow the router or switch to conform to electromagnetic interference (EMI) emissions requirements and to allow proper airflow across the port adapters. If you plan to install a new port adapter in a slot that is not in use, you must first remove the blank port adapter.



Caution

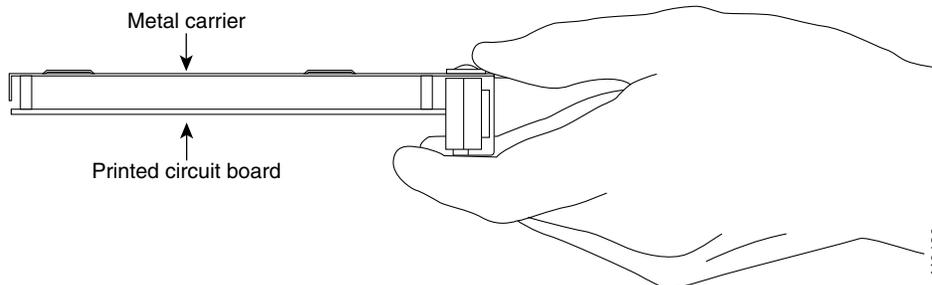
When powering off the router, wait a minimum of 30 seconds before powering it on again.

Handling Port Adapters


Caution

Always handle the port adapter by the carrier edges and handle; never touch the port adapter components or connector pins. (See [Figure 3-1](#).)

Figure 3-1 Handling a Port Adapter



Online Insertion and Removal

Several platforms support online insertion and removal (OIR) of port adapters; therefore, you do not have to power down routers when removing and replacing a PA-2FEISL on Cisco 7100 series routers, Cisco 7200 series routers, or Cisco uBR7200 series routers.

Although the VIP2 and the Catalyst RSM/VIP2 support online insertion and removal, individual port adapters do not. To replace port adapters, you must first remove the VIP2 or Catalyst RSM/VIP2 from the chassis and then install or replace port adapters as required. If a blank port adapter is installed on the VIP2 or Catalyst RSM/VIP2 on which you want to install a new port adapter, you must first remove the VIP2 or Catalyst RSM/VIP2 from the chassis and then remove the blank port adapter.


Caution

To prevent system problems, do not remove port adapters from the VIP2 or Catalyst RSM/VIP2 motherboard or attempt to install other port adapters on the motherboard when the system is operating. To install or replace port adapters, first remove the VIP2 or Catalyst RSM/VIP2 from its interface processor slot.

It is wise to gracefully shut down the system before removing a port adapter that has active traffic moving through it. Removing a module while traffic is flowing through the ports can cause system disruption. Once the module is inserted, the ports can be brought back up.


Note

As you disengage the module from the router or switch, online insertion and removal (OIR) administratively shuts down all active interfaces in the module.

OIR allows you to install and replace modules while the router is operating; you do not need to notify the software or shut down the system power, although you should not run traffic through the module you are removing while it is being removed. OIR is a method that is seamless to end users on the network, maintains all routing information, and preserves sessions.

The following is a functional description of OIR for background information only; for specific procedures for installing and replacing a module in a supported platform, refer to the “[Port Adapter Removal and Installation](#)” section on page 3-4.

Each module has a bus connector that connects it to the router. The connector has a set of tiered pins in three lengths that send specific signals to the system as they make contact with the module. The system assesses the signals it receives and the order in which it receives them to determine if a module is being removed from or introduced to the system. From these signals, the system determines whether to reinitialize a new interface or to shut down a disconnected interface.

Specifically, when you insert a module, the longest pins make contact with the module first, and the shortest pins make contact last. The system recognizes the signals and the sequence in which it receives them.

When you remove or insert a module, the pins send signals to notify the system of changes. The router then performs the following procedure:

1. Rapidly scans the system for configuration changes.
2. Initializes newly inserted port adapters or administratively shuts down any vacant interfaces.
3. Brings all previously configured interfaces on the module back to their previously installed state. Any newly inserted interface is put in the administratively shutdown state, as if it was present (but not configured) at boot time. If a similar module type is reinserted into a slot, its ports are configured and brought online up to the port count of the originally installed module of that type.

**Note**

Before you begin installation, read [Chapter 2, “Preparing for Installation,”](#) for a list of parts and tools required for installation.

Warnings and Cautions

Observe the following warnings and cautions when installing or removing port adapters.

**Caution**

Do not slide a port adapter all the way into the slot until you have connected all required cables. Trying to do so disrupts normal operation of the router or switch.

**Note**

If a port adapter lever or other retaining mechanism does not move to the locked position, the port adapter is not completely seated in the midplane. Carefully pull the port adapter halfway out of the slot, reinsert it, and move the port adapter lever or other mechanism to the locked position.

**Caution**

To prevent jamming the carrier between the upper and the lower edges of the port adapter slot, and to ensure that the edge connector at the rear of the port adapter mates with the connection at the rear of the port adapter slot, make certain that the carrier is positioned correctly, as shown in the cutaway in the following illustrations.

**Warning**

During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the midplane with your hand or any metal tool, or you could shock yourself. Statement 181

Port Adapter Removal and Installation

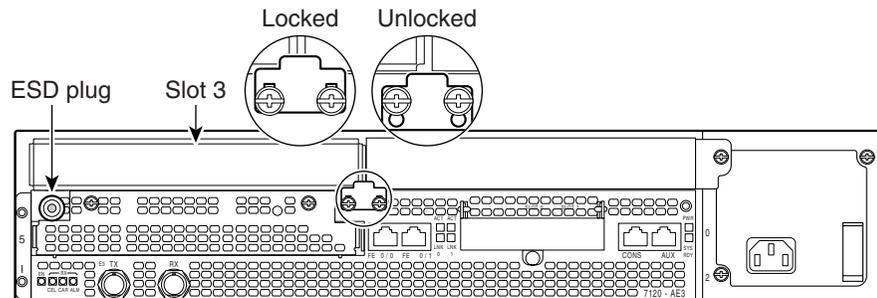
In this section, these illustrations give step-by-step instructions on how to remove and install port adapters.

- [Cisco 7100 Series—Removing and Installing a Port Adapter, page 3-5](#)
- [Cisco 7200 Series—Removing and Installing a Port Adapter, page 3-6](#)
- [Cisco uBR7200 Series—Removing a Port Adapter, page 3-7](#)
- [Cisco uBR7200 Series—Installing a Port Adapter, page 3-8](#)
- [VIP2—Removing and Installing a Port Adapter, page 3-9](#)

Cisco 7100 Series—Removing and Installing a Port Adapter

Step 1

To remove the port adapter, use a number 2 Phillips screwdriver to loosen the screws on the locking tab. Then slide the tab down to the unlocked position.



Step 2

Grasp the handle of the port adapter and pull the port adapter from the router, about halfway out of its slot. If you are removing a blank port adapter, pull the blank port adapter completely out of the chassis slot.

Step 3

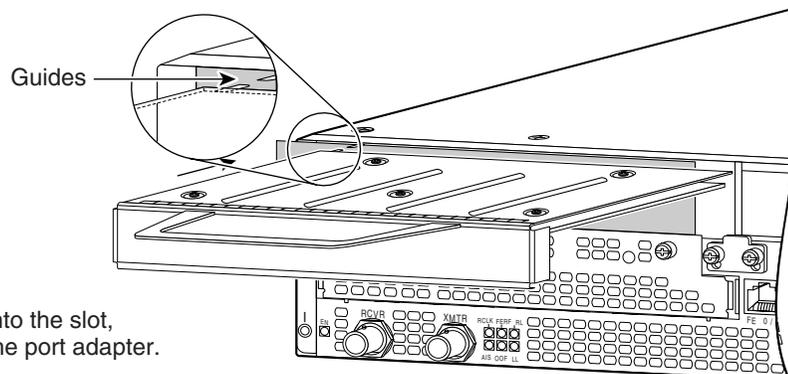
With the port adapter halfway out of the slot, disconnect all cables from the port adapter.

Step 4

After disconnecting the cables, pull the port adapter from its chassis slot.

Step 5

To insert the port adapter, carefully align the port adapter carrier between the upper and the lower edges of the port adapter slot.



Step 6

With the port adapter halfway into the slot, connect all required cables to the port adapter.

Step 7

After connecting all required cables, carefully slide the port adapter all the way into the slot until the port adapter is seated in the router midplane.

Step 8

Cisco 7200 Series—Removing and Installing a Port Adapter

Step 1

To remove the port adapter, place the port adapter lever in the unlocked position. (See A.) The port adapter lever remains in the unlocked position.

Step 2

Grasp the handle of the port adapter and pull the port adapter from the router, about halfway out of its slot. If you are removing a blank port adapter, pull the blank port adapter completely out of the chassis slot.

Step 3

With the port adapter halfway out of the slot, disconnect all cables from the port adapter. After disconnecting the cables, pull the port adapter from its chassis slot.

Step 4

To insert the port adapter, carefully align the port adapter carrier between the upper and the lower edges of the port adapter slot. (See B.)

Step 5

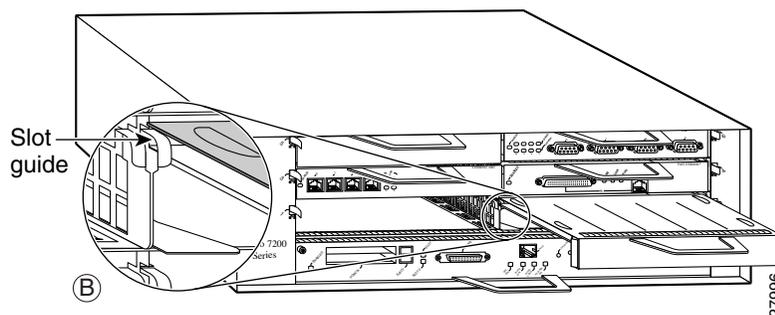
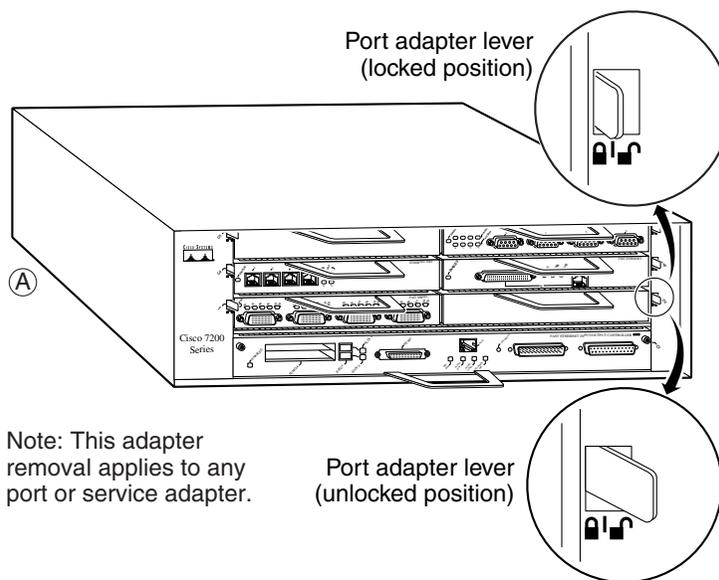
Carefully slide the new port adapter halfway into the port adapter slot. (See B.)

Step 6

With the port adapter halfway into the slot, connect all required cables to the port adapter. After connecting all required cables, carefully slide the port adapter all the way into the slot until the port adapter is seated in the router midplane.

Step 7

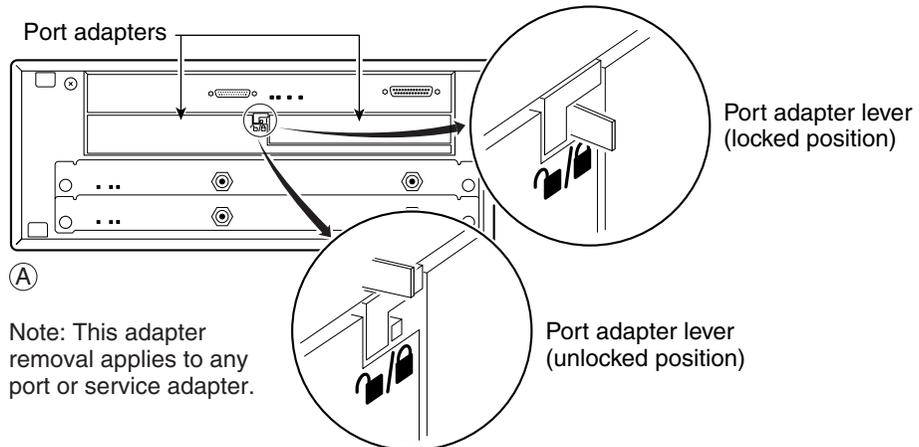
After the port adapter is properly seated, lock the port adapter lever. (See A.)



Cisco uBR7200 Series—Removing a Port Adapter

Step 1

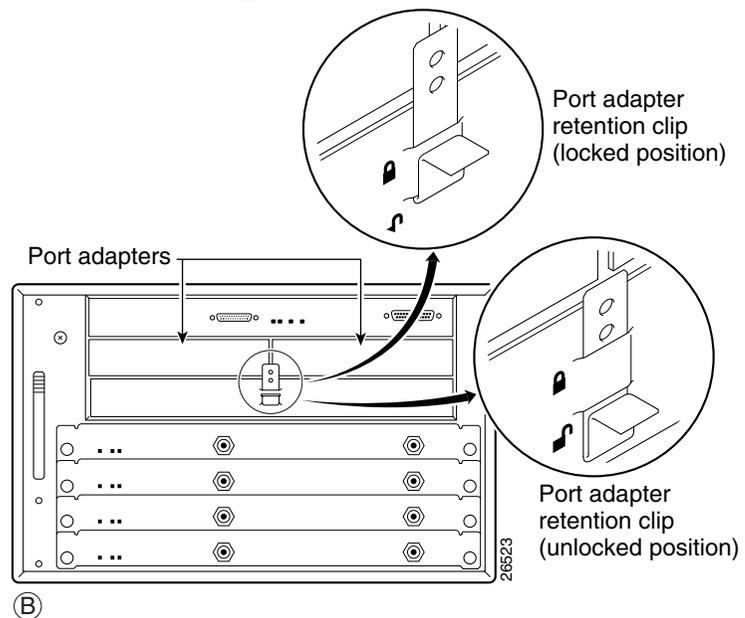
To remove the port adapter, unlock the port adapter retaining mechanism. The port adapter lever remains in the unlocked position.



Place the port adapter lever (Cisco uBR7223, see A), or the port adapter retention clip (Cisco uBR7246 and Cisco uBR7246 VXR, see B) in the unlocked position. Either mechanism remains in the unlocked position.

Step 2

Grasp the handle of the port adapter and pull the port adapter from the router, about halfway out of its slot. If you are removing a blank port adapter, pull the blank port adapter completely out of the chassis slot.



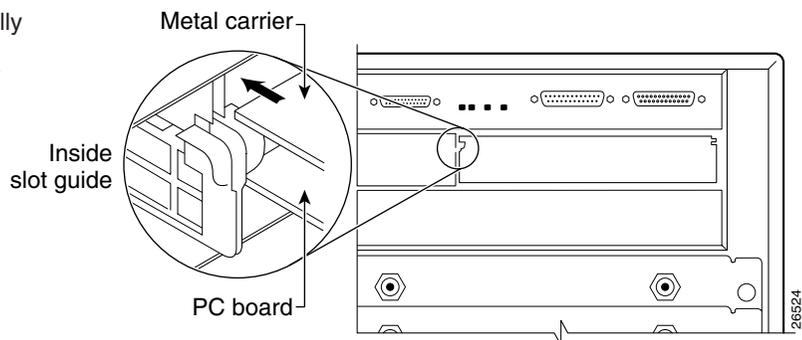
Step 3

With the port adapter halfway out of the slot, disconnect all cables from the port adapter. After disconnecting the cables, pull the port adapter from its chassis slot.

Cisco uBR7200 Series—Installing a Port Adapter

Step 1

To insert the port adapter, carefully align the port adapter carrier between the upper and the lower edges of the port adapter slot.



Step 2

Carefully slide the new port adapter halfway into the port adapter slot.

Step 3

With the port adapter halfway into the slot, connect all required cables to the port adapter. After connecting all required cables, carefully slide the port adapter all the way into the slot until the port adapter is seated in the router midplane.

Step 4

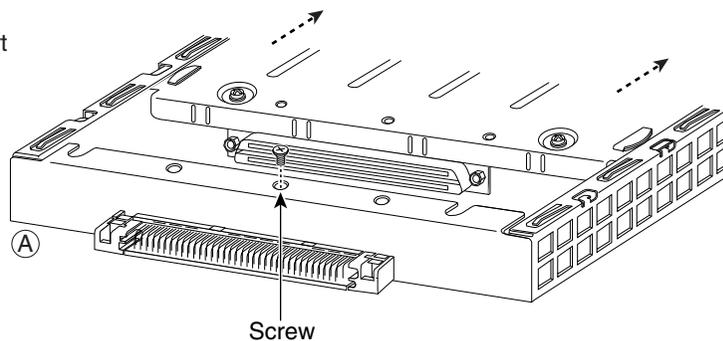
After the port adapter is properly seated, lock the port adapter lever or retention clip, depending on your system. (See illustration on preceding page.)

VIP2—Removing and Installing a Port Adapter

Note: You must first remove the VIP from the chassis before removing a port adapter from the VIP.

Step 1

To remove the port adapter, remove the screw that secures the port adapter (or blank port adapter). (See A.)

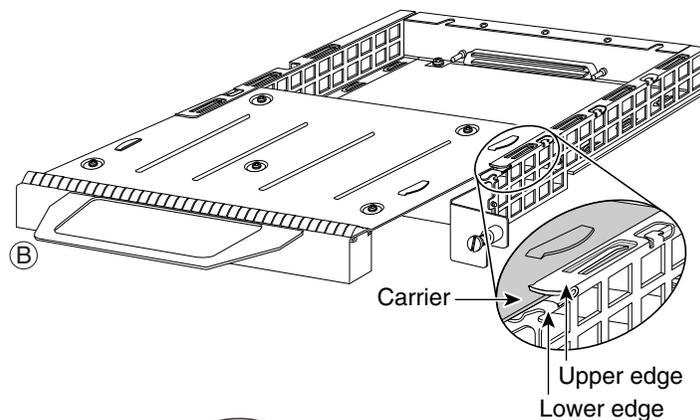


Step 2

With the screw removed, grasp the handle on the front of the port adapter (or blank port adapter) and carefully pull it out of its slot, away from the edge connector at the rear of the slot. (See A.)

Step 3

To insert the port adapter, carefully align the port adapter carrier between the upper and the lower edges of the port adapter slot. (See B.)

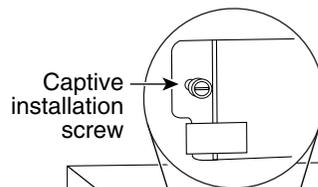


Step 4

Carefully slide the new port adapter into the port adapter slot until the connector on the port adapter is completely seated in the connector at the rear of the port adapter slot. (See B.)

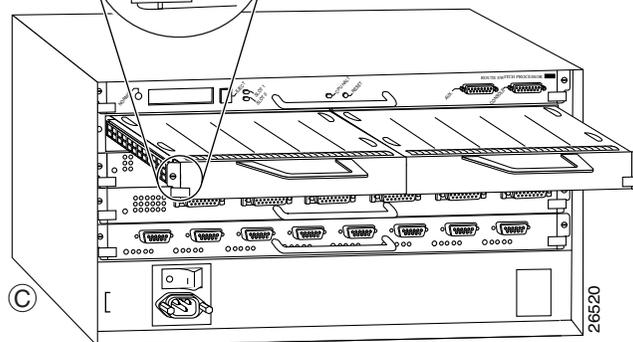
Step 5

Install the screw in the rear of the port adapter slot on the VIP. Do not overtighten the screw. (See A.)



Step 6

Carefully slide the VIP motherboard into the interface processor slot until the connectors at the rear of the VIP are completely seated in the connectors at the rear of the interface processor slot. Use the ejector levers to seat the VIP in the interface processor slot. Tighten the captive installation screws on the VIP. (See C.)



Connecting a PA-2FEISL RJ-45 or SC Cable

To continue your PA-2FEISL port adapter installation, you must install the port adapter's interface cables. The following instructions apply to all supported platforms.

RJ-45 and SC-type fiber optic cables are not available from Cisco; they are available from commercial cable vendors.

Use the following procedure to connect RJ-45 or SC cables:

- Step 1** If you have RJ-45 connections (PA-2FEISL-TX), attach the Category 5 unshielded twisted-pair (UTP) cable directly to an RJ-45 port on the PA-2FEISL-TX. See (Figure 3-2.) The PA-2FEISL is an end station device and not a repeater. You *must* connect the PA-2FEISL to a repeater, hub, or back-to-back to another 100-Mbps Fast Ethernet adapter.

If you have SC connections (PA-2FEISL-FX), attach the cable directly to an SC port on the PA-2FEISL-FX. See (Figure 3-3.) Use either one duplex SC connector or two simplex SC connectors, and observe the correct relationship between the receive (RX) and transmit (TX) ports on the PA-2FEISL-FX and your repeater.



Note Port adapters have a handle attached, but this handle is not shown to allow a full detailed view of each port adapter's faceplate.

Figure 3-2 Connecting a PA-2FEISL-TX RJ-45 Cable—Horizontal Orientation (Shown Without Handles)

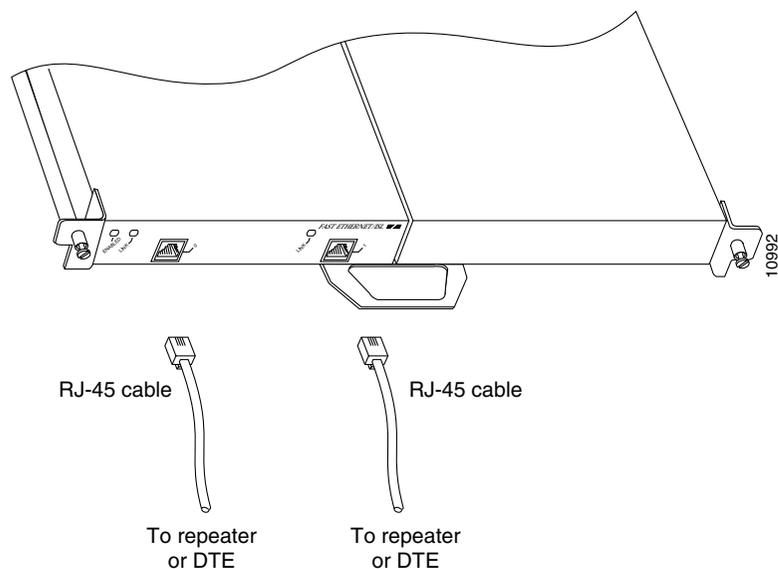
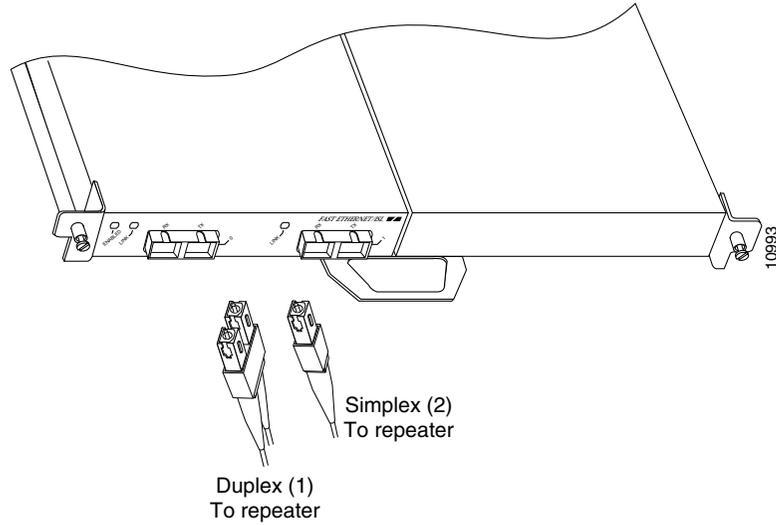


Figure 3-3 Connecting PA-2FEISL-FX SC Cables—Horizontal Orientation (Shown Without Handles)



Caution

Only connect cables that comply with EIA/TIA-568 standards.

Step 2

Attach the network end of your RJ-45 or SC-type cable to your 100BASE-T transceiver, switch, hub, repeater, DTE, or other external 100BASE-T equipment.

This completes the PA-2FEISL cable installation. Proceed to [Chapter 4, “Configuring the PA-2FEISL,”](#) to configure the PA-2FEISL and complete the installation.



Configuring the PA-2FEISL

To continue your PA-2FEISL port adapter installation, you must configure the PA-2FEISL interfaces. The instructions that follow apply to all supported platforms. Minor differences between the platforms—with Cisco IOS software commands—are noted.

This chapter contains the following sections:

- [Using the EXEC Command Interpreter, page 4-1](#)
- [Configuring the Interfaces, page 4-2](#)
- [Checking the Configuration, page 4-5](#)

Using the EXEC Command Interpreter

You modify the configuration of your router through the software command interpreter called the *EXEC* (also called enable mode). You must enter the privileged level of the EXEC command interpreter with the **enable** command before you can use the **configure** command to configure a new interface or change the existing configuration of an interface. The system prompts you for a password if one has been set.

The system prompt for the privileged level ends with a pound sign (#) instead of an angle bracket (>). At the console terminal, use the following procedure to enter the privileged level:

-
- Step 1** At the user-level EXEC prompt, enter the **enable** command. The EXEC prompts you for a privileged-level password as follows:

```
Router> enable
```

```
Password:
```

- Step 2** Enter the password (the password is case sensitive). For security purposes, the password is not displayed. When you enter the correct password, the system displays the privileged-level system prompt (#):

```
Router#
```

To configure the new interfaces, proceed to the [“Configuring the Interfaces” section on page 4-2](#).

Configuring the Interfaces

After you verify that the new PA-2FEISL is installed correctly (the enabled LED goes on), use the privileged-level **configure** command to configure the new interfaces. Have the following information available:

- Protocols you plan to route on each new interface
- IP addresses, if you plan to configure the interfaces for IP routing
- Bridging protocols you plan to use

If you installed a new PA-2FEISL or if you want to change the configuration of an existing interface, you must enter configuration mode to configure the new interfaces. If you replaced a PA-2FEISL that was previously configured, the system recognizes the new interfaces and brings each of them up in their existing configuration.

For a summary of the configuration options available and instructions for configuring interfaces on a PA-2FEISL, refer to the appropriate configuration publications listed in the [“Obtaining Documentation” section on page vii](#).

You execute configuration commands from the privileged level of the EXEC command interpreter, which usually requires password access. Contact your system administrator, if necessary, to obtain password access. (See the [“Using the EXEC Command Interpreter” section on page 4-1](#) for an explanation of the privileged level of the EXEC.)

You can configure each of the interfaces on a PA-FEISL at:

- 100 Mbps, half duplex; 200 MBps is the maximum aggregate of the 2 ports
Half duplex operation is the default.
- 200 Mbps, full duplex; 400 MBps is the maximum aggregate of the 2 ports

You can also configure one PA-2FEISL interface at 100 mbps, half duplex, and the second PA-2FEISL interface at 200 Mbps, full duplex; 300 Mbps is the maximum aggregate of the two ports.

This section contains the following subsections:

- [Performing a Basic Configuration, page 4-2](#)
- [Configuring FE Port Adapter Transmission Mode, page 4-4](#)

Performing a Basic Configuration

Following are instructions for a basic configuration: enabling an interface, and specifying IP routing. You might also need to enter other configuration subcommands, depending on the requirements for your system configuration and the protocols you plan to route on the interface. For complete descriptions of configuration subcommands and the configuration options available for fast Ethernet interfaces, refer to the appropriate software documentation.

In the following procedure, press the **Return** key after each step unless otherwise noted. At any time you can exit the privileged level and return to the user level by entering **disable** at the prompt as follows:

```
Router# disable
```

```
Router>
```

- Step 1** Enter configuration mode and specify that the console terminal is the source of the configuration subcommands, as follows:
- ```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
```
- Step 2** Specify the first interface to configure by entering the **interface fastethernet** subcommand, followed by the interface address of the interface you plan to configure. [Table 4-1](#) gives examples.

**Table 4-1** Examples of the interface fastethernet Subcommand

| Platform                                                             | Command                                                                                                                                                                                    | Example                                                                                                                                                           |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cisco 7100 series; Cisco 7200 series or Cisco uBR7200 series routers | interface, followed by <i>type</i> (fastethernet) and <i>slot/interface</i> (port adapter slot number/interface port number)                                                               | The example is for the first interface of the port adapter in slot 4<br>Router (config)# <b>interface fastethernet 4/0</b>                                        |
| VIP2                                                                 | <b>interface</b> , followed by <i>type</i> ( <b>fastethernet</b> ) and <i>slot/port-adapter/port</i> (interface processor slot number/port adapter slot number and interface port number). | The example is for the first interface of the first port adapter on a VIP2 in interface processor slot 1.<br>Router (config)# <b>interface fastethernet 1/0/0</b> |

- Step 3** Assign an IP address and subnet mask to the interface (if IP routing is enabled on the system) by using the **ip address** subcommand, as in the following example:
- ```
Router(config-if)# ip address 10.0.0.0 10.255.255.255
```
- Step 4** Add any additional configuration subcommands required to enable routing protocols and set the interface characteristics.
- Step 5** Reenable the interfaces using the **no shutdown** command. (See the “[Performing a Basic Configuration](#)” section on page 4-2.)
- Step 6** Configure all additional port adapter interfaces as required.
- Step 7** After including all of the configuration subcommands to complete your configuration, press **Ctrl-Z**—hold down the **Control** key while you press **Z**—or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter prompt.
- Step 8** Write the new configuration to NVRAM as follows:
- ```
Router# copy running-config startup-config
[OK]
Router#
```

This completes the procedure for creating a basic configuration.

## Configuring FE Port Adapter Transmission Mode

Depending on the requirements for your system configuration and the protocols you plan to route on the interface, you might also need to enter other configuration subcommands. For complete descriptions of configuration subcommands and the configuration options available for Fast Ethernet interfaces, refer to the publications listed in the [“Obtaining Documentation”](#) section on page vii.

**Note**

Following are descriptions and examples of the commands for configuring the PA-2FEISL interface 4/0 (slot 4, Fast Ethernet interface port 0). Descriptions are limited to fields that are relevant for establishing and verifying the configuration. After configuring a new PA-2FEISL interface, use **show** commands to display the status of the new interface or all interfaces, or to verify changes you have made.

Half-duplex operation is the default for the PA-2FEISL. To change to full-duplex operation, use the following series of commands:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)# interface fastethernet 4/0
Router(config-if)# full-duplex
Ctrl-z
```

Use the **show interfaces fastethernet** command to verify that the 4/0 Fast Ethernet interface is now configured for full-duplex operation as follows:

```
Router# show interfaces fastethernet 4/0
FastEthernet 4/0 is administratively up, line protocol is up
 (display text omitted)
Encapsulation ARPA, loopback not set, keepalive not set, fdx, 100BaseTX
 (display text omitted)
```

Use the **no full-duplex** configuration command to return the interface to half-duplex operation as follows:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface fastethernet 4/0
Router(config-if)# no full-duplex
Ctrl-z
Router#
```

Use the **show interfaces fastethernet** command to verify that the 4/0 Fast Ethernet interface is now configured for half-duplex operation as follows:

```
Router# show interfaces fastethernet 4/0
FastEthernet2/0 is administratively up, line protocol is up
 (display text omitted)
Encapsulation ARPA, loopback not set, keepalive not set, hdx, 100BaseTX
 (display text omitted)
```

This completes the procedure for creating a basic configuration. To check the interface configuration using **show** commands, proceed to the following section, [“Checking the Configuration.”](#)

# Checking the Configuration

After configuring the new interface, use the **show** commands to display the status of the new interface or all interfaces, and use the **ping** command to check connectivity. This section includes the following subsections:

- [Using show Commands to Verify the New Interface Status, page 4-5](#)
- [Using the ping Command to Verify Network Connectivity, page 4-13](#)

## Using show Commands to Verify the New Interface Status

Table 4-2 demonstrates how you can use the **show** commands to verify that new interfaces are configured and operating correctly and that the PA-2FEISL appears in them correctly. Sample displays of the output of selected **show** commands appear in the sections that follow. For complete command descriptions and examples, refer to the publications listed in the “[Obtaining Documentation](#)” section on page vii.



### Note

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

**Table 4-2** Using show Commands

| Command                                                                                                           | Function                                                                                                                                                                   | Example                                   |
|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>show version</b> or<br><b>show hardware</b>                                                                    | Displays system hardware configuration, the number of each interface type installed, Cisco IOS software version, names and sources of configuration files, and boot images | Router# <b>show version</b>               |
| <b>show controllers</b>                                                                                           | Displays all the current interface processors and their interfaces                                                                                                         | Router# <b>show controllers</b>           |
| <b>show diag slot</b><br><b>Note</b> The <i>slot</i> argument is not required with Catalyst 5000 family switches. | Displays types of port adapters installed in your system and information about a specific port adapter slot, interface processor slot, or chassis slot                     | Router# <b>show diag 2</b>                |
| <b>show interfaces type 0</b> or <b>1/ interface-port-number</b>                                                  | Displays status information about a specific type of interface (for example, serial) on a Catalyst RSM/VIP2                                                                | Router# <b>show interfaces serial 1/0</b> |
| <b>show interfaces type 3/interface-port-number</b>                                                               | Displays status information about a specific type of interface (for example, serial) in a Cisco 7120 series router                                                         | Router# <b>show interfaces serial 3/1</b> |

Table 4-2 Using show Commands (continued)

| Command                                                                                                           | Function                                                                                                                                          | Example                                     |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>show interfaces</b> <i>type 4/interface-port-number</i>                                                        | Displays status information about a specific type of interface (for example, serial) in a Cisco 7140 series router                                | Router# <b>show interfaces serial 4/1</b>   |
| <b>show interfaces</b> <i>type 1/interface-port-number</i>                                                        | Displays status information about a specific type of interface (for example, serial) in a Cisco uBR7223 router                                    | Router# <b>show interfaces serial 1/1</b>   |
| <b>show interfaces</b> <i>type 1 or 2/interface-port-number</i>                                                   | Displays status information about a specific type of interface (for example, serial) in a Cisco uBR7246 router                                    | Router# <b>show interfaces serial 2/0</b>   |
| <b>show interfaces</b> <i>type interface-processor-slot-number/port-adapter-slot-number/interface-port-number</i> | Displays status information about a specific type of interface (for example, serial) on a VIP2 in a Cisco 7000 series or Cisco 7500 series router | Router# <b>show interfaces serial 3/1/0</b> |
| <b>show protocols</b>                                                                                             | Displays protocols configured for the entire system and for specific interfaces                                                                   | Router# <b>show protocols</b>               |
| <b>show running-config</b>                                                                                        | Displays the running configuration file                                                                                                           | Router# <b>show running-config</b>          |
| <b>show startup-config</b>                                                                                        | Displays the configuration stored in NVRAM                                                                                                        | Router# <b>show startup-config</b>          |

If an interface is shut down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, ensure that the interface is properly connected and terminated. If you still have problems bringing up the interface, contact a service representative for assistance. This section includes the following subsections:

- [Using the show version or show hardware Commands, page 4-6](#)
- [Using the show diag Command, page 4-9](#)
- [Using the show interfaces Command, page 4-10](#)

Choose the subsection appropriate for your system. Proceed to the [“Using the ping Command to Verify Network Connectivity”](#) section on page 4-13 when you have finished using the **show** commands.

## Using the show version or show hardware Commands

Display the configuration of the system hardware, the number of each interface type installed, the Cisco IOS software version, the names and sources of configuration files, and the boot images, using the **show version** (or **show hardware**) command.

**Note**

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

## Cisco 7100 Series Routers

Use the **show version** (or **show hardware**) command to display the configuration of the system hardware (the number of each port adapter type installed), the software version, the names and sources of configuration files, and the boot images. The following is an example of the **show version** command from a Cisco 7120 series router with the PA-2FEISL:

```
Router #show version
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-JS-M), Version 12.0(5)T
Copyright (c) 1986-1999 by cisco Systems, Inc.
Compiled Wed 30-Jun-99 13:56 by userid
Image text-base:0x60008900, data-base:0x6136A000

ROM:System Bootstrap, Version 11.1(13)CA, RELEASE SOFTWARE (f)

Router uptime is 27 minutes
System restarted by reload
System image file is "slot0:c7200-js-m.960421", booted via slot0

cisco 7206 (NPE200) processor with 57344K/8192K bytes of memory.
R5000 CPU at 200Mhz, Implementation 35, Rev 2.1, 512KB L2 Cache
6 slot midplane, Version 1.3

Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
4 Ethernet/IEEE 802.3 interface(s)
2 FastEthernet/IEEE 802.3 interface(s)
4 Token Ring/IEEE 802.5 interface(s)
125K bytes of non-volatile configuration memory.
4096K bytes of packet SRAM memory.

4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2100
```

## Cisco 7200 Series and Cisco uBR7200 Series Routers

Use the **show version** (or **show hardware**) command to display the configuration of the system hardware (the number of each port adapter type installed), the software version, the names and sources of configuration files, and the boot images. The following is an example of the **show version** command from a Cisco 7200 series router with the PA-2FEISL:

```
Router #show version
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-JS-M), Version 12.0(5)T
Copyright (c) 1986-1999 by cisco Systems, Inc.
Compiled Wed 30-Jun-99 13:56 by userid
Image text-base:0x60008900, data-base:0x6136A000

ROM:System Bootstrap, Version 11.1(13)CA, RELEASE SOFTWARE (f)

Router uptime is 27 minutes
System restarted by reload
```

```

System image file is "slot0:c7200-js-m.960421", booted via slot0

cisco 7206 (NPE200) processor with 57344K/8192K bytes of memory.
R5000 CPU at 200Mhz, Implementation 35, Rev 2.1, 512KB L2 Cache
6 slot midplane, Version 1.3

Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
4 Ethernet/IEEE 802.3 interface(s)
2 FastEthernet/IEEE 802.3 interface(s)
4 Token Ring/IEEE 802.5 interface(s)
125K bytes of non-volatile configuration memory.
4096K bytes of packet SRAM memory.

4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2100

```

## VIP2 in Cisco 7000 Series and Cisco 7500 Series Routers

Use the **show version** (or **show hardware**) command to display the configuration of the system hardware (the number of each interface processor type installed), the software version, the names and sources of configuration files, and the boot images. The following is an example of the **show version** command from a Cisco 7500 series router with the PA-2FEISL:

```

Router# show version

Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-A), Version 11.1(6)CA [mpo 105]
Copyright (c) 1986-1995 by cisco Systems, Inc.
Compiled Fri 06-Oct-95 12:22 by mpo
Image text-base: 0x600088A0, data-base: 0x605A4000
ROM: System Bootstrap, Version 5.3(16645) [biff 571], RELEASED SOFTWARE
ROM: GS Bootstrap Software (RSP-BOOT-M), Version 11.0(1.2), MAINTENANCE
honda uptime is 4 hours, 22 minutes
System restarted by reload
System image file is "slot0:rsp-a111-1", booted via slot0

cisco RSP2 (R4600) processor with 32768K bytes of memory.
R4600 processor, Implementation 32, Revision 2.0
Last reset from power-on
G.703/E1 software, Version 1.0.
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
Chassis Interface.
1 VIP2 controllers (1 FastEthernet).
1 FastEthernet/IEEE 802.3 interfaces.
125K bytes of non-volatile configuration memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
No slave installed in slot 6.
Configuration register is 0x2

```

## Using the show diag Command

Display the types of port adapters installed in your system (and specific information about each) using the **show diag slot** command, where *slot* is the *port adapter slot* in a Cisco 7100 series, Cisco 7200 series, and Cisco uBR7200 series router and the *interface processor slot* in a Cisco 7000 series or Cisco 7500 series router with a VIP2.



### Note

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

### Cisco 7100 Series Routers

Use the **show diag slot** command to determine which type of port adapter is installed in your system. Specific port adapter information is displayed, as shown in the following example of a PA-2FEISL-FX in port adapter slot 2:

```
Router# show diag 2

Fastethernet (TX-ISL) port adapter, 2 ports
Port adapter is analyzed
Port adapter insertion time 00:02:27 ago
Hardware revision 1.0 Board revision A0
Serial number 8500290 Part number 73-2618-01
Test history 0x0 RMA number 00-00-00
EEPROM format version 1
EEPROM contents (hex):
0x20: 01 6C 01 00 00 81 B4 42 49 0A 3A 01 00 00 00 00
0x30: 50 00 00 00 98 04 00 00 00 00 FF FF FF FF FF 00
```



### Note

For complete command descriptions and examples for the Cisco 7100 series, Cisco 7200 series, and Cisco uBR7200 series routers, refer to the publications listed in the [“Obtaining Documentation”](#) section on page vii.



### Note

To use the **show diag** command with the Cisco 7140 series router, replace the slot argument **3** with **4**.

### Cisco 7200 Series and Cisco uBR7200 Series Routers

Use the **show diag slot** command to determine which type of port adapter is installed in your system. Specific port adapter information is displayed, as shown in the following example of a PA-2FEISL-FX in port adapter slot 2:

```
Router# show diag 2

Fastethernet (TX-ISL) port adapter, 2 ports
Port adapter is analyzed
Port adapter insertion time 00:02:27 ago
Hardware revision 1.0 Board revision A0
Serial number 8500290 Part number 73-2618-01
Test history 0x0 RMA number 00-00-00
EEPROM format version 1
EEPROM contents (hex):
0x20: 01 6C 01 00 00 81 B4 42 49 0A 3A 01 00 00 00 00
0x30: 50 00 00 00 98 04 00 00 00 00 FF FF FF FF FF 00
```

**Note**

For complete command descriptions and examples for the Cisco 7100 series, Cisco 7200 series, and Cisco uBR7200 series routers, refer to the publications listed in the [“Obtaining Documentation” section on page vii](#).

## VIP2 in Cisco 7000 Series and Cisco 7500 Series Routers

Use the **show diag slot** command to determine which type of port adapter is installed on a VIP2 in your system. Specific port adapter information is displayed, as shown in the following example of a PA-2FEISL-FX in interface processor slot 3:

```
Router# show diag 3
Slot 3:
Physical slot 3, ~physical slot 0xC, logical slot 3, CBus 0
Microcode Status 0xC
Master Enable, LED, WCS Loaded
Board is analyzed
Pending I/O Status: Console I/O
EEPROM format version 1
VIP2 controller, HW rev 2.04, board revision D0
Serial number: 08224085 Part number: 73-1684-03
Test history: 0x00 RMA number: 00-00-00
Flags: cisco 7000 board; 7500 compatible

EEPROM contents (hex):
0x20: 01 15 02 04 00 7D 7D 55 49 06 94 03 00 00 00 00
0x30: 68 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Slot database information:
Flags: 0x4 Insertion time: 0x1068 (4d22h ago)

Controller Memory Size: 8 MBytes DRAM, 1024 KBytes SRAM

PA Bay 0 Information:
Fast-Ethernet PA, 2 ports, 100BaseFX-ISL
EEPROM format version 1
HW rev 1.00, Board revision A0
Serial number: 00000005 Part number: 73-2619-01

PA Bay 1 Information:
Fast-Ethernet PA, 2 ports, 100BaseTX-ISL
EEPROM format version 1
HW rev 1.00, Board revision A0
Serial number: 00000027 Part number: 73-2618-01
```

**Note**

For complete command descriptions and examples for the VIP2, refer to the publications listed in the [“Obtaining Documentation” section on page vii](#).

## Using the show interfaces Command

The **show interfaces** command displays status information (including the physical slot and interface address) for the interfaces you specify. All of the examples that follow specify serial interfaces.

For complete descriptions of interface subcommands and the configuration options available for **Cisco 7100 series, Cisco 7200, Cisco uBR7200 series, and VIP2** interfaces, refer to the publications listed in the [“Obtaining Documentation” section on page vii](#).

**Note**

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

**Cisco 7100 Series Routers**

With the **show interfaces type slot/port** command, use arguments such as the interface type (for example, fastethernet) and the port number (slot/port) to display information about a specific interface only. The following example of the **show interfaces fastethernet** command shows information specific to a Fast Ethernet interface on a PA-2FEISL in slot 4:

```
Router# show interfaces fastethernet 4/0
FastEthernet4/0 is administratively down, line protocol is down
 Hardware is DEC21140, address is 1.1.1.11 (bia 0000)
Internet address is 10.0.0.0
 MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec, rely 255/255, load 1/255
 Encapsulation ARPA, loopback not set, keepalive not set, fdx, 100BaseTX
 ARP type: ARPA, ARP Timeout 4:00:00
 Last input 3:08:43, output 3:08:42, output hang never
 Last clearing of "show interfaces" counters 2:58:36
 Output queue 0/40, 0 drops; input queue 0/75, 0 drops
 5 minute input rate 0 bits/sec, 0 packets/sec
 5 minute output rate 0 bits/sec, 0 packets/sec
 0 packets input, 0 bytes, 0 no buffer
 Received 0 broadcasts, 0 runts, 0 giants
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
 0 watchdog, 0 multicast
 0 input packets with dribble condition detected
 0 packets output, 0 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets, 0 restarts
 0 babbles, 0 late collision, 0 deferred
 0 lost carrier, 0 no carrier
 0 output buffer failures, 0 output buffers swapped out
```

**Note**

For the Cisco 7206VXR and the Cisco 7206 router shelves, the **show interfaces** command requires a shelf number in the format **show interfaces type shelf number/port adapter slot/interface**.

The Fast Ethernet interface port adapter is numbered as port adapter 4. The Fast Ethernet ports on the PA-2FEISL are interfaces 0 and 1.

**Cisco 7200 Series and Cisco uBR7200 Series Routers**

With the **show interfaces type slot/port** command, use arguments such as the interface type (for example, fastethernet) and the port number (slot/port) to display information about a specific interface only. The following example of the **show interfaces fastethernet** command shows information specific to a Fast Ethernet interface on a PA-2FEISL in slot 4:

```
Router# show interfaces fastethernet 4/0
FastEthernet4/0 is administratively down, line protocol is down
 Hardware is DEC21140, address is 1.1.1.11 (bia 0000)
Internet address is 10.0.0.0
 MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec, rely 255/255, load 1/255
 Encapsulation ARPA, loopback not set, keepalive not set, fdx, 100BaseTX
 ARP type: ARPA, ARP Timeout 4:00:00
 Last input 3:08:43, output 3:08:42, output hang never
 Last clearing of "show interfaces" counters 2:58:36
 Output queue 0/40, 0 drops; input queue 0/75, 0 drops
 5 minute input rate 0 bits/sec, 0 packets/sec
```

```

5 minute output rate 0 bits/sec, 0 packets/sec
 0 packets input, 0 bytes, 0 no buffer
 Received 0 broadcasts, 0 runts, 0 giants
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
 0 watchdog, 0 multicast
 0 input packets with dribble condition detected
 0 packets output, 0 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets, 0 restarts
 0 babbles, 0 late collision, 0 deferred
 0 lost carrier, 0 no carrier
 0 output buffer failures, 0 output buffers swapped out

```

**Note**


---

For the Cisco 7206VXR and the Cisco 7206 router shelves, the **show interfaces** command requires a shelf number in the format **show interfaces type shelf number/port adapter slot/interface**.

---

The Fast Ethernet interface port adapter is numbered as port adapter 4. The Fast Ethernet ports on the PA-2FEISL are interfaces 0 and 1.

### VIP2 in Cisco 7000 Series or Cisco 7500 Series Routers

Use the **show interfaces type slot/port-adapter/port** command, with arguments such as the interface type (for example, fastethernet) and the port number (slot/port), to display information about a specific interface. The following example of the **show interfaces fastethernet** command shows information specific to a Fast Ethernet interface on the PA-2FEISL in slot 3:

```

Router# show interfaces fastethernet 3/0/0
FastEthernet3/0/0 is up, line protocol is up
 Hardware is cyBus FastEthernet Interface, address is 0010.5493.9860 (bia 0010)
 MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec, rely 255/255, load 1/255
 Encapsulation ARPA, loopback not set, keepalive set (10 sec)
 Half-duplex, 100Mb/s, 100BaseTX/FX
 ARP type: ARPA, ARP Timeout 04:00:00
 Last input never, output 00:00:07, output hang never
 Last clearing of "show interface" counters never
 Queueing strategy: fifo
 Output queue 0/40, 0 drops; input queue 0/75, 0 drops
 5 minute input rate 0 bits/sec, 0 packets/sec
 5 minute output rate 0 bits/sec, 0 packets/sec
 0 packets input, 0 bytes, 0 no buffer
 Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 15654 ignored, 0 abort
 0 watchdog, 0 multicast
 0 input packets with dribble condition detected
 27784 packets output, 2742738 bytes, 0 underruns
 50 output errors, 0 collisions, 3 interface resets
 0 babbles, 50 late collision, 119 deferred
 0 lost carrier, 0 no carrier
 0 output buffer failures, 0 output buffers swapped out

```

## Using the ping Command to Verify Network Connectivity

Using the **ping** command, you can verify that an interface port is functioning properly. This section provides a brief description of this command. Refer to the publications listed in the [“Obtaining Documentation” section on page vii](#) for detailed command descriptions and examples.

The **ping** command sends echo request packets out to a remote device at an IP address that you specify. After sending an echo request, the system waits a specified time for the remote device to reply. Each echo reply is displayed as an exclamation point (!) on the console terminal; each request that is not returned before the specified timeout is displayed as a period (.). A series of exclamation points (!!!!!) indicates a good connection; a series of periods (.....) or the messages [timed out] or [failed] indicate a bad connection.

Following is an example of a successful **ping** command to a remote server with the address 10.0.0.10:

```
Router# ping 10.0.0.10 <Return>
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 10.0.0.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/15/64 ms
Router#
```

If the connection fails, verify that you have the correct IP address for the destination and that the device is active (powered on), and repeat the **ping** command.

