CISCO SYSTEMS

PA-12E/2FE Port Adapter Installation and Configuration

Product Number: PA-12E/2FE(=)
Platforms Supported: Cisco 7200 Series, Cisco uBR7246

CONTENTS

Preface

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

Objectives

This document describes how to install and configure the 14-port Ethernet (twelve 10Base-T and two 10/100Base-TX) switch port adapter (PA-12E/2FE) hereafter referred to as the PA-12E/2FE, which is used in the following platforms:

- 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 uBR7246 universal broadband router

Organization

This document contains the following chapters:

Section	Title	Description
Chapter 1	Overview	Describes the PA-12E/2FE 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.

Section	Title	Description
Chapter 3	Removing and Installing Port Adapters	Describes the procedures for installing and removing PA-12E/2FE port adapters and connecting port adapter cables in the supported platforms.
Chapter 4	Configuring the PA-12E/2FE	Provides instructions for configuring the PA-12E/2FE 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.

    Note You can access Cisco IOS software configuration and hardware installation and maintenance documentation on the World Wide Web at http://www.cisco.com, http://www-china.cisco.com, or http://www-europe.cisco.com.

- Cisco AS5800 Universal Access Server:

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

    – Cisco AS5800 Universal Access Server Hardware Installation and Configuration Guide

    – Cisco AS5800 Universal Access Server Software Installation and 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 installation and configuration guide that shipped with your Cisco 7200 series router.

- Cisco 7200 VXR routers:

    For hardware installation and maintenance information, refer to the *Cisco 7200 VXR Installation and Configuration Guide* that shipped with your Cisco 7200 VXR router.

- Cisco uBR7200 series routers:

    For hardware installation and maintenance information, refer to the installation and configuration guide that shipped with your Cisco uBR7200 series router.

- For international agency compliance, safety, and statutory information for WAN interfaces, refer to the following publications:

    – Site Preparation Guide

    – Regulatory Compliance and Safety Information for the Cisco 7200 Series Routers

- Regulatory Compliance and Safety Information for the Cisco uBR7200 Series Universal Broadband Routers

- To view Cisco documentation or obtain general information about the documentation, refer to the following sources:

  - "Obtaining Documentation" section on page vii.

  - "Obtaining Technical Assistance" section on page viii.

  - Customer service at 800 553-6387 or 408 526-7208. Customer service hours are 5:00 a.m. to 6:00 p.m. Pacific time, Monday through Friday (excluding Cisco-observed holidays). You can also send e-mail to cs-rep@cisco.com.

  - *Cisco Information Packet* that shipped with your router or switch.

Obtaining Documentation

These sections explain how to obtain documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at this URL:

http://www.cisco.com

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

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which is shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription.

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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 Networking Products MarketPlace:

  http://www.cisco.com/cgi-bin/order/order_root.pl

- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:

  http://www.cisco.com/go/subscription

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

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Cisco Systems
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170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain online documentation, troubleshooting tips, and sample configurations from online tools by using the Cisco Technical Assistance Center (TAC) Web Site. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC Web Site.

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Technical Assistance Center

The Cisco Technical Assistance Center (TAC) is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

Cisco TAC inquiries are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.

- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.

- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.

- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

The Cisco TAC resource that you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

Cisco TAC Web Site

You can use the Cisco TAC Web Site to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC Web Site, go to this URL:

http://www.cisco.com/tac

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC Web Site. The Cisco TAC Web Site requires a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

http://www.cisco.com/register/

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC Web Site, you can open a case online by using the TAC Case Open tool at this URL:

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

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC Web Site.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

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

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

C H A P T E R 1

Overview

This chapter describes the PA-12E/2FE port adapter and contains the following sections:

- Port Adapter Overview, page 1-1
- Ethernet 10Base-T and Fast Ethernet 100Base-TX Overview, page 1-2
- IEEE 802.3 10Base-T and IEEE 802.3u 100Base-TX Specifications, page 1-2
- LEDs, page 1-3
- Cables, Connectors, and Pinouts, page 1-4
- Port Adapter Slot Locations on the Supported Platforms, page 1-7
- Identifying Interface Addresses, page 1-8

Port Adapter Overview

The PA-12E/2FE, shown in Figure 1-1, provides up to twelve 10-Mbps and two 10/100-Mbps switched Ethernet (10Base-T) and Fast Ethernet (100BaseTX) interfaces for the chassis. The PA-12E/2FE network interfaces provide a direct connection between the high-speed bus in the router and external networks. Each PA-12E/2FE provides an aggregate bandwidth of 435 Mbps, full-duplex.

Figure 1-1   PA-12E/2FE Faceplate View
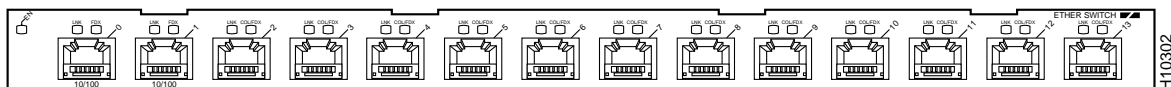
The PA-12E/2FE is a dual-width port adapter, which means it occupies two horizontally aligned port adapter slots when installed in a Cisco 7200 series router or Cisco uBR7246. (Single-width port adapters occupy individual port adapter slots.)

The PA-12E/2FE has two handles, but the handles are not shown in Figure 1-1 to allow a full view of the port adapter faceplate.

✎
Note   Cisco 7200 series and Cisco uBR7200 series routers support online insertion and removal (OIR) of all port adapter types.

The PA-12E/2FE port adapter off-loads Layer 2 switching from the host CPU by using store-and-forward or cut-through packet switching technology between interfaces within the same virtual LAN (VLAN) on the PA-12E/2FE. The PA-12E/2FE supports up to four VLANs (referred to in this document as *bridge groups*).

When using store-and-forward packet switching technology, the PA-12E/2FE receives and processes a packet completely (calculates the cyclic redundancy check [CRC] and checks the packet destination address) before forwarding the packet through the outgoing interface; packets are temporarily stored until the outgoing interface is available. Store-and-forward packet switching is the default for the PA-12E/2FE.

When using cut-through packet switching technology, the PA-12E/2FE reads, processes, and forwards a packet as soon as the packet destination address is looked up and the outgoing interface is determined. While cut-through packet switching technology greatly reduces the amount of time a packet spends in the PA-12E/2FE—the leading edge of the packet exits the output interface before the packet finishes entering the input interface—it enables the PA-12E/2FE to forward packets before calculating the CRC.

All 12E/2FE interfaces (port 0 through port 13) support autosensing and autonegotiation of the proper transmission mode (half-duplex or full-duplex) with an attached device. The first two 12E/2FE interfaces (port 0 and port 1) also support autosensing and autonegotiation of the proper connection speed (10-Mbps or 100-Mbps) with an attached device.

Each 12E/2FE interface connector is an RJ-45 receptacle that supports standard straight-through and crossover Category 3 or Category 5 UTP cables. Cisco Systems does not supply Category 3 and Category 5 UTP cables; these cables are available commercially.

Ethernet 10Base-T and Fast Ethernet 100Base-TX Overview

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

Ethernet, IEEE 802.3, 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.

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, the station waits until the network is not in use, and then transmits. A collision occurs when two stations listen for network traffic, hear none, and transmit simultaneously. When this happens, both transmissions are damaged, and the stations must retransmit. The stations detect the collision and use backoff algorithms to determine when to retransmit.

The 12E/2FE port adapter supports the Ethernet, IEEE 802.3, and IEEE 802.3u specifications for 10-Mbps and 100-Mbps transmission over UTP cables.

IEEE 802.3 10Base-T and IEEE 802.3u 100Base-TX Specifications

Table 1-1 lists the cabling specifications for 10-Mbps transmission over UTP cables.

Table 1-1   Cable Specifications for 10-Mbps 10Base-T

Parameter	RJ-45 Connector
Cable specification	Category 5 UTP[1], 22 to 24 AWG[2]
Maximum segment length	328 ft (100 m)
Maximum network length	656 ft[3] (200 m) (with 1 repeater)

1. Cisco Systems does not supply Category 5 UTP cables; these cables are available commercially.

2. AWG = American Wire Gauge. This gauge is specified by the EIA/TIA-568 standard.

3. This length is specifically between any two stations on a repeated segment.

Table 1-2 lists the cabling specifications for 100-Mbps Fast Ethernet transmission over UTP cables.

Table 1-2   Cable Specifications for 100-Mbps 100Base-TX

Parameter	RJ-45 Connector
Cable specification	Category 5[1] UTP[2], 22 to 24 AWG[3]
Maximum segment length	100 m (328 ft)
Maximum network length	200 m (656 ft)[4] (with 1 repeater)

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

2. Cisco Systems does not supply Category 5 UTP; these cables are available commercially.

3. AWG = American Wire Gauge. This gauge is specified by the EIA/TIA-568 standard.

4. This length is specifically between any two stations on a repeated segment.

Use Category 3 unshielded twisted-pair (UTP) crossover cables when connecting 10-Mbps 12E/2FE interfaces (port 2 through port 13) to a hub. Use Category 3 UTP straight-through cables when connecting 10-Mbps 12E/2FE interfaces to an end station.

Use Category 5 UTP crossover cables when connecting 10/100-Mbps 12E/2FE interfaces (port 0 and port 1) to a hub. Use Category 5 UTP straight-through cables when connecting 10/100-Mbps 12E/2FE interfaces to an end station.

12E/2FE interfaces do not support VLAN trunking.

LEDs

The PA-12E/2FE has two status LEDs for each port and one enabled LED. (See Figure 1-2.) The green- and amber-colored LED for each port indicates port status.

Figure 1-2   LEDs on the PA-12E/2FE—Horizontal Orientation
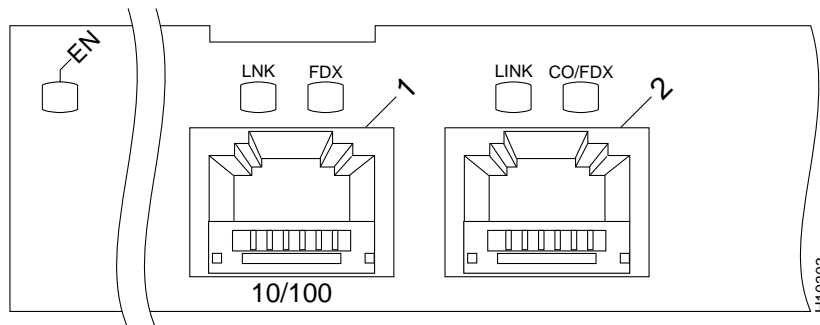
After system initialization, the enabled LED goes on to indicate that the port adapter has been enabled for operation.

The following conditions must be met before the PA-12E/2FE is enabled:

•   The PA-12E/2FE 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-12E/2FE.

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 1-3 lists port LED status indications.

Table 1-3   PA-12E/2FE LEDs

LED Label	Color	State	Meaning
ENABLED	Green	On	Port adapter is enabled for operation.
LNK	Green	On	The port is receiving a carrier signal from the network.
FDX[1]	Green	On	The port is configured for full-duplex operation.
		Off	The port is configured for half-duplex operation.
CO/FDX[2]	Green	On	The port is configured for full-duplex operation.
		Off	The port is configured for half-duplex operation.
		Flashing	The port detects a transmission collision on the network.

1.   The FDX LED is present on port 0 and port 1.

2.   The CO/FDX LED is present on port 2 through port 13.

Cables, Connectors, and Pinouts

The interface connectors on the PA-12E/2FE are 14 individual RJ-45 receptacles. You can use all 14 receptacles simultaneously. The first two receptacles support IEEE 802.3, Ethernet, and IEEE 802.3u interfaces compliant with 10Base-T and 100Base-TX specifications. The remaining 12 receptacles support IEEE 802.3 and Ethernet interfaces compliant with 10Base-T specifications.

Note   Use Category 3 unshielded twisted-pair (UTP) crossover cables when connecting 10-Mbps 12E/2FE interfaces (port 2 through port 13) to a hub. Use Category 3 UTP straight-through cables when connecting 10-Mbps 12E/2FE interfaces to an end station.

Use Category 5 UTP crossover cables when connecting 10/100-Mbps 12E/2FE interfaces (port 0 and port 1) to a hub. Use Category 5 UTP straight-through cables when connecting 10/100-Mbps 12E/2FE interfaces to an end station.

12E/2FE interfaces do not support VLAN trunking.

Figure 1-3 shows an RJ-45 connector. Table 1-4 lists the pinouts and signals for the RJ-45 connectors.

Figure 1-3   PA-12E/2FE RJ-45 Connection, Plug and Receptacle

87654321

RJ-45 connector

H2936
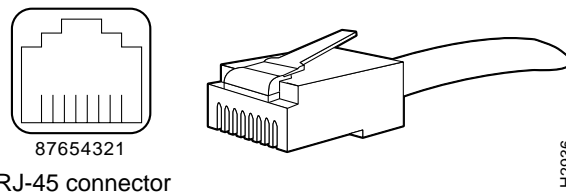
Warning   **To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.**

Table 1-4   PA-12E/2FE RJ-45 Connector Pinouts

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

Note   Proper common-mode line terminations should be used for the unused Category 3 and Category 5, UTP cable pairs 4/5 and 7/8. Common-mode termination reduces electromagnetic interference (EMI).

Depending on your 12E/2FE RJ-45 interface cabling requirements, use the pinouts shown in Figure 1-4 and Figure 1-5 for straight-through and crossover twisted-pair cable connections.

Figure 1-4   Straight-Through Cable Pinout, 12E/2FE RJ-45 Connection to an End Station

Ethernet port   End station

3 TxD+ ——————— 3 RxD+
6 TxD– ——————— 6 RxD–

1 RxD+ ——————— 1 TxD+   H10416
2 RxD– ——————— 2 TxD–
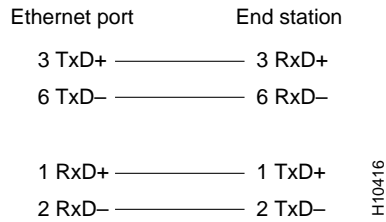
Figure 1-5   Crossover Cable Pinout, 12E/2FE RJ-45 Connections To a Hub

Ethernet port   Hub

3 TxD+   3 TxD+
6 TxD–   6 TxD–

1 RxD+   1 RxD+   H10417
2 RxD–   2 RxD–
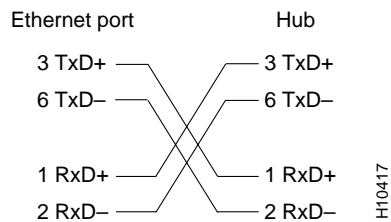
To identify the RJ-45 cable type, hold the two ends of the cable next to each other so you can see the colored wires inside the ends, as shown in Figure 1-6.

Figure 1-6   RJ-45 Cable Identification
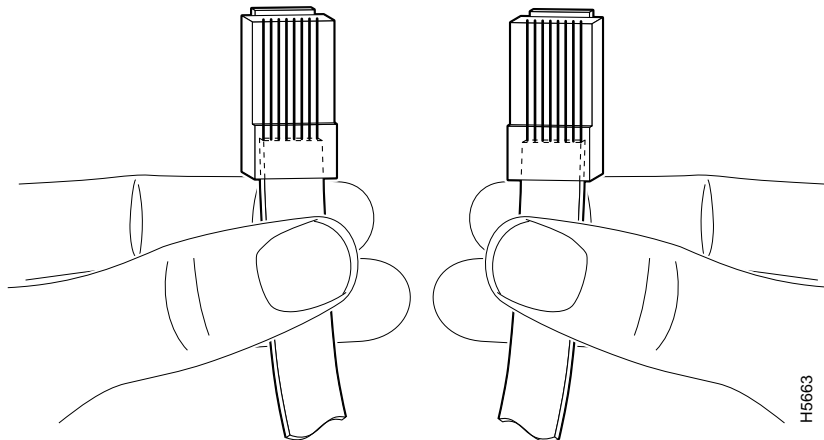
Examine the sequence of colored wires to determine the type of RJ-45 cable as follows:

•   Straight-through—The colored wires are in the same sequence at both ends of the cable.

•   Crossover—The first (far left) colored wire at one end of the cable is the third colored wire at the other end of the cable, and the second colored wire at one end of the cable is the sixth colored wire at the other end of the cable.

To connect Category 5 UTP crossover or straight-through cables with RJ-45 connectors, connect 10/100-Mbps 12E/2FE interfaces (port 0 and port 1) to a hub using crossover cables or to an end station using straight-through cables.

Note   Category 3 and Category 5 UTP cables are not available from Cisco Systems; they are available from commercial cable vendors.

Port Adapter Slot Locations on the Supported Platforms

This section discusses port adapter slot locations on the supported platforms. The illustrations that follow summarize slot location conventions on each platform.

Cisco 7200 Series and Cisco uBR7200 Series Routers Slot Numbering

Figure 1-7 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-12E/2FE can be installed in any two available port adapter slots.)

Figure 1-7   Port Adapter Slots in the Cisco 7206
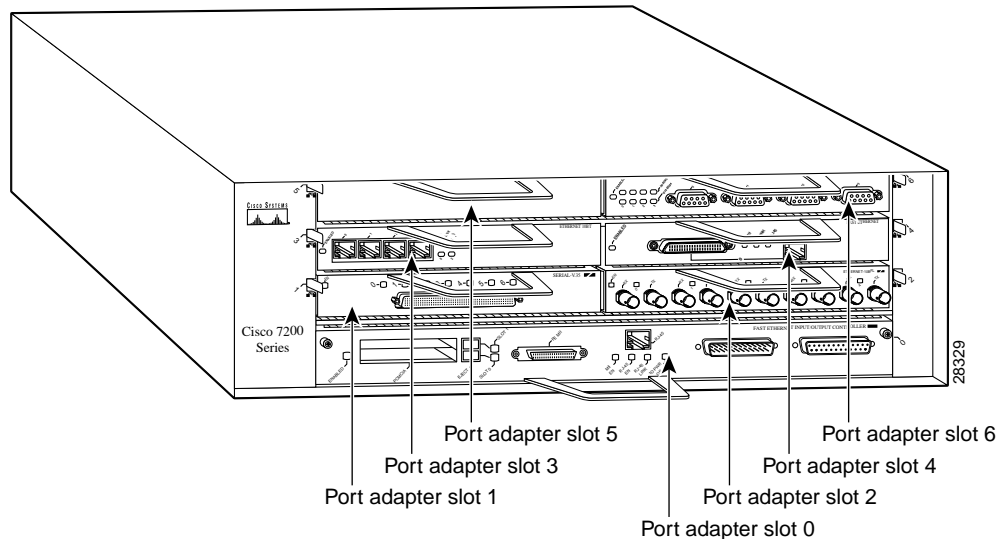
Figure Figure 1-8 shows the slot numbering of port adapters in a Cisco uBR7246 series router. The port adapter slots are numbered slot 1 and slot 2 for the cisco uBR7246. (Slot 0 is always reserved for the Fast Ethernet port on the I/O controller–if present.)

Figure 1-8   Port Adapter Slots in the Cisco uBR7246
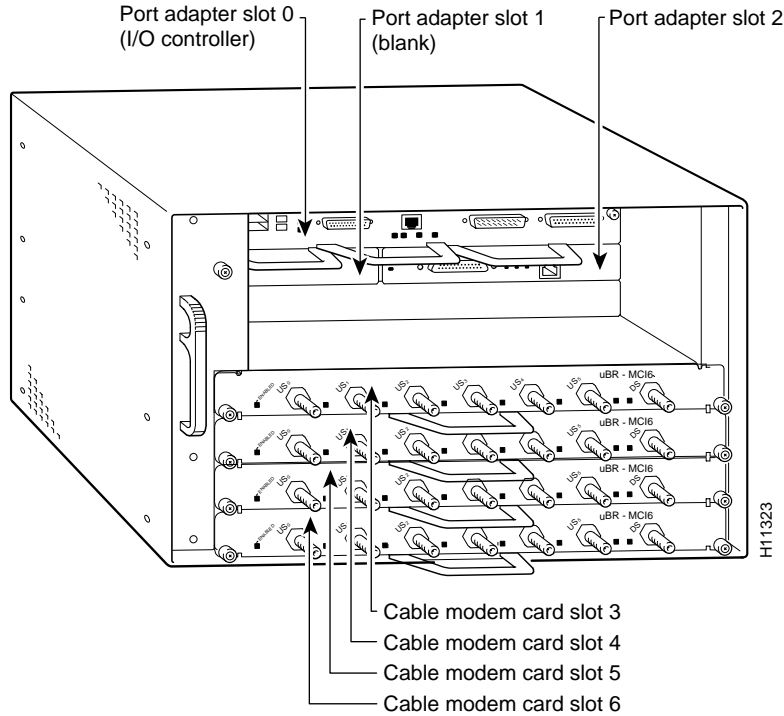
Identifying Interface Addresses

This section describes how to identify interface addresses for the PA-12E/2FE in supported platforms. Interface addresses specify the actual physical location of each interface on a router or switch.

Interfaces on the PA-12E/2FE 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.

Note   For dual-wide port adapters, such as the 12E/2FE, the port adapter slot number in the physical port addresses is the left port adapter slot (slot 1 in a Cisco uBR7246, slot 1 or slot 3 in a Cisco 7204, and slot 1, slot 3 or slot 5 in a Cisco 7206).

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

Table 1-5 explains how to identify interface addresses.

Table 1-5   Identifying Interface Addresses

Platform	Interface Address Format	Numbers	Syntax
Cisco 7200 series routers	Port-adapter-slot-number/interface-port-number	Port adapter slot–1,3, or 5 (depends on the number of slots in the router)[1] Interface port–0 through 13	1/1
Cisco uBR7246 router	Port-adapter-slot-number/interface-port-number	Port adapter slot–always slot 1 Interface port–0 through 13	1/1

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

Cisco 7200 Series and Cisco uBR7246 Routers Interface Addresses

This section describes how to identify the interface addresses used for the PA-12E/2FE in Cisco 7200 series routers or Cisco uBR7246 routers. The interface address is composed of a two-part number in the format *port-adapter-slot-number/interface-port-number*. See Table 1-5 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.)

The interface addresses of the interfaces on the PA-12E/2FE in port adapter slot 1 are 1/0 through 1/13 (port adapter slot 1 and interfaces 0 through 13). If the PA-12E/2FE was in port adapter slot 5, these same interfaces would be numbered 5/0 through 5/13 (port adapter slot 5 and interfaces 0 through13).

In a Cisco uBR7246 series router, port adapter slots are numbered slot 1 and slot 2. (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-12E/2FE in port adapter slot 1 are 1/0 through 1/13 (port adapter slot 1 and interfaces 0 through 13).

Note For the Cisco 7206 router shelf, physical port addresses are composed of a three-part number in the format *shelf-number/port-adapter-slot-number/interface-port-number*, where the *shelf number* is a number assigned to the Cisco 7206 router shelf during the initial configuration of the Cisco AS5800 Universal Access Server. A Cisco AS5800 Universal Access Server can consist of several shelves; therefore, each shelf is assigned a number.

C H A P T E R 2

Preparing for Installation

This chapter describes the general equipment, safety, and site preparation requirements for installing the PA-12E/2FE port adapter. This chapter contains the following sections:

- Required Tools and Equipment, page 2-1
- Software and Hardware Requirements, page 2-1
- Checking Hardware and Software Compatibility, page 2-2
- Safety Guidelines, page 2-2
- FCC Class A Compliance, page 2-5

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-12E/2FE port adapter.
- Category 3 unshielded twisted-pair (UTP) crossover or straight-through cables with RJ-45 connectors.
- Category 5 UTP crossover or straight-through cables with RJ-45 connectors.

> **Note** Category 3 and Category 5 UTP cables are not available from Cisco Systems; they are available from outside commercial cable vendors.

- Number 2 Phillips screwdriver.
- Your own electrostatic discharge (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-12E/2FE in supported router or switch platforms.

Table 2-1   PA-12E/2FE Software Requirements

Router Platform	Recommended Minimum Cisco IOS Release
Cisco 7200 series	
• Cisco 7204VXR, Cisco 7206VXR and Cisco 7206VXR router shelf	Cisco IOS Release 12.0(2)XE2 or a later release of 12.0 XE Cisco IOS Release 12.0(3)T or a later release of 12.0 T Cisco IOS Release 12.2(4)B or a later release of 12.2 B
• Cisco 7204 and Cisco 7206	Cisco IOS Release 11.2(10)P or a later release of 11.2 P Cisco IOS Release 11.3(2)T or a later release of 11.3 T Cisco IOS Release 12.2(4)B or a later release of 12.2 B
• Cisco 7206 router shelf	Cisco IOS Release 11.3(2)AA or a later release of 11.3 AA Cisco IOS Release 12.2(4)B or a later release of 12.2 B
Cisco uBR7200 series	
• Cisco uBR7246	Cisco IOS Release 12.0(5)T or a later release of 12.0 T

For configuration guidelines on port adapters in the Cisco 7200 series, refer to the *Cisco 7200 Series Port Adapter Hardware Configuration Guidelines*.

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, click **Login** at Cisco.com and go to **Technical Support Help—Cisco TAC**: **Tool Index**: **Software Advisor**. You can also access the tool by pointing your browser directly to http://www.cisco.com/cgi-bin/support/CompNav/Index.pl.

Choose a product family or enter a specific product number to search for the minimum supported software release needed for your hardware.

Safety Guidelines

Following are safety guidelines that you should follow when working with any equipment that connects to electrical power or telephone wiring.

Warning   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. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.

Waarschuwing   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 standaard maatregelen om ongelukken te voorkomen. Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het document *Regulatory Compliance and Safety Information* (Informatie over naleving van veiligheids- en andere voorschriften) raadplegen dat bij dit toestel is ingesloten.

Varoitus   Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä julkaisussa esiintyvien varoitusten käännökset löydät laitteen mukana olevasta *Regulatory Compliance and Safety Information* -kirjasesta (määräysten noudattaminen ja tietoa turvallisuudesta).

Attention   Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez le document *Regulatory Compliance and Safety Information* (Conformité aux règlements et consignes de sécurité) qui accompagne cet appareil.

Warnung   Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Dokument *Regulatory Compliance and Safety Information* (Informationen zu behördlichen Vorschriften und Sicherheit), das zusammen mit diesem Gerät geliefert wurde.

Avvertenza   Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nel documento *Regulatory Compliance and Safety Information* (Conformità alle norme e informazioni sulla sicurezza) che accompagna questo dispositivo.

Advarsel   Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i dokumentet *Regulatory Compliance and Safety Information* (Overholdelse av forskrifter og sikkerhetsinformasjon) som ble levert med denne enheten.

Aviso   **Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. Para ver as traduções dos avisos que constam desta publicação, consulte o documento *Regulatory Compliance and Safety Information* (Informação de Segurança e Disposições Reguladoras) que acompanha este dispositivo.**

¡Advertencia!   **Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. Para ver una traducción de las advertencias que aparecen en esta publicación, consultar el documento titulado *Regulatory Compliance and Safety Information* (Información sobre seguridad y conformidad con las disposiciones reglamentarias) que se acompaña con este dispositivo.**

Varning!   **Denna varningssymbol 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 vanligt förfarande för att förebygga skador. Se förklaringar av de varningar som förkommer i denna publikation i dokumentet *Regulatory Compliance and Safety Information* (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.**

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.

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 component board-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 15 of the FCC rules. These limits are designed to provide reasonable protection 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-12E/2FE port adapter has been designed to meet these requirements. Modifications to this product not authorized by Cisco Systems, Inc., could void the various approvals and negate your authority to operate the product.

CHAPTER 3

Removing and Installing Port Adapters

This chapter describes how to remove the PA-12E/2FE port adapter from supported platforms and also how to install a new or replacement port adapter. This chapter contains the following sections:

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

Metal carrier

Printed circuit board

H6420
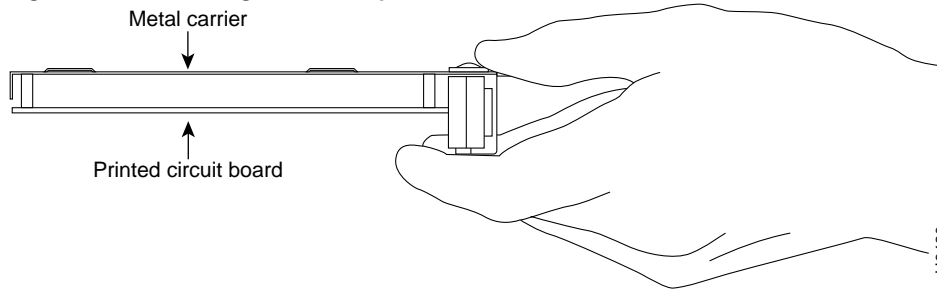
Online Insertion and Removal

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-12E/2FE on a Cisco 7200 series or Cisco uBR7246 series router.

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 3-5.

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 perfoms 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   **When performing the following procedures, wear a grounding wrist strap to avoid ESD damage to the card. Some platforms have an ESD connector for attaching the wrist strap. Do not directly touch the midplane or backplane with your hand or any metal tool, or you could shock yourself.**

Port Adapter Slot Divider

If you are installing a dual-width port adapter in a Cisco 7200 series router or a Cisco uBR7246 router that has two single-width port adapters installed, then you need to perform the following procedure.

Cisco 7200 Series and Cisco uBR7246—Removing the Slot Divider

Step 1

Remove installed single-width port adapters from the slots on both sides of the port adapter slot divider.

Step 2

With one hand, raise the slot divider lever to unlock the slot divider from the chassis.
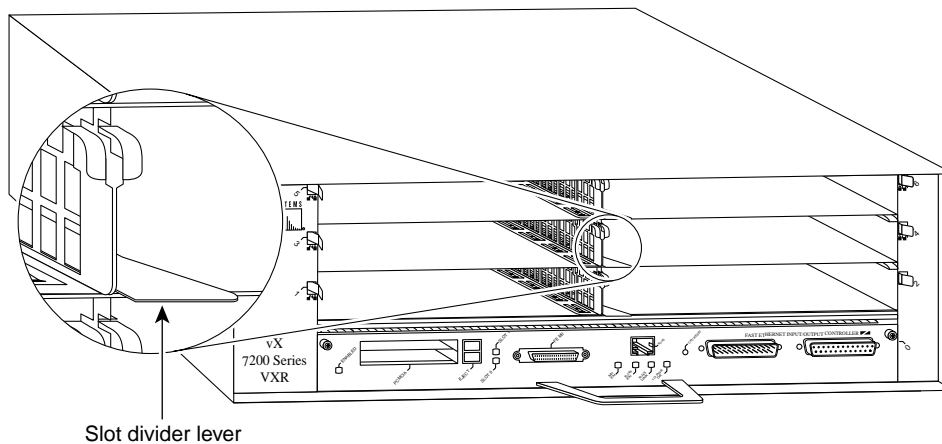
Slot divider lever

Step 3

With the slot divider lever still raised, use your other hand to pull the slot divider from the chassis.
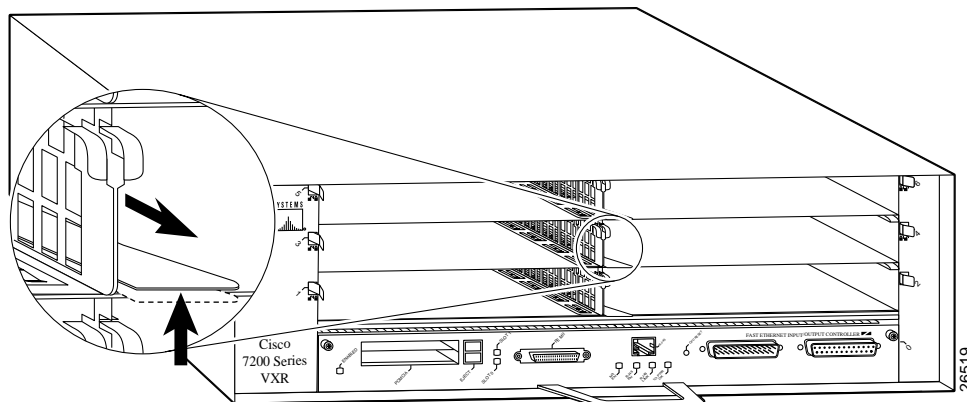
Step 4

Store the slot divider in a location where you can retrieve it for use later.

Port Adapter Removal and Installation

In this section, the illustrations that follow give step-by-step instruction on how to remove and install port adapters. This section contains the following illustrations:

- 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

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.)

Note: This adapter removal applies to any port or service adapter.
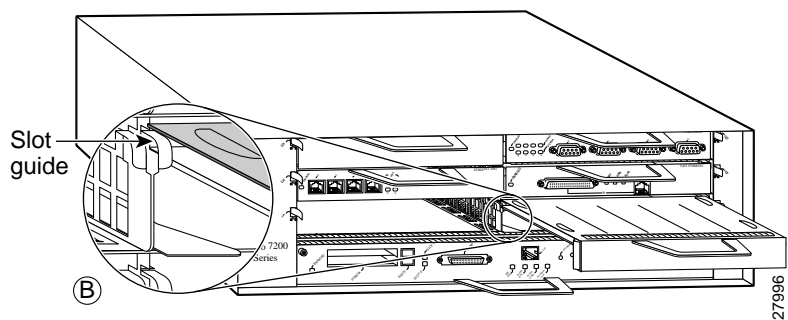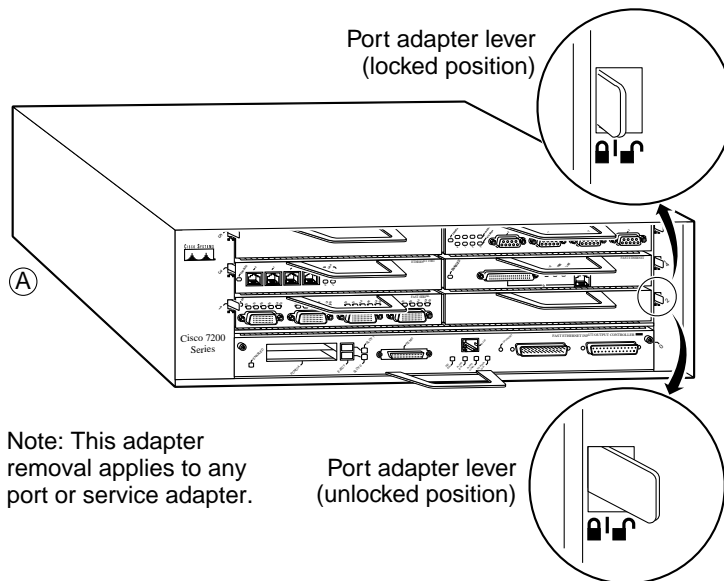
Cisco uBR7200 Series—Removing a Port Adapter

Step 1

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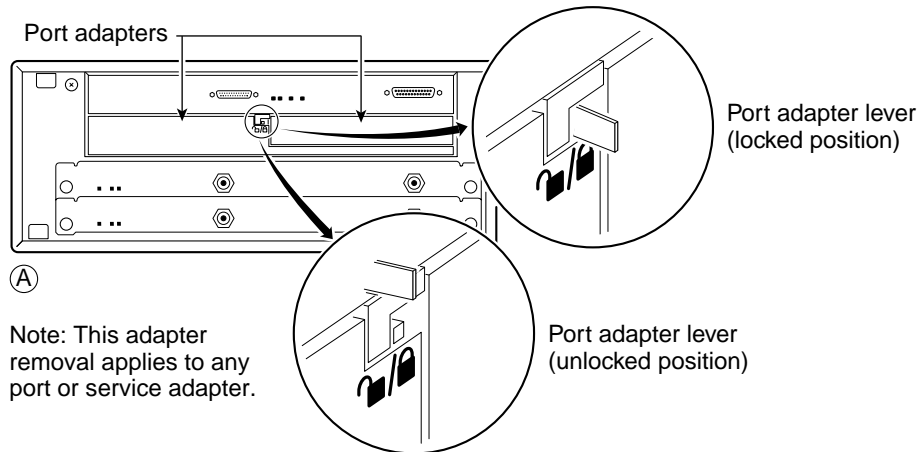
Place the port adapter lever (Cisco uBR7223, see A), or the port adapter retention clip (Cisco uBR7246 and Cisco uBR7246 VXR, see B) in the unlocked position. Either mechanism remains in the unlocked position.

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.

Port adapters

Note: This adapter removal applies to any port or service adapter.

Port adapter lever (locked position)

Port adapter lever (unlocked position)

Port adapter retention clip (locked position)

Port adapters

Port adapter retention clip (unlocked position)

26523
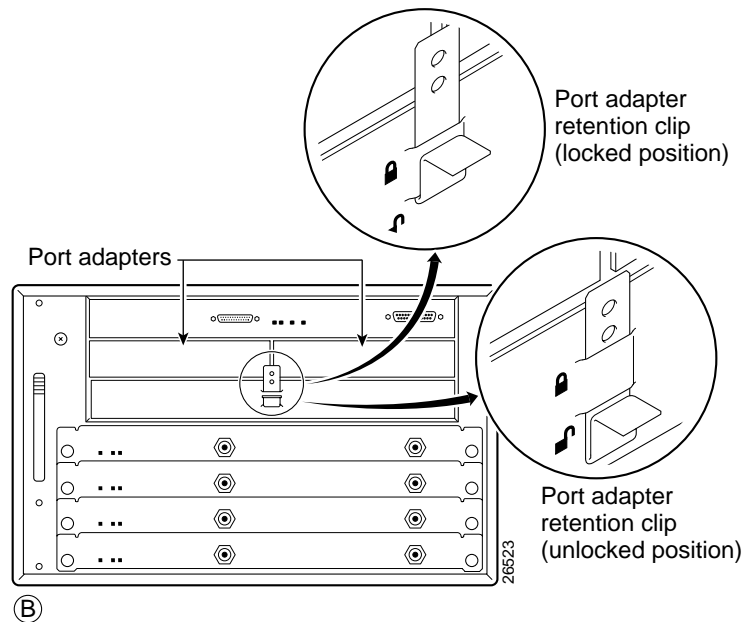
Cisco uBR7200 Series—Installing a Port Adapter

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.

Metal carrier

Inside slot guide

PC board
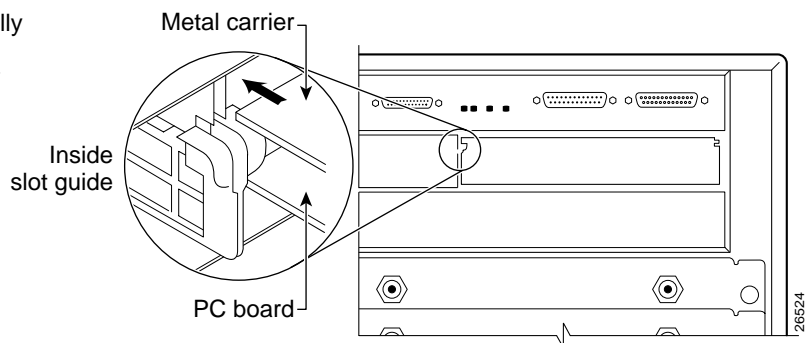
Step 2

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.)

Connecting a Port Adapter Interface Cable

On a single PA-12E/2FE, you can use up to 14 RJ-45 connections. (Category 3 and Category 5 UTP cables are not available from Cisco Systems; they are available from commercial cable vendors.)

Note   Use Category 3 unshielded twisted-pair (UTP) crossover cables when connecting 10-Mbps 12E/2FE interfaces (port 2 through port 13) to a hub. Use Category 3 UTP straight-through cables when connecting 10-Mbps 12E/2FE interfaces to an end station.

Use Category 5 UTP crossover cables when connecting 10/100-Mbps 12E/2FE interfaces (port 0 and port 1) to a hub. Use Category 5 UTP straight-through cables when connecting 10/100-Mbps 12E/2FE interfaces to an end station.

The 12E/2FE interfaces do not support VLAN trunking.

To connect an RJ-45 cable to the PA-12E/2FE, follow these steps:

Step 1   Attach the cable directly to the RJ-45 port on the PA-12E/2FE port adapter. (See Figure 3-2.)

The PA-2E/2FE functions as a repeater or hub, and its interfaces connect to an end station or DTE.

Note   Port adapters have a handle attached, but this handle is not shown to allow a full detailed view of the faceplate.

When attaching the cable receptacle on the PA-12E/2FE, use the cable-management bracket that shipped with your router for extra strain relief.

Figure 3-2   Connecting 12E/2FE RJ-45 Cables
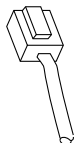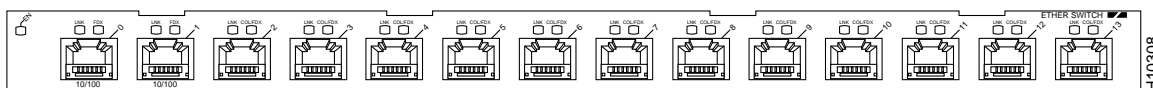
RJ-45 cable (up to 14)

To end station or DTE

Step 2   Attach the network end of your RJ-45 cable to your end station or DTE.

This completes the process for attaching 12E/2FE port adapter interface cables. Proceed to Chapter 4, "Configuring the PA-12E/2FE."

CHAPTER 4

Configuring the PA-12E/2FE

To continue your PA-12E/2FE port adapter installation, you must configure the 12E/2FE interfaces. The instructions that follow apply to all supported platforms. Minor differences between the platforms are noted–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 4-10
- Using the 12E/2FE VLAN Configuration WebTool, page 4-17

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.

Step 3 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-12E/2FE is installed correctly (the enabled LED goes on), use the **configure** command to configure the new interfaces. Be prepared with the information you will need, such as the following:

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

If you installed a new PA12E/2FE 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-12E/2FE 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 PA12E/2FE, refer to the appropriate configuration publications listed in the "Related Documentation" section on page vi.

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.)

This section contains the following subsections:

- Shutting Down an Interface, page 4-2
- Performing a Basic Configuration, page 4-5
- Configuring the Transmission Mode, page 4-8

Shutting Down an Interface

Before you replace an interface cable, replace port adapters, or remove an interface that you will not replace, use the **shutdown** command to shut down (disable) the interfaces to prevent anomalies when you reinstall the new or reconfigured interface processor. When you shut down an interface, it is designated *administratively down* in the **show** command displays.

Note   Interface port numbers 0 and 1 of the 12E/2FE port adapter are identified by the system as *Fast Ethernet* interfaces, while interface port numbers 2 through 13 are identified as *Ethernet* interfaces.

Follow these steps to shut down an interface:

Step 1   Enter the privileged level of the EXEC command interpreter (also called enable mode). (See the "Using the EXEC Command Interpreter" section on page 4-1 for instructions)

Step 2   At the privileged-level prompt, enter configuration mode and specify that the console terminal will be the source of the configuration commands, as follows:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
```

Step 3   Shut down interfaces by entering the **interface fastethernet** (for interface port numbers 0 and 1) or **interface ethernet** (for interface port numbers 2 through 13) subcommand, and then enter the **shutdown** command. Table 4-1 shows the command syntax.

When you have finished, 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.

Table 4-1   Syntax of the shutdown Command

Platform	Command	Example

Cisco 7200 series routers	**interface** followed by the *type* (**ethernet** or **fastethernet**) and *slot/port* (port-adapter-slot-number/interface-port-number	The example is for interface 1 and interface 2 on a port adapter in port adapter slot 1:
		
		```Router(config-if)# interface ethernet 1/1```
		```Router(config-if)# shutdown```
		```Router(config-if)# interface fastethernet 1/2```
		```Router(config-if)# shutdown```
		```Ctrl-Z```
		```Router#```

Cisco uBR7246 routers	**interface** followed by the *type* (**ethernet** or **fastethernet**) and *slot/port* (port-adapter-slot-number/interface-port-number	The example is for interface 1 and interface 2 on a port adapter in port adapter slot 1:
		
		```Router(config-if)# interface ethernet 1/1```
		```Router(config-if)# shutdown```
		```Router(config-if)# interface fastethernet 1/2```
		```Router(config-if)# shutdown```
		```Ctrl-Z```
		```Router#```

Note   If you need to shut down additional interfaces, enter the **interface ethernet** (for interface port number 0 or 1) or the **interface fastethernet** (for interface port number 2 through 13) command (followed by the interface address of the interface) for each of the interfaces on your port adapter. Use the **no shutdown** command to enable the interface.

Step 4   Write the new configuration to NVRAM as follows:

```
Router# copy running-config startup-config
[OK]
Router#
```

The system displays an OK message when the configuration has been stored in NVRAM.

Step 5   Verify that new interfaces are now in the correct state (shut down) using the **show interfaces** command (followed by the interface type and interface address of the interface) to display the specific interface. Table 4-2 provides examples.

Table 4-2   Examples of the show interfaces Command

Platform	Command	Example

Cisco 7200 series routers	**show interfaces ethernet** or
	
	show interfaces fastethernet,
	followed by *slot/port*
	(port-adapter-slot-number/
	interface-port-number)
		The example is for interface 1 on a port adapter in port adapter slot 5.
		
		`Router#` **`show interfaces ethernet 1/5`**
		`Ethernet 1/5 is administratively down, line`
		`protocol is down`
		`[Additional display text omitted from this`
		`example]`
		
		The example is for interface 2 on a port adapter in port adapter slot 5.
		
		`Router#` **`show interfaces fastethernet 2/5`**
		`Fastethernet 2/5 is administratively down,`
		`line protocol is down`
		`[Additional display text omitted from this`
		`example]`

Cisco uBR7246 routers	**show interfaces ethernet** or
	
	show interfaces fastethernet,
	followed by *slot/port*
	(port-adapter-slot-number/
	interface-port-number)
		The example is for interface 1 on a port adapter in port adapter slot 1.
		
		`Router#` **`show interfaces ethernet 1/1`**
		`Ethernet 1/1 is administratively down, line`
		`protocol is down`
		`[Additional display text omitted from this`
		`example]`
		
		The example is for interface 2 on a port adapter in port adapter slot 1.
		
		`Router#` **`show interfaces fastethernet 2/1`**
		`Fastethernet 2/1 is administratively down,`
		`line protocol is down`
		`[Additional display text omitted from this`
		`example]`

Step 6   Reenable interfaces by doing the following:

a.   Repeat Step 3 to reenable and interface. Substitute the **no shutdown** command for the **shutdown** command.

b.   Repeat Step 4 to write the new configuration to memory. Use the **copy-running-config startup-config** command.

c.   Repeat Step 5 to verify that the interfaces are in the correct state. Use the **show interfaces** command followed by the interface type and interface address of the interface.

For complete descriptions of software configuration commands, refer to the publications listed in the "Related Documentation" section on page vi.

Performing a Basic Configuration

Following are instructions for a basic configuration: enabling a controller, specifying a bridge group, 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 Ethernet and FastEthernet interfaces, refer to the appropriate software documentation.

> **Note** If you plan to use a 12E/2FE interface to boot from a network (TFTP) on a Cisco 7200 series router, ensure that the interface is configured for a loop-free environment, an IP address is configured for the interface's bridge-group virtual interface, and system boot image 11.2(10)P, 11.3(2)T, or 11.3(2)AA is installed on your router (use the **show version** command to view your router's system boot image).
>
> If you plan to use a 12E/2FE interface to boot from a network (TFTP) on a Cisco uBR7246, ensure that the interface is configured for a loop-free environment, an IP address is configured for the interface's bridge-group virtual interface, and system boot image 12.0(5)T is installed on your router (use the **show version** command to view your router's system boot image).
>
> *Before* booting from the network server, use the **bridge-group** *bridge-group number* **spanning-disabled** command to disable the Spanning-Tree Protocol configured on the interface to keep the TFTP server from timing out and closing the connection.
>
> For detailed information about booting from a network (TFTP), loading system images from a network server, and configuring the Spanning-Tree Protocol on your Cisco 7200 series router, refer to the *Configuration Fundamentals Configuration Guide* and *Bridging and IBM Networking Configuration Guide* publications. See the "Related Documentation" section on page vi for more information.

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>
```

> **Note** Interface port numbers 0 and 1 of the PA-12E/2FE are identified by the system as *Fast Ethernet* interfaces, while interface port numbers 2 through 13 are identified as *Ethernet* interfaces.

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 a bridge-group number and Spanning-Tree Protocol by entering the **bridge-group command**. The following examples are for bridge group 10, 20, and 30, and the IEEE Spanning-Tree Protocol:

```
Router(config)# bridge 10 protocol ieee
Router(config)# bridge 20 protocol ieee
Router(config)# bridge 30 protocol ieee
Router(config)# bridge 40 protocol ieee
```

Note   The PA-12E/2FE supports up to four bridge groups.

The PA-12E/2FE port adapter supports DEC and IEEE Spanning-Tree Protocols; however, we recommend using the IEEE protocol when configuring bridge groups.

Step 3   Specify the first interface to configure by entering the **interface fastethernet** (for interface port numbers 0 and 1) or **interface ethernet** (for interface port numbers 2 through 13) subcommand, followed by the interface address of the interface you plan to configure. Table 4-3 provides examples.

Table 4-3   Examples of the interface ethernet and internet fastethernet Subcommand

Platform	Command	Example
Cisco 7200 series routers	**interface fastethernet**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number) **interface ethernet**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 1. `Router(config)# `**`interface fastethernet 1/0`** `Router(config-if)#` The example is for the third interface of a port adapter in port adapter slot 1. `Router(config)# `**`interface ethernet 1/2`** `Router(config-if)#`
Cisco uBR7246 router	**interface fastethernet**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number) **interface ethernet**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 1. `Router(config)# `**`interface fastethernet 1/0`** `Router(config-if)#` The example is for the third interface of a port adapter in port adapter slot 1. `Router(config)# `**`interface ethernet 1/2`** `Router(config-if)#`

Step 4   Assign an interface to a bridge group by entering the **bridge-group** subcommand. Table 4-3 provides examples.

Table 4-4   Examples of the bridge-group Subcommand

Platform	Command	Example
Cisco 7200 series routers	**bridge-group** *bridge-group-number*	The example is for the first interface of a port adapter in port adapter slot 3 and bridge-group 10. `Router(config)#` **`interface fastethernet 3/0`** `Router(config-if)#` **`bridge-group 10`** The example is for the third interface of a port adapter in port adapter slot 1 and bridge-group 20. `Router(config)#` **`interface ethernet 1/2`** `Router(config-if)#` **`bridge-group 20`**
Cisco uBR7246 router	**bridge-group** *bridge-group-number*	The example is for the first interface of a port adapter in port adapter slot 1 and bridge-group 10. `Router(config)#` **`interface fastethernet 1/0`** `Router(config-if)#` **`bridge-group 10`** The example is for the third interface of a port adapter in port adapter slot 1 and bridge-group 20. `Router(config)#` **`interface ethernet 1/2`** `Router(config-if)#` **`bridge-group 20`**

Step 5   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 6   Add any additional configuration subcommands required to enable routing protocols and set the interface characteristics. Table 4-5 provides examples.

Table 4-5   Examples of Configuration Subcommands

Purpose	Command	Example
Enables integrated routing and bridging on the bridge groups.	**bridge irb**	`Router(config)#` **`bridge irb`**
Enables a virtual interface on a bridge group and assigns an ip address and subnet mask to the interface.	**interface bvi** *bridge-group-number* **ip address**	`Router(config)#` **`interface bvi 10`** `Router(config-if)#` **`ip address 10.0.0.0 255.255.255`** `Router(config-if)#` **`no shutdown`** `Router(config-if)` **`exit`**
Specifies the protocol to route in each bridge group.	**bridge** *bridge-group-number* **route** {**ip** | **ips** | **appletalk**}	`Router(config)#` **`bridge 10 route ips`**
Configures an interface for cut-through switching of received and transmitted data.[1]	**cut-through** [**receive** | **transmit**]	`Router(config-if)#` **`cut-through`**
Returns an interface to the default; store-and-forward switching.	**no cut-through**	`Router(config-if)#` **`no cut-through`**

1. The PA-12E/2FE supports store-and-forward or cut-through packet switching technology between interfaces within the same bridge group; store-and-forward is the default. Use the **cut-through** [**receive** | **transmit**] command to configure each interface for cut-through switching of received and transmitted data. To return each interface to store-and-forward switching, use the **no cut-through** command.

Step 7   Reenable the interfaces using the **no shutdown** command. (See the "Shutting Down an Interface" section on page 4-2**.)**

Step 8   Configure all additional port adapter interfaces as required.

Step 9   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 10   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 the Transmission Mode

By default, all 12E/2FE interfaces (port 0 through port 13) support autosensing and autonegotiation of the proper transmission mode (half-duplex or full-duplex) with an attached device. If an attached device does not support autosensing and autonegotiation of the proper transmission mode, the 12E/2FE interfaces attached to the device automatically enter half-duplex mode.

Use the **show running-config** command to determine if a 12E/2FE interface is autosensing and autonegotiating the proper transmission mode with an attached device. If a 12E/2FE interface is autosensing and autonegotiating the transmission mode, the output from the **show running-config** command does not display transmission mode information. If a 12E/2FE interface is configured for half-duplex or full-duplex mode, the output from the **show running-config** command displays the configured mode.

The first example below shows that the first 12E/2FE interface port (interface port 0) in port adapter slot 3 is autosensing and autonegotiating the transmission mode with an attached device; the second example shows the same interface configured for half-duplex mode:

```
Router# show running-config

  (display text omitted)

interface FastEthernet3/0
 no ip address
 bridge-group 1

  (display text omitted)


Router# show running-config

  (display text omitted)

interface FastEthernet3/0
 no ip address
```

```
half-duplex
bridge-group 1

  (display text omitted)
```

Use the **full-duplex** and **half-duplex** commands to change the transmission mode of a 12E/2FE interface. After changing the transmission mode, use the **show interfaces** command to verify the interface's transmission mode.

Note If you use the **full-duplex** and **half-duplex** commands to change the transmission mode of the first two 12E/2FE interfaces (port 0 and port 1), the transmission speed of the two 12E/2FE interfaces automatically defaults to 100 Mbps. The first two 12E/2FE interfaces only operate at 10 Mbps when the interfaces are autosensing and autonegotiating the proper connection speed (10 Mbps or 100 Mbps) with an attached device.

In the following example, full-duplex mode is configured on the first 12E/2FE interface port (interface port 0) in port adapter slot 3:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface fastethernet 3/0
Router(config-if)# full-duplex
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet3/0, changed
state to up
%LINK-3-UPDOWN: Interface FastEthernet3/0, changed state to up

Router# show interface fastethernet 3/0
FastEthernet0/0 is administratively up, line protocol is up

  (display text omitted)

Full-Duplex, 100BaseTX

  (display text omitted)
```

Use the **no full-duplex** command to return the interface to autosensing and autonegotiation of the proper transmission mode with the attached device.

In the following example, half-duplex mode is configured on the same 12E/2FE interface port as in the previous example:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface fastethernet 3/0
Router(config-if)# half-duplex
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet3/0, changed
state to up
%LINK-3-UPDOWN: Interface FastEthernet3/0, changed state to up

Router# show interface fastethernet 3/0
FastEthernet0/0 is administratively up, line protocol is up

  (display text omitted)

Half-Duplex, 100BaseTX
```

```
(display text omitted)
```

Use the **no half-duplex** command to return the interface to autosensing and autonegotiation of the proper transmission mode with the attached device.

✎
Note For the Cisco 7206 router shelf, the interface specified in the above examples requires a shelf number in the format **interface** or **show interface** *type shelf number/port adapter slot/interface*.

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** and **loopback** commands to check connectivity. This section includes the following subsections:

- Using show Commands to Verify the New Interface Status, page 4-10
- Using the ping Command to Verify the Network Connectivity, page 4-16
- Using loopback Commands, page 4-16

Using show Commands to Verify the New Interface Status

Table 4-6 demonstrates how you can use the **show** commands to verify that new interfaces are configured and operating correctly and that the PA-12E/2FE 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 "Related Documentation" section on page vi.

✎
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 4-6   Using show Commands

Command	Function	Example
show version or **show hardware**	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# **show version**
show controllers	Displays all the current interface processors and their interfaces	Router# **show controllers**
show diag *slot*	Displays types of port adapters installed in your system and information about a specific port adapter slot, or chassis slot	Router# **show diag 2**

Table 4-6   Using show Commands

Command	Function	Example
show interfaces *type*[1] *port-adapter-slot-number/ interface-port-number*	Displays status information about a specific type of interface (for example, ethernet) in a Cisco 7200 series router	Router# **show interfaces ethernet 3/4**
show interfaces *type* **1**/ *interface-port number*	Displays status information about a specific type of interface (for example, fastethernet) in a Cisco uBR7246 router	Router# **show interfaces fastethernet 1/1**
show bridge group	Displays all bridge groups in the system and their interfaces.	Router# **show bridge group**
show pas eswitch addresses fastethernet (or **ethernet** *port-adapter-slot-number/ interface-port-number*	Displays Layer 2 learned addresses for an interface.	Router# **show pas eswitch addresses fastethernet 3/0**
show interfaces fastethernet (or **ethernet**) *slot/interface* **irb**	Displays the routed protocol configured for an interface	Router# **show interfaces fastethernet 1/1 irb**
show protocols	Displays protocols configured for the entire system and for specific interfaces	Router# **show protocols**
show running-config	Displays the running configuration file	Router# **show running-config**
show startup-config	Displays the configuration stored in NVRAM	Router# **show startup-config**

1.   On the PA-12E/2FE interface port numbers 0 and 1 are fastethernet interfaces and interface port numbers 2 through 13 are ethernet interfaces.

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 4-11
- Using the show diag Command, page 4-12
- Using the show bridge group Command, page 4-13
- Using the show interfaces Command, page 4-13

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 7200 Series and Cisco uBR7246 Routers

Following is an example of the **show version** command from a Cisco7206 series router with the P-12E/2FE:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-J-M), Version 11.2(10)p RELEASED SOFTWARE
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled Wed 23-Apr-97 15:11 by rmontino
Image text-base: 0x60008890, data-base: 0x608E0000

ROM: System Bootstrap, Version 11.2(10)p RELEASE SOFTWARE
ROM: 7200 Software (C7200-BOOT-M), 11.2(10)p RELEASE SOFTWARE

Router uptime is 4 hours, 22 minutes
System restarted by reload
System image file is "c7200-j-mz", booted via slot0

cisco 7206 (NPE150) processor with 26624K/6144K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0 (Level 2 Cache)
Last reset from power-on
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV Inc).
Chassis Interface.
32 Ethernet/IEEE 802.3 interface(s)
2 FastEthernet/IEEE 802.3 interface(s)
1024K bytes of packet SRAM memory.

16384K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0
```

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 7200 series or Cisco uBR7246 router.

✎
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 7200 Series and Cisco uBR7246 Routers

Following is an example of the **show diag** *slot* command that show a PA-12E/2FE in port adapter slot 3 of a Cisco 7200 series router:

```
Router# show diag 3
Slot 3:
        Ethernet Switch port adapter, 14 ports
        Port adapter is analyzed
        Port adapter insertion time 20:51:22 ago
        Hardware revision 1.0 Board revision AO
        Serial number    4294967295    Part number 800-02611-05
        Test history      0xFF          RMA number     000-000-000
        EEPROM format version 255
```

```
                        EEPROM contents (hex):
                          0x20: FF 3F FF FF FF FF FF FF FF FF FF FF FF FF FF FF
                          0x30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

Using the show bridge group Command

Display all bridge groups in the system and the interfaces configured for each bridge group, using the **show bridge group** command.

Cisco 7200 Series and Cisco uBR7246 Routers

The following examples are for bridge group 30 and bridge group 40 of a PA-12E/2FE in port adapter slot 3:

```
Router# show bridge group

Bridge Group 30 is running the IEEE compatible Spanning Tree protocol
   Port 19 (FastEthernet3/0) of bridge group 30 is forwarding
   Port 20 (FastEthernet3/1) of bridge group 30 is forwarding
   Port 21 (Ethernet3/2) of bridge group 30 is forwarding
   Port 22 (Ethernet3/3) of bridge group 30 is forwarding
   Port 23 (Ethernet3/4) of bridge group 30 is forwarding
   Port 24 (Ethernet3/5) of bridge group 30 is forwarding
   Port 25 (Ethernet3/6) of bridge group 30 is forwarding


Bridge Group 40 is running the IEEE compatible Spanning Tree protocol

   Port 26 (Ethernet3/7) of bridge group 40 is down
   Port 27 (Ethernet3/8) of bridge group 40 is down
   Port 28 (Ethernet3/9) of bridge group 40 is down
   Port 29 (Ethernet3/10) of bridge group 40 is down
   Port 30 (Ethernet3/11) of bridge group 40 is down
   Port 31 (Ethernet3/12) of bridge group 40 is down
   Port 32 (Ethernet3/13) of bridge group 40 is down
```

Using the show interfaces Command

The **show interfaces** command displays status information (including the physical slot and interface address) for the interfaces you specify. The example that follows specifies a fastethernet interface.

For complete descriptions of interface subcommands and the configuration options available for Cisco 7200 series and Cisco uBR7246 interfaces, refer to the publications listed in the "Related Documentation" section on page vi.

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 7200 Series and Cisco uBR7246 Routers

Following is an example of the **show interfaces** command used with a Cisco 7200 series router. This example shows all of the information specific to the first 12E/2FE interface port (interface port 0) on a PA-12E/2FE installed in port adapter slot 3:

```
Router# show interface fastethernet 3/0
FastEthernet3/0 is up, line protocol is up
```

```
Hardware is TSWITCH, address is 00e0.f7a4.5130 (bia 00e0.f7a4.5130)
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, 100BaseTX
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:05:30, output 00:00:00, 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
    312 packets input, 18370 bytes, 0 no buffer
    Received 216 broadcasts, 0 runts, 0 giants, 0 throttles
    3 input errors, 0 CRC, 0 frame, 0 overrun, 3 ignored, 0 abort
    0 input packets with dribble condition detected
    15490 packets output, 1555780 bytes, 0 underruns
    2 output errors, 0 collisions, 2 interface resets
    0 babbles, 0 late collision, 0 deferred
    0 lost carrier, 0 no carrier
    2 output buffer failures, 0 output buffers swapped out
```

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

Intel Corporation recently changed the specifications for its Peripheral component Interconnect (PCI) Fast Ethernet hardware interface. These changes have been incorporated into certain Cisco hardware products. For most users, this change is transparent. However, an anomaly has been identified when this updated Cisco hardware is used in conjunction with certain releases of Cisco IOS software.

When you enter the **show interfaces fastethernet** command on a Cisco 7200 series router using Cisco IOS Release 11.1(10) or older, or Release 11.3(4) or older with updated Cisco hardware, the "overrun" field (shown in **bold** in the output above) is always zero.

If you use this command because you are troubleshooting potential network problems, you may be expecting to see a number in the overrun field.

To work around this problem, issue the following Cisco IOS software command to obtain an overrun value:

Router# **show controller fastethernet** FE-slot number/0

The following output is normally displayed:

```
Hardware is DEC21140
dec21140_ds=0x603531A0, registers=0x4D800000, ib=0x300612C0
rx ring entries=64, tx ring entries=128
rxring=0x300613C0, rxr shadow=0x603532C0, rx_head=5, rx_tail=0
txring=0x30061800, txr shadow=0x60353400, tx_head=33, tx_tail=33, tx_count=0
PHY link up
Far End Fault Indication (For Fx Interface): OFF
CSR0=0xFE02E080, CSR3=0x300613C0, CSR4=0x30061800, CSR5=0xFC660000
CSR6=0x320CA002, CSR7=0xFFFFA261, CSR8=0xE0400000, CSR9=0xFFFDC3FF
CSR11=0xFFFE0000, CSR12=0xFFFFFF09, CSR15=0xFFFFFEC8
DEC21140 PCI registers:
bus_no=2, device_no=0
CFID=0x00091011, CFCS=0x22800006, CFRV=0x02000022, CFLT=0x0000FF00
CBIO=0x08312001, CBMA=0x01800000, CFIT=0x28140100, CFDA=0x00000000
MII registers:
Register 0x00:  2000  784F  2000  5C01  0081  0000  0000  0000
Register 0x08:  0000  0000  0000  0000  0000  0000  0000  0000
Register 0x10:  0000  0000  0000  0009        0000  0001  8060
Register 0x18:  8020  0820  0000  3800  A3B9
```

```
:
<additional information omitted>
```

The field that determines overrun is "CSR8" (shown in bold in the output above). This field is in hexadecimal format. To determine an overrun value, take the first four (high-order) digits, drop the first one from the left, convert the remaining three digits to the decimal equivalent, and then divide that number in half.

In the example above, there are overflows recorded in CSR8=0xE0400000. To determine the overflow value from this example, take the first four (high-order) digits (E040), drop the first digit (E), and convert the remaining number (040) to the decimal equivalent (64). Then divide that number in half. The overrun value in this example is 32.

To display the routed protocol configured for an interface, enter the **show interfaces fastethernet** or **ethernet** *slot/interface* **irb** command. The following example shows that IP is configured for the first 12E/2FE interface in port adapter in slot 3:

```
Router# show interface fastethernet 3/0 irb

FastEthernet3/0

 Routed protocols on FastEthernet3/0:
  ip

 Bridged protocols on FastEthernet3/0:
  appletalk  clns        decnet      ip
  vines      apollo      ipx         xns

 Software MAC address filter on FastEthernet3/0
  Hash Len    Address         Matches  Act      Type
  0x00:  0 ffff.ffff.ffff          0 RCV Physical broadcast
  0x2A:  0 0900.2b01.0001          0 RCV DEC spanning tree
  0xC2:  0 0180.c200.0000          0 RCV IEEE spanning tree
  0xC7:  0 00e0.f7a4.5130          0 RCV Interface MAC address
  0xC7:  1 00e0.f7a4.5130          0 RCV Bridge-group Virtual Interface
```

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

To display the Layer 2 learned addresses for an interface, enter the
show pas eswitch addresses fastethernet or **ethernet** *slot/interface* command. The following example shows that the first 12E/2FE interface (listed below as port 0) in port adapter slot 3 has learned the Layer 2 address 00e0.f7a4.5100 for bridge group 30 (listed below as BG 30):

```
Router# show pas eswitch addresses fastethernet 3/0
U 00e0.f7a4.5100, AgeTs 56273 s, BG 30 (vLAN 0), Port 0
```

Note   For the Cisco 7206 router shelf, the **show pas eswitch addresses fastethernet** command requires a shelf number in the format **show pas eswitch addresses** *type-shelf-number/ port-adapter-slot/interface*.

To determine if a 12E/2FE interface is configured for cut-through packet switching (store-and-forward is the default for all 12E/2FE interfaces), enter the **show running-config** command. If a 12E/2FE interface is configured for store-and-forward packet switching, output from the **show running-config** command does not display switching information.

In the following example, the first 12E/2FE interface port (interface port 0) in port adapter slot 3 is configured for cut-through packet switching:

```
Router# show running-config

  (display text omitted)

interface FastEthernet3/0
 no ip address
cut-through
 bridge-group 1

  (display text omitted)
```

Proceed to the next section, "Using the ping Command to Verify the Network Connectivity," to check network connectivity of the PA-12E/2FE and switch or router.

Using the ping Command to Verify the 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 "Related Documentation" section on page vi, 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 that 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
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 10.1.1.10, 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.

Proceed to the next section "Using loopback Commands," to finish checking network connectivity.

Using loopback Commands

With the loopback test, you can detect and isolate equipment malfunctions by testing the connection between the PA-12E/2FE interface and a remote device such as a modem or a CSU/DSU. The **loopback** subcommand places an interface in loopback mode, which enables test packets that are generated from the **ping** command to loop through a remote device or compact serial cable. If the packets complete the loop, the connection is good. If not, you can isolate a fault to the remote device or compact serial cable in the path of the loopback test.

Depending on the mode of the port, issuing the **loopback** command checks the following path:

- When no compact serial cable is attached to the PA-12E/2FE interface port, or if a DCE cable is attached to a port that is configured as line protocol up, the **loopback** command tests the path between the network processing engine and the interface port only (without leaving the network processing engine and port adapter).

- When a DTE cable is attached to the port, the **loopback** command tests the path between the network processing engine and the near (networking processing engine) side of the DSU or modem to test the PA-12E/2FE interface and compact serial cable.

Using the 12E/2FE VLAN Configuration WebTool

The 12E/2FE VLAN Configuration WebTool, shown in Figure 4-1, is a Web browser-based Java applet that displays configured interfaces and bridge groups for PA-12E/2FE port adapters installed in Cisco 7200 series routers. Using the WebTool, you can:

- Create and delete bridge groups (also referred to as VLANs)

- Add and remove 12E/2FE interfaces from bridge groups

- Assign colors to bridge groups and 12E/2FE interfaces

- Administratively shut down (disable) and bring up (enable) 12E/2FE interfaces
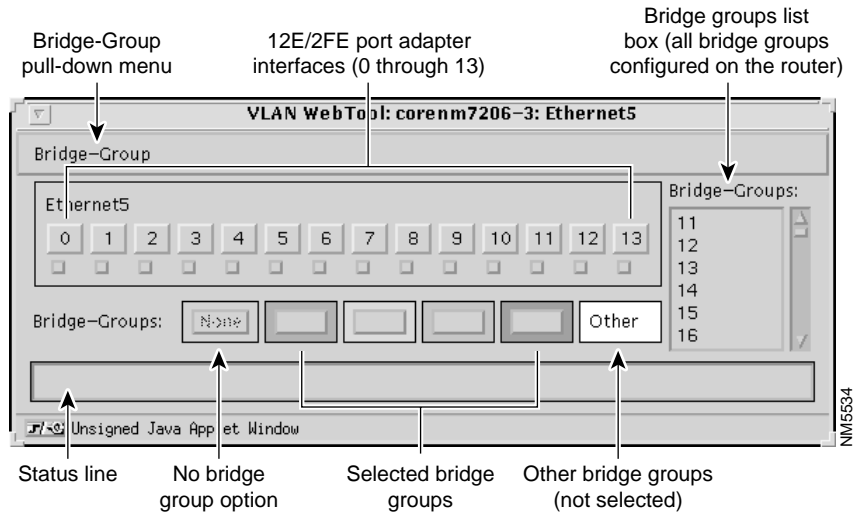
- View the bridge-group status of each 12E/2FE interface

Note   The Cisco 7206 as a router shelf in a Cisco AS5800 Universal Access Server and the Cisco uBR7246 do not support the 12E/2FE VLAN Configuration WebTool.

This section contains the following subsections:

Figure 4-1   12E/2FE VLAN Configuration WebTool

> **Note**   You must use a Java-enabled Web browser to access the 12E/2FE VLAN Configuration WebTool from your router's home page.

Accessing the 12E/2FE VLAN Configuration WebTool

All Cisco routers running Cisco IOS Release 11.0 or later have a home page. If your router has an installed PA-12E/2FE, you can access the 12E/2FE VLAN Configuration WebTool from the router's home page.

> **Note**   All Cisco router home pages are password protected. Contact your network administrator if you do not have the name or password for your Cisco 7200 series router.

Follow these steps to access the WebTool from your router's home page:

Step 1   Enter the name of your router in the URL field of your Web browser and press **Return**. The browser prompts you for the router password.

Step 2   Enter the router password. The browser displays the router's home page. (See Figure 4-2.)

*Figure 4-2   Example Home Page for a Cisco 7200 Series Router—Cisco 7206 Shown*
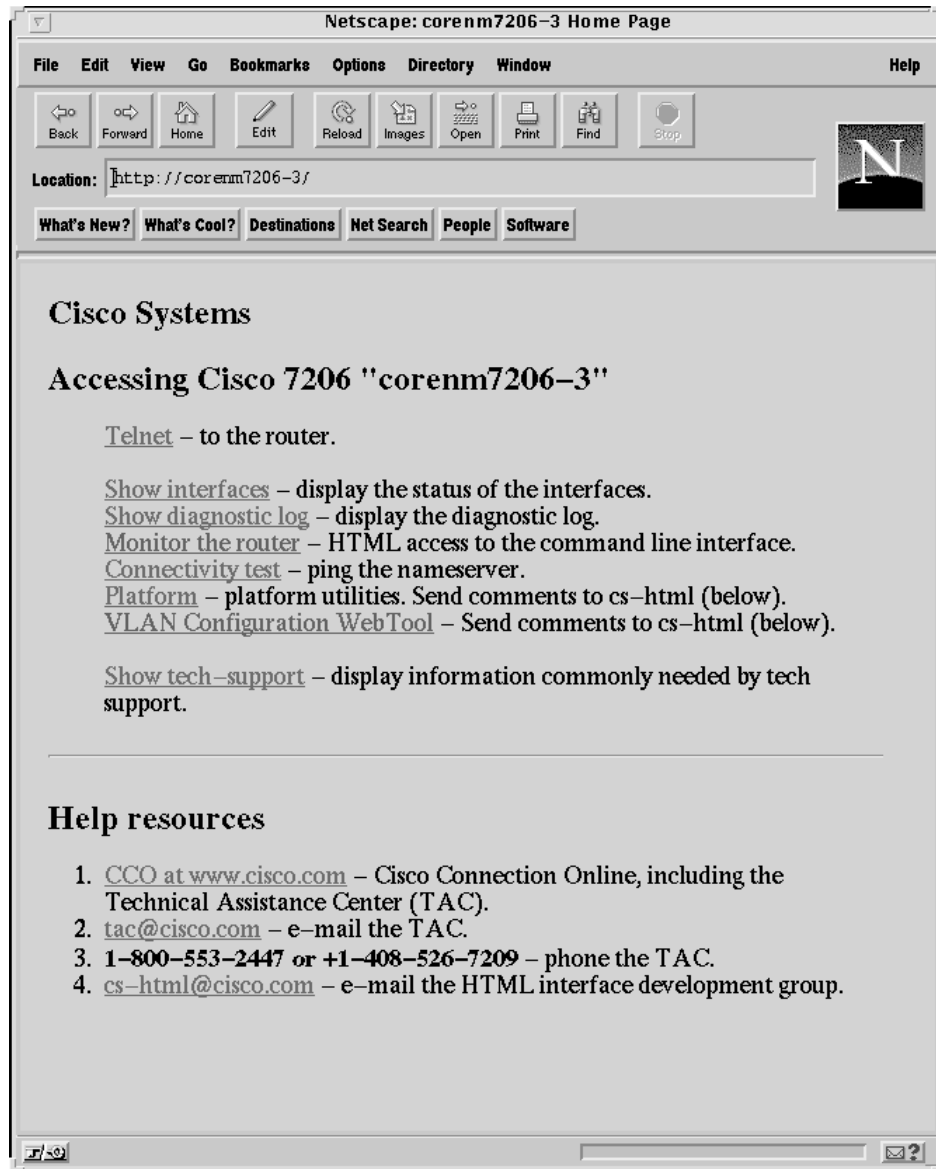
Step 3   At the home page, select "VLAN Configuration WebTool" in the first list of hypertext links. The browser displays one hypertext link for each PA-12E/2FE installed in the router. (See Figure 4-3.)

✎

Note   The VLAN Configuration WebTool hypertext link is listed in the home page *only* when a PA-12E/2FE is installed in the router.

Figure 4-3   Installed 12E/2FE Port Adapters

12E/2FE in slot 5
of a Cisco 7206
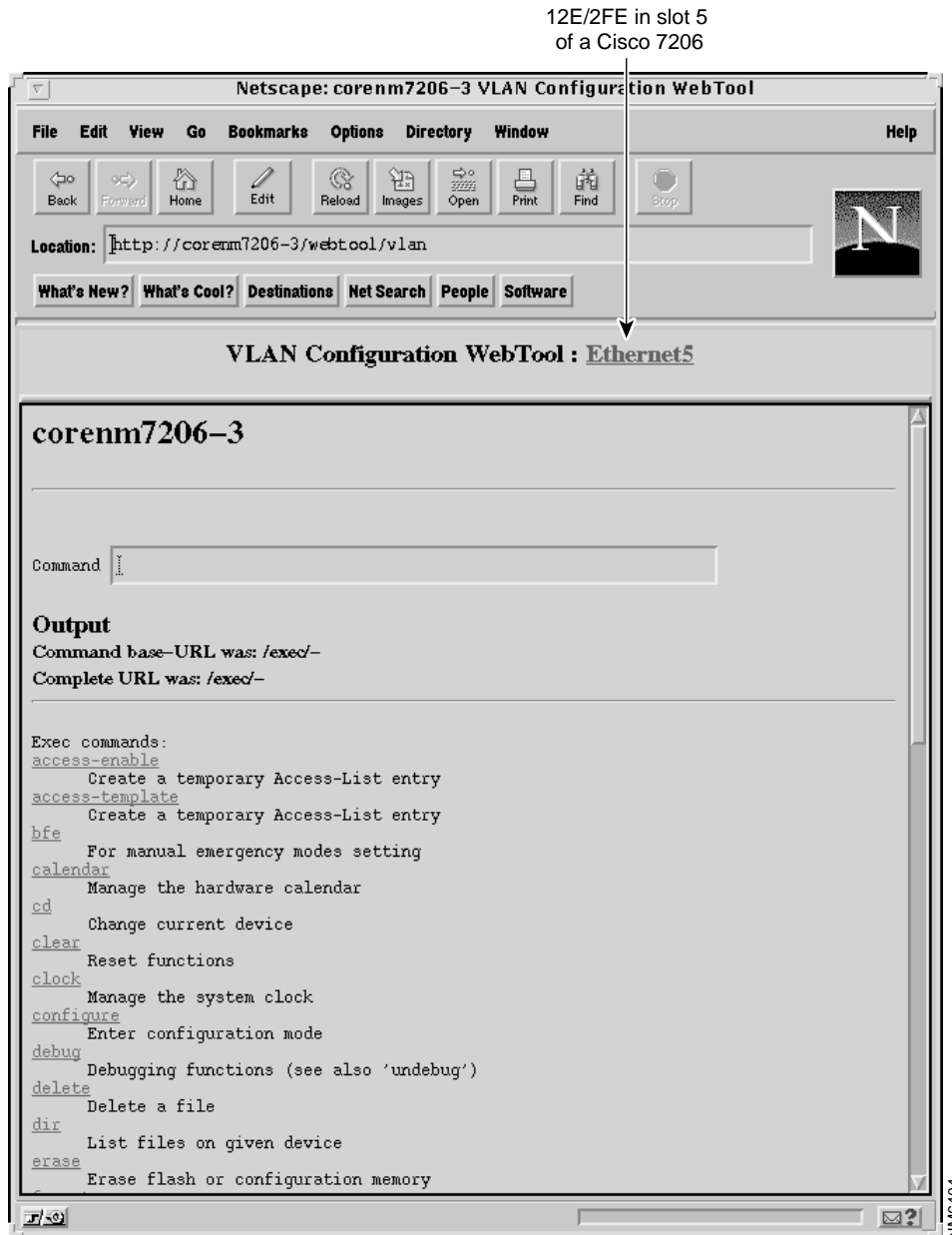
Step 4   Select the hypertext link for an installed PA-12E/2FE. The browser launches the WebTool for the selected PA-12E/2FE. (See Figure 4-1.)

✎

Note   The browser launches one WebTool for each selected PA-12E/2FE hypertext link. You can launch only one WebTool at a time from the browser.

This completes the procedure for accessing the 12E/2FE VLAN Configuration WebTool.
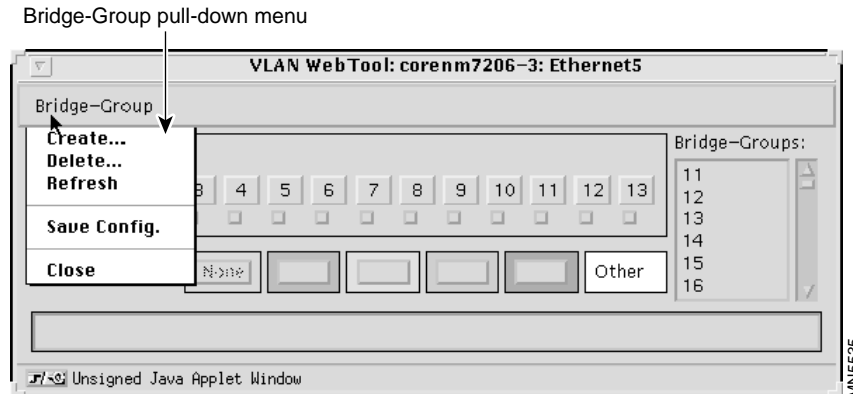
Creating a Bridge Group

Follow these steps to create a new bridge group:

Step 1   In the WebTool, select the Create option from the Bridge-Group pull-down menu. (See Figure 4-4.)

The Create New Bridge-Group dialog box appears. (See Figure 4-5.)

Figure 4-4   12E/2FE VLAN Configuration WebTool Pull-Down Menu

Step 2   In the Create New Bridge-Group dialog box, enter the new bridge-group number and select OK.

After entering the new bridge-group number and selecting OK, the status line of the WebTool indicates that the new bridge group was created, and the new bridge-group number is listed in the WebTool's configured Bridge-Groups list box. (See Figure 4-6.)

> **Note**   The acceptable range of bridge-group numbers is from 1 to 63. The status line of the WebTool will indicate if the number specified for the new bridge group is already in use or is out of the acceptable range (1-63).

Figure 4-5   Create New-Bridge Group Dialog Box
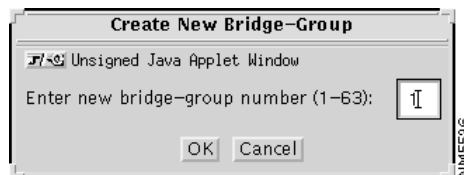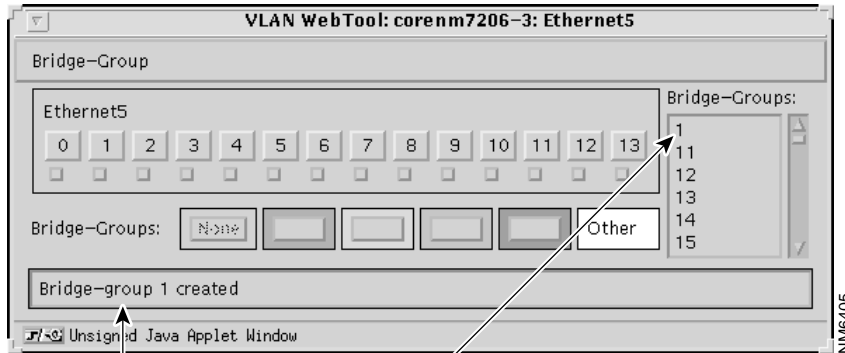
Figure 4-6   Verifying a New Bridge Group

New bridge group status   New bridge group

Step 3   Repeat Step 1 and Step 2 for additional bridge groups.

Step 4   Save the change by selecting the Save Config option from the Bridge-Group pull-down menu. (See Figure 4-4.)

This completes the procedure for creating a new bridge group using the 12E/2FE VLAN Configuration WebTool.

Assigning a Color to a New Bridge Group

Using the WebTool you can assign a color to four of the router's configured bridge groups and their 12E/2FE interfaces so that you can easily identify which 12E/2FE interfaces are assigned to a bridge group.

Note   While the configured Bridge-Groups list box displays all bridge groups configured on the router, you can only assign a color to four bridge groups at a time.

Follow these steps to assign a color to a new bridge group:

Step 1   Select the new bridge group from the configured Bridge-Groups list box. The status line of the WebTool prompts you to assign the bridge group to a color. (See Figure 4-7.)

Figure 4-7   Selecting the New Bridge Group

Status line prompt   Colored buttons   Selected bridge group
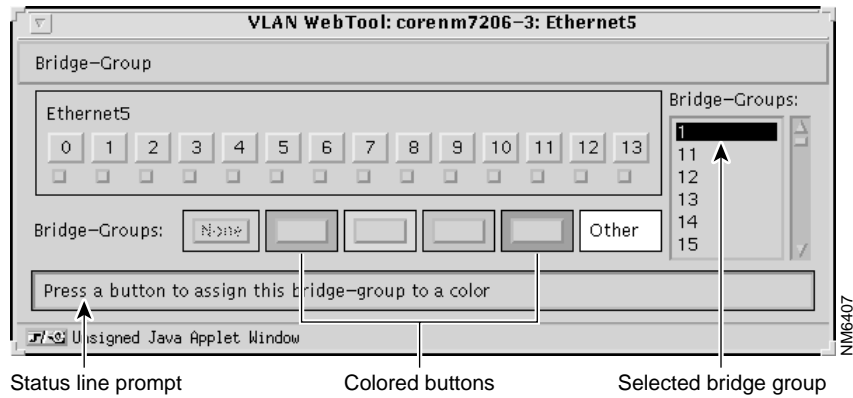
Step 2   After selecting the bridge group from the Bridge-Groups list box, select one of the Bridge-Groups colored buttons.

The bridge group's number is listed in the selected button, the status line of the WebTool indicates that the colored button represents the new bridge group, and the color of the button is applied to the bridge group's 12E/2FE interfaces. (See Figure 4-8.)

Figure 4-8   Assigning a Color to the New Bridge Group

Updated   Selected button
button status
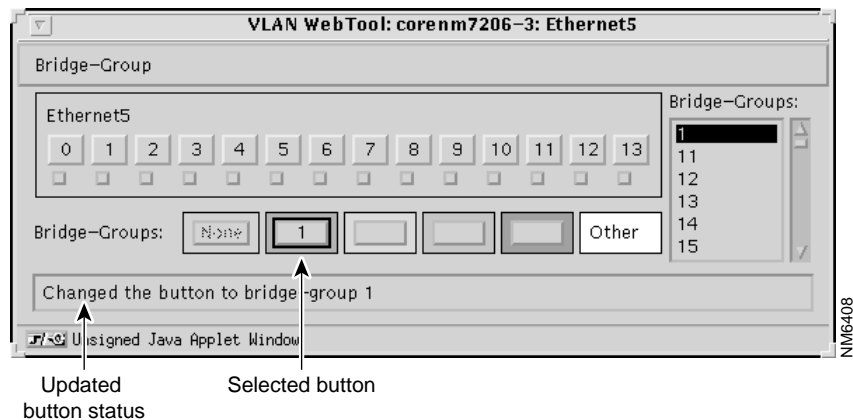
Step 3   Repeat Step 1 and Step 2 for additional bridge groups.

This completes the procedure for assigning a color to a new bridge group using the 12E/2FE VLAN Configuration WebTool.
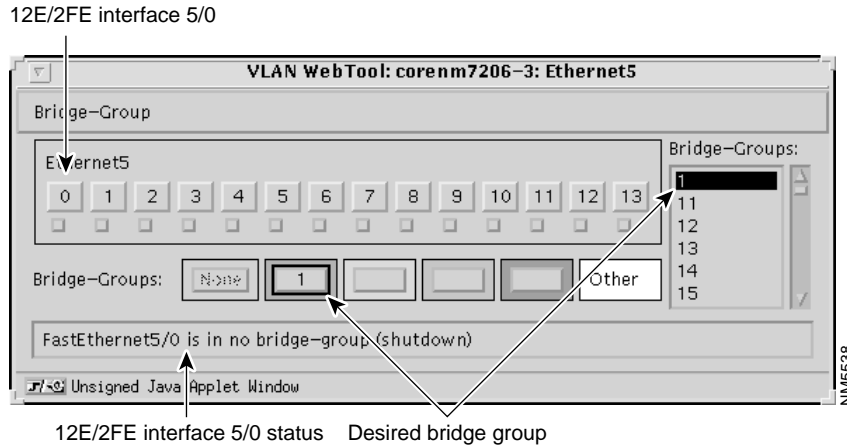
Adding an Interface to a Bridge Group

The following procedure explains how to add a 12E/2FE interface to a bridge group. Before adding a 12E/2FE interface to a bridge group, make sure the desired bridge group is listed in the Bridge-Groups list box and assigned to one of the Bridge-Groups colored buttons. See earlier sections for instructions.

In Figure 4-9, bridge group 1 is listed in the Bridge-Groups list box and is assigned to the first Bridge-Groups colored button.

Note   Placing the cursor over a 12E/2FE interface displays the bridge group and administrative status of the interface in the status line of the WebTool. In Figure 4-9, the first 12E/2FE interface (FastEthernet5/0) is not assigned to a bridge group and is administratively down.

Figure 4-9   Selecting an Interface

12E/2FE interface 5/0



12E/2FE interface 5/0 status   Desired bridge group

Step 1   After verifying that the desired bridge group is listed in the Bridge-Groups list box and assigned to a Bridge-Group button, select the 12E/2FE interface you want to add, and then select the Bridge-Group button.

In Figure 4-10, 12E/2FE interface 5/0 is added to bridge group 1.

Note   To select multiple 12E/2FE interfaces, hold down the **Shift** key as you select each interface.

Figure 4-10   Verifying an Added Interface

Selected 12E/2FE interface 5/0

Updated 12E/2FE   Selected button
interface 5/0 status
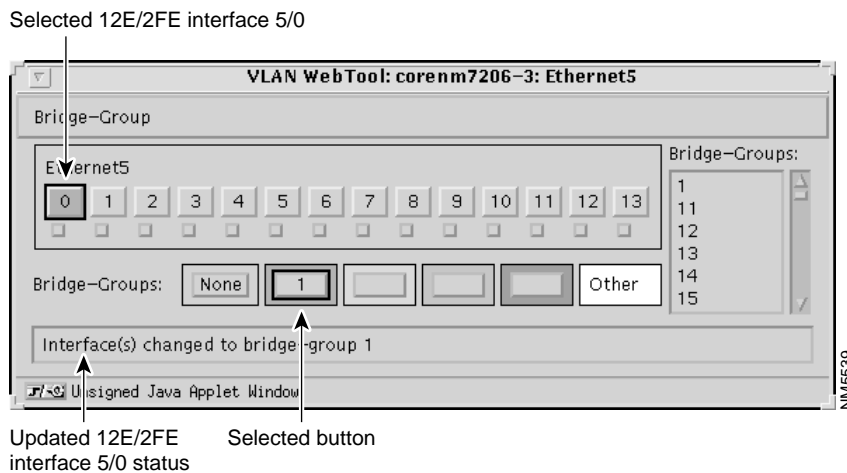
Step 2   Make sure the status line of the WebTool indicates that the interface was added to the correct bridge group.

Step 3   Bring up the interface by selecting the administrative check box below the interface. (See Figure 4-11.)

Note   To shut down an interface, clear the administrative check box below an interface.

Figure 4-11   Bringing Up an Interface
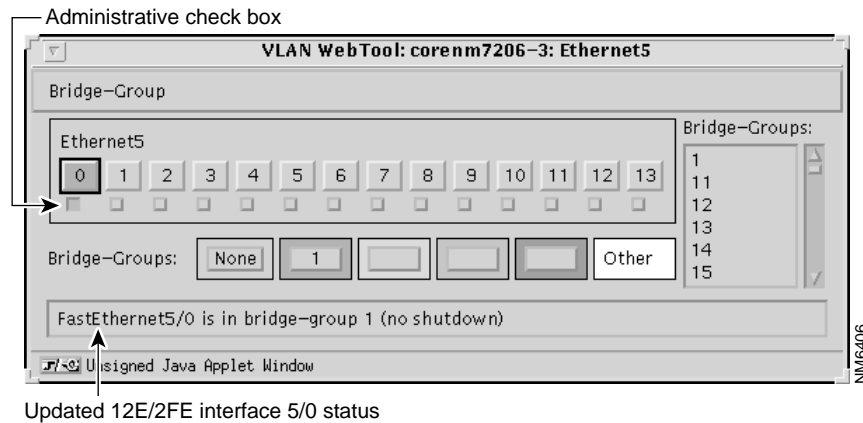
Updated 12E/2FE interface 5/0 status

Step 4   Repeat Step 1 through Step 3 for additional interfaces and bridge groups.

Step 5   Save the change by selecting the Save Config option from the Bridge-Group pull-down menu. (See Figure 4-4.)

This completes the procedure for adding a 12E/2FE interface to a bridge group.

Removing an Interface From a Bridge Group

Follow these steps to remove a 12E/2FE interface from a bridge group:

**Step 1**   In the WebTool, select the 12E/2FE interface you want to remove.

Note   To display the status of a 12E/2FE interface (its assigned bridge-group and administrative state [up or down]) in the status line of the Webtool, place your cursor over the interface.

Note   To select multiple 12E/2FE interfaces, hold down the **Shift** key as you select each interface.

Step 2   After selecting the 12E/2FE interface you want to remove, select the None option (next to the Bridge-Groups colored buttons). (See Figure 4-12.)

Figure 4-12   Verifying the Removed Interface

Selected 12E/2FE interface 5/0

Updated 12E/2FE   No bridge group selected
interface 5/0 status
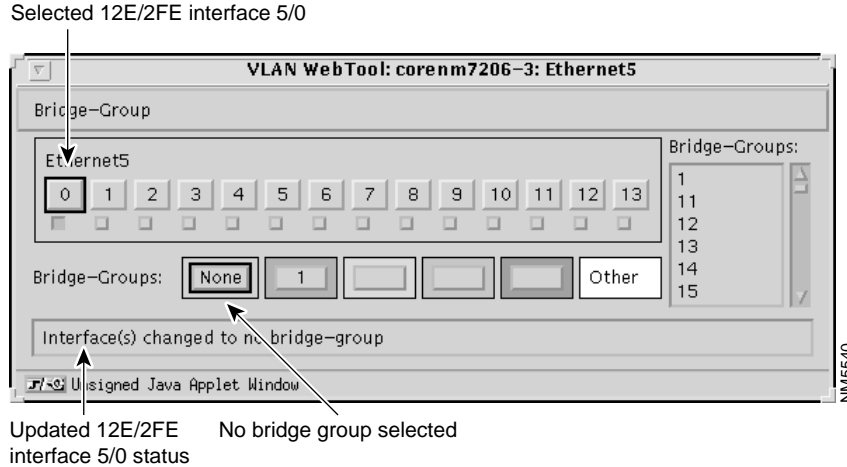
Step 3   Repeat Step 1 and Step 2 for additional interfaces.

Step 4   Save the change by selecting the Save Config option from the Bridge-Group pull-down menu. (See Figure 4-4.)

This completes the procedure for removing a 12E/2FE interface from a bridge group.
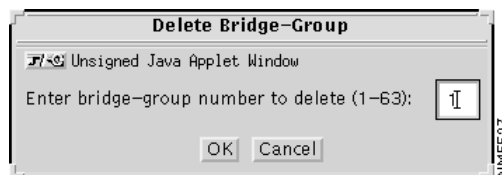
Deleting a Bridge Group

Follow these steps to delete a bridge group:

Step 1   In the WebTool, select the Delete option from the Bridge-Group pull-down menu. (See Figure 4-4.) The Delete Bridge-Group dialog box appears. (See Figure 4-13.)

Step 2   In the Delete Bridge-Group dialog box, enter the bridge-group number and select OK.

✎

Note   The acceptable range of bridge-group numbers is from 1 to 63.

Figure 4-13   Delete a Bridge-Group Dialog Box

Step 3   After entering the bridge-group number and selecting OK in the Delete Bridge-Group dialog box, make sure the status line of the WebTool indicates that the bridge group was removed and that the removed bridge group is not listed in the Bridge-Groups list box. (See Figure 4-14.)

✎

Note   When you remove a bridge group, all interfaces associated with the removed bridge group are given no bridge group status, the bridge-group number is removed from its assigned color, and the assigned color is removed from the bridge group's interfaces.

✎

Note   The status line of the WebTool indicates if the number specified for the bridge group you want to remove exists or is out of the acceptable range (1-63).

Figure 4-14   Verifying a Deleted Bridge Group

Selected 12E/2FE interface 5/0   Bridge group 1 has been removed

Updated bridge group 1 status
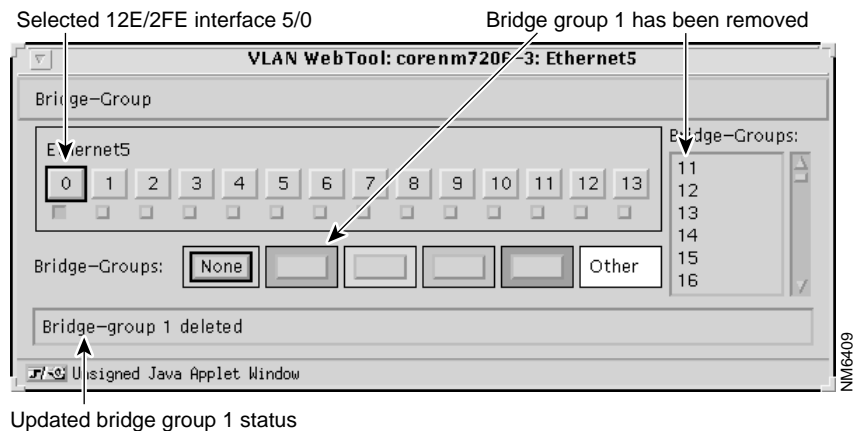
Step 4   Repeat Step 1 through Step 3 for additional bridge groups.

Step 5   Save the change by selecting the Save Config option from the Bridge-Group pull-down menu. (See Figure 4-4.)

This completes the procedure for deleting a bridge group.

For additional information about accessing the router home page and using the Cisco Web browser interface, refer to the "Understanding the User Interface" chapter of the *Configuration Fundamentals Configuration Guide*.