



Text Part Number: 78-3158-04

PA-5EFL Ethernet 10BASE-FL Port Adapter Installation and Configuration

Product Numbers: PA-5EFL and PA-5EFL=

Introduction

This configuration note describes the installation and configuration of the Ethernet 10BASE-FL port adapter (PA-5EFL[=]), which can be used in the following platforms:

- Cisco 7200 series routers—which consist of the 2-slot Cisco 7202, 4-slot Cisco 7204 and Cisco 7204VXR, and the 6-slot Cisco 7206 and Cisco 7206VXR
- Cisco uBR7246 universal broadband router
- Second-generation Versatile Interface Processor (VIP2) in all Cisco 7500 series routers and in Cisco 7000 series routers using the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI) installed.

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- Cisco 7200 Series and the 5EFL Port Adapter, page 25

The section “Cisco Connection Online,” on page 38, includes general reference information.

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If You Need More Information

The Cisco IOS software running your router contains extensive features and functionality. The effective use of many of many of these features is easier if you have more information at hand. For additional information on configuring and maintaining the Cisco 7000 series, Cisco 7200 series, and Cisco 7500 series routers, and PA-5EFL, the following documentation resources are available:

- For hardware installation and maintenance information on the Cisco 7000 series and Cisco 7500 series routers, and the VIP2, refer to the following publications:
 - The installation and configuration guide that shipped with your Cisco 7000 series or Cisco 7500 series router
 - *Second-Generation Versatile Interface Processor (VIP2) Installation and Configuration* (for VIP2 users only)
- For hardware installation and maintenance information on the Cisco 7200 routers, refer to the following publications that shipped with your router:
 - *Cisco 7202 Installation and Configuration Guide*
 - *Cisco 7204 Installation and Configuration Guide*
 - *Cisco 7206 Installation and Configuration Guide*
- For hardware installation and maintenance information on the Cisco 7200VXR routers, refer to the *Cisco 7200 VXR Installation and Configuration Guide* publication that shipped with your Cisco 7200VXR router.
- To view Cisco documentation or obtain general information about the documentation, refer to the “Cisco Connection Online” section on page Reference, the “Cisco Connection Online” section on page 38, or call 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 company holidays). You can also send e-mail to cs-rep@cisco.com, refer to the *Cisco Information Packet* that shipped with your router, or access Cisco documentation on the World Wide Web at <http://www.cisco.com>, <http://www-china.cisco.com>, or <http://www-europe.cisco.com>.

Port Adapter Installation Prerequisites

This section provides software requirements, a list of parts and tools you will need to perform the port adapter installation, and safety and ESD-prevention guidelines to help you avoid injury and damage to the equipment during installation. Also included is information on the systems in which port adapters can be installed and overview information on interface specifications.

The following sections discuss general information and information about port adapter installation requirements:

- Software and Hardware Requirements
- Tools and Parts Required, page 3
- Safety Guidelines, page 4
- Ethernet and Ethernet 10BASE-FL Overview, page 6
- IEEE 802.3 10BASE-FL Specifications, page 7

Tools and Parts Required

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-5EFL(=) port adapter and one of the following:
 - VIP2-15(=), VIP2-20=, VIP2-40(=) or VIP2-50(=)
 - Cisco 7200 series router with at least one available port adapter slot
- Cables appropriate for the port adapter interfaces (ST-type optical-fiber cables are not available from Cisco Systems; they are available from outside commercial cable vendors.)
- Number 1 Phillips and a 3/16-inch, flat-blade screwdriver.
- Your own ESD-prevention equipment or the disposable grounding wrist strap included with all upgrade kits, FRUs, and spares.

Software and Hardware Requirements

Table 1 PA-5EFL Port Adapter Software Requirements

Router Platform	Minimum Cisco IOS Release
Cisco 7000 series and Cisco 7500 series	
• With VIP2-15 or VIP2-40	Cisco IOS Release 11.1(472) or a later release of Cisco IOS Release 11.1 Cisco IOS Release 11.1(6)CA or a later release of Cisco IOS Release 11.1 CA Cisco IOS Release 11.2(1) or a later release of Cisco IOS Release 11.2 Cisco IOS Release 11.2(6)P or a later release of Cisco IOS Release 11.1 P Cisco IOS Release 11.1(14)CA or a later release of Cisco IOS Release 11.1 CA
• With VIP2-50	Cisco IOS Release 11.1(14)CA or a later release of Cisco IOS Release 11.1 CA
Cisco 7200 series	
• Cisco 7204VXR and Cisco 7206VXR	Cisco IOS Release 12.0(3)T or a later release of Cisco IOS Release 12.0 T Cisco IOS Release 12.0(2)XE2 or a later release of Cisco IOS Release 12.0 XE
• Cisco 7204 and Cisco 7206	Cisco IOS Release 11.1(9)CA1 or a later release of Cisco IOS Release 11.1 CA
• Cisco 7202	Cisco IOS Release 11.1(19)CC1 or a later release of Cisco IOS Release 11.1 C Cisco IOS Release 11.3(4)AA or a later release of Cisco IOS Release 11.3 AA

In the Cisco 7000 series or Cisco 7500 series routers, the 5EFL port adapter requires the following VIP2 models:

- VIP2-15 (1 MB of SRAM, 8 MB of DRAM)
- VIP2-20 (1 MB of DRAM, 16 MB of SRAM)
- VIP2-40 (2 MB of SRAM, 32 MB of DRAM)
- VIP2-50 (4 to 8 MB of SRAM, 32 to 128 MB of DRAM)



Caution To prevent system problems, the VIP2 requires that the Cisco 7000 series router has the RSP7000 and RSP7000CI installed. The VIP2 will *not* operate properly with the Route Processor (RP), Switch Processor (SP), or Silicon Switch Processor (SSP) installed in the Cisco 7000 series router.

Note Port adapters used with the 7200 VXR routers require the correct base hardware revision in order to function. The following error message will occur on bootup if the incorrect hardware revision is used:

```
> PA-3-REVNOTSUPPORTED:PA in slot 1 (Ethernet) requires base h/w revision of (1.5)
for this chassis
```

Use the **sh diag** command to display the hardware revision. (See the “Using show Commands to Display Interface Information” section on page 34).

Note The minimum recommended VIP2 model is a VIP2-15.

Safety Guidelines

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

Safety Warnings

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



Warning 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 være 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.

Warning! 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 förekommer 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 and never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe. Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

Telephone Wiring Guidelines

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

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

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. Port adapters and processor modules consist of 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.

Ethernet and Ethernet 10BASE-FL 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. Ethernet Version 2 and IEEE 802.3 were based on, and developed shortly after, Ethernet Version 1. The slight differences between Ethernet and IEEE 802.3 are implemented in hardware, and both are supported automatically by the 5EFL without any hardware configuration

changes. Together, Ethernet and IEEE 802.3 are the most widely used LAN protocols. They are well suited to applications where a local communication medium must carry sporadic, occasionally heavy traffic at high peak data rates.

The term *10BASE-FL* is an abbreviation for *10* Mbps transmission, *Baseband* medium, *F* for fiber, and *L* for link, as defined in the 10BASE-FL specification. The Ethernet specifications call the 5EFL device a *transceiver*, and it is connected to the station with a *transceiver cable*. The 5EFL port adapter is not an end station. The IEEE 802.3 specifications refer to the same type of device as a *media attachment unit* (MAU). 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, 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 they should retransmit.

Both Ethernet and IEEE 802.3 are broadcast networks, which means that all stations see all transmissions. Each station must examine received frames to determine whether it is the intended destination and, if it is, pass the frame to a higher protocol layer for processing. IEEE 802.3 specifies several different physical layers, and Ethernet defines only one. Each IEEE 802.3 physical layer protocol has a name that summarizes its characteristics in the format *speed/signaling method/segment length* where *speed* is the LAN speed in Mbps, *signaling method* is the signaling method used (either *Baseband* or *Broadband*), and *segment length* is the maximum length between stations in hundreds of meters. The maximum distances for Ethernet network segments and connections depend on the type of transmission cable used; for example, fiber-optic cable (10BASE-FL).

IEEE 802.3 10BASE-FL Specifications

Table 2 summarizes the characteristics of IEEE 802.3 Ethernet and Ethernet 10BASE-FL.

Table 2 IEEE 802.3 Ethernet and Ethernet 10BASE-FL Physical Characteristics

Parameter	IEEE 802.3 Ethernet	10BASE-FL Ethernet
Data Rate (Mbps)	10	10
Signaling method	Baseband	Baseband
Media	50-ohm coax (thick)	Multimode optical fiber
Topology	Bus	Star

Table 3 lists the distance limitations for 10-Mbps transmission over multimode optical-fiber cables.

Table 3 Cable Distance Limitations for 10-Mbps 10BASE-FL Transmission

Parameter	ST Connections
Cable specification	Multimode fiber-optic cable ¹
Maximum segment lengths	400 m (1,312 ft) for any repeater-to-DTE fiber segment 500 m (1,640 ft) with four repeaters and five segments 1000 m (3,280 ft) for any inter-repeater fiber segment 2km (6,561 ft) without a repeater

¹ Cisco Systems does not supply fiber-optic cables; these cables are available commercially.

Table 4 lists multimode optical-fiber parameters.

Table 4 Multimode Optical-Fiber Parameters

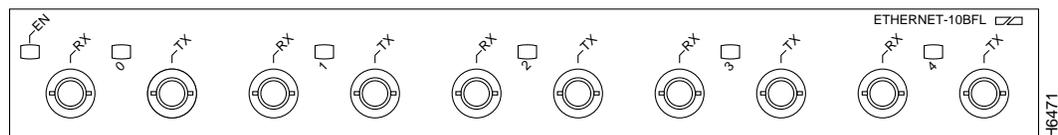
Parameter	Multimode
Size	62.5/125 micrometer (nominal diameter) optical fiber ¹
Attenuation	3.75 dB/km, at 850 nanometers (nm)
Insertion loss	< 12.5 dB, at 850 nm
Bandwidth	> 160MHzkm, at 850 nm
Propagation delay	5 microseconds/km

¹ Specified in IEC Publication 793-2[14].

What Is the 5EFL Port Adapter?

The 5EFL port adapter provides up to five IEEE 802.3 Ethernet 10BASE-FL interfaces. (See Figure 1.) Each Ethernet 10BASE-FL interface allows a maximum bandwidth of 10 Mbps, for a maximum aggregate bandwidth of 50 Mbps, half-duplex. Each 10BASE-FL interface uses two multimode (ST) receptacles for receive (RX) and transmit (TX). All five ports run at wire speed.

Figure 1 5EFL Port Adapter, Faceplate View



Port Adapter Locations on the VIP2 and in the Cisco 7200 Series Routers

This section provides information about where you can install the 5EFL port adapter on the VIP2 and in the Cisco 7200 series routers.

Note Port adapters have handles that allow for easy installation and removal; however, they are occasionally not shown in this publication to highlight port adapter faceplate detail.

Figure 2 shows a VIP2-15 or VIP2-40 with two installed port adapters. Figure 3 shows a VIP2-50 with two installed port adapters. With the VIP2 oriented as shown, the left port adapter is in port adapter slot 0, and the right port adapter is in port adapter slot 1.

Figure 2 Two Port Adapters on a VIP2-15 or VIP2-40 (Horizontal Orientation Shown)

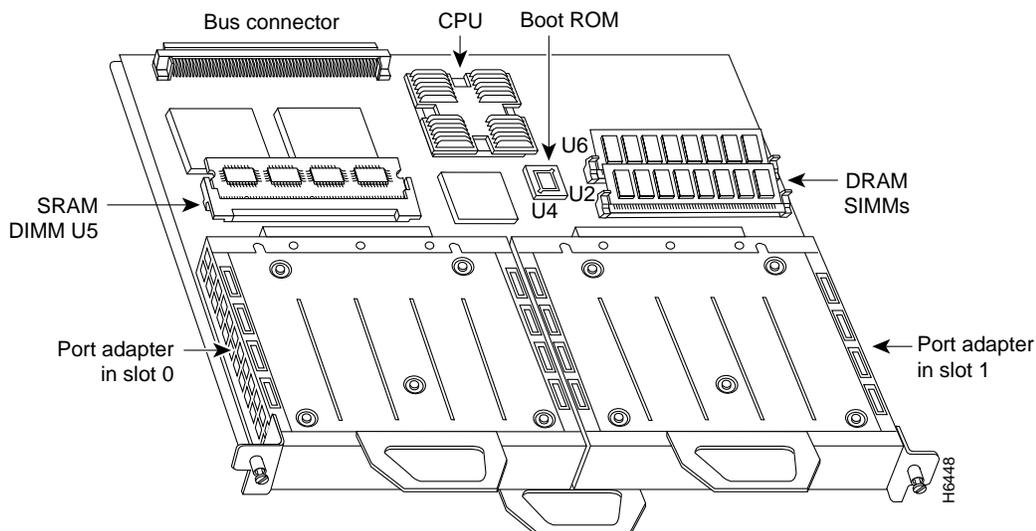
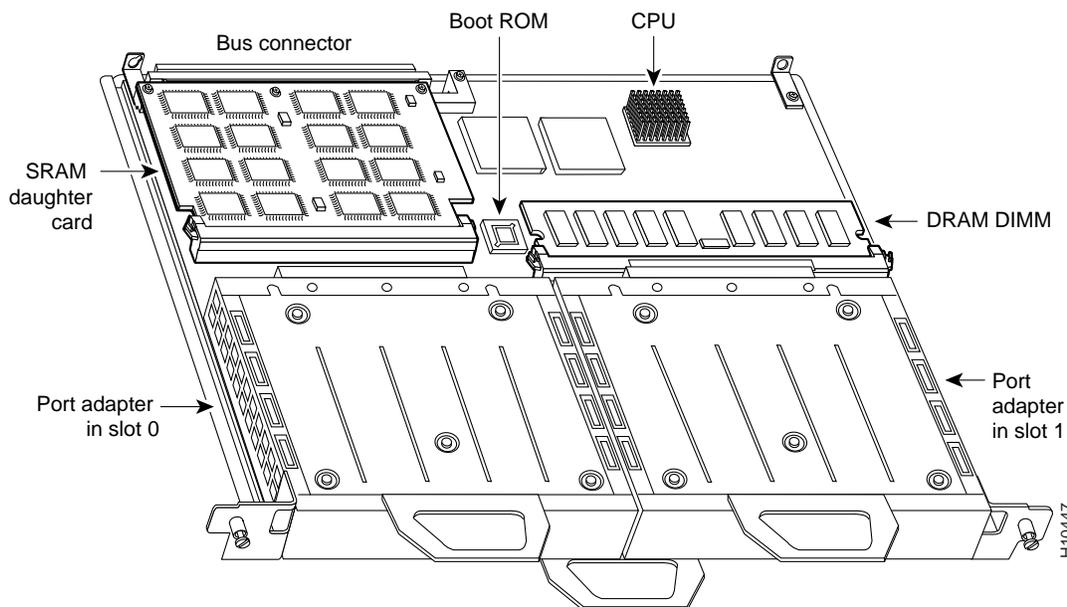


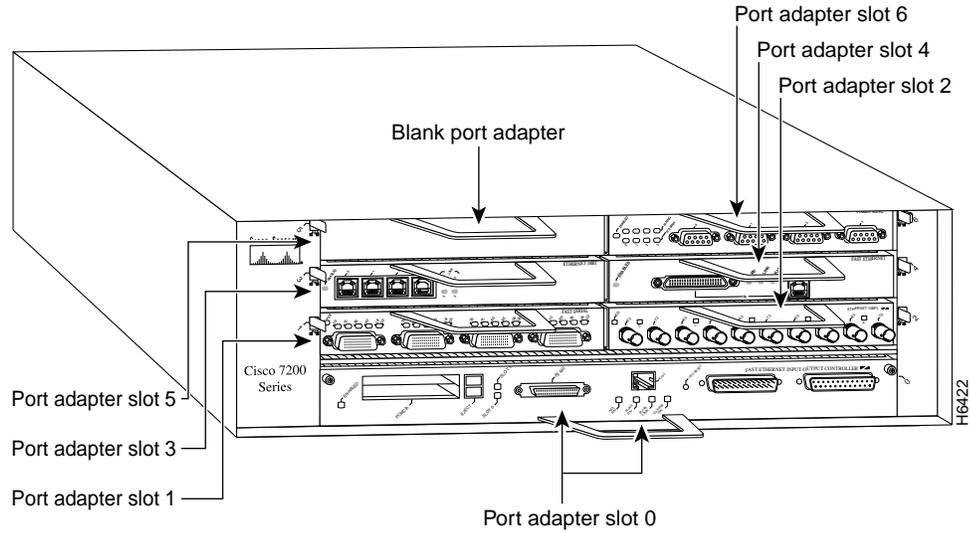
Figure 3 Two Port Adapters on a VIP2-50 (Horizontal Orientation Shown)



Note In the Cisco 7000, Cisco 7507, and Cisco 7513 chassis, the VIP2 is installed vertically. In the Cisco 7010 and Cisco 7505 chassis, the VIP2 is installed horizontally.

Figure 4 shows a Cisco 7206 with port adapters installed. In the Cisco 7206 and Cisco 7206VXR, port adapter slot 1 is in the lower left position and port adapter slot 6 is in the upper right position. The Cisco 7204 and Cisco 7204VXR are not shown, but have four port adapter slots; PA-5EFL can be installed in any of these four slots.

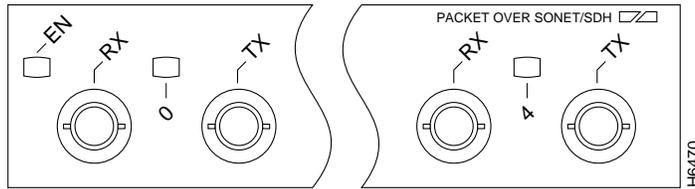
Figure 4 Port Adapters in the Cisco 7206



5EFL Port Adapter LEDs

The 5EFL port adapter contains the enabled LED, standard on all port adapters, and one status LED for each port, called the *link* LED. After system initialization, the enabled LED goes on to indicate that the 5EFL port adapter has been enabled for operation. (The LEDs are shown in Figure 5.)

Figure 5 LEDs on the 5EFL Port Adapter, Partial Faceplate View



The following conditions must be met before the enabled LED goes on:

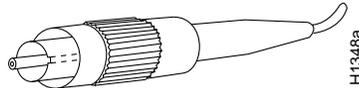
- The 5EFL interface is correctly connected and receiving power
- The 5EFL-equipped card or chassis contains a valid microcode version that has been downloaded successfully
- The bus recognizes the 5EFL port adapter or 5EFL-equipped VIP2

If any of these conditions is not met, or if the initialization fails for other reasons, the enabled LED does not go on. When a 10BASE-FL port is active, its link LED is on when the 5EFL port adapter is receiving a carrier signal from the network.

5EFL Port Adapter Multimode Fiber-Optic Cable and Receptacles

The interface connectors on the 5EFL port adapter are five pairs of (ST) receptacles, designated as *RX* and *TX*. You can use all five connection pairs simultaneously or any combination of each pair individually. Each connection pair supports IEEE 802.3 and Ethernet 10BASE-FL interfaces compliant with appropriate standards. Figure 6 shows the ST fiber-optic cable plug used for RX and TX connections.

Figure 6 Ethernet 10BASE-FL Fiber-Optic Cable Plug (ST Type)



Note The 5EFL interfaces on a VIP2 are configured for 10 Mbps, half duplex, for a maximum aggregate bandwidth of 50 Mbps for half-duplex. Cisco Systems does not supply ST-type optical-fiber cables; these cables are available commercially. For ST-type, multimode optical-fiber cable specifications and transmission distance limitations and requirements, refer to the section “IEEE 802.3 10BASE-FL Specifications” on page 7.

VIP2 and the 5EFL Port Adapter

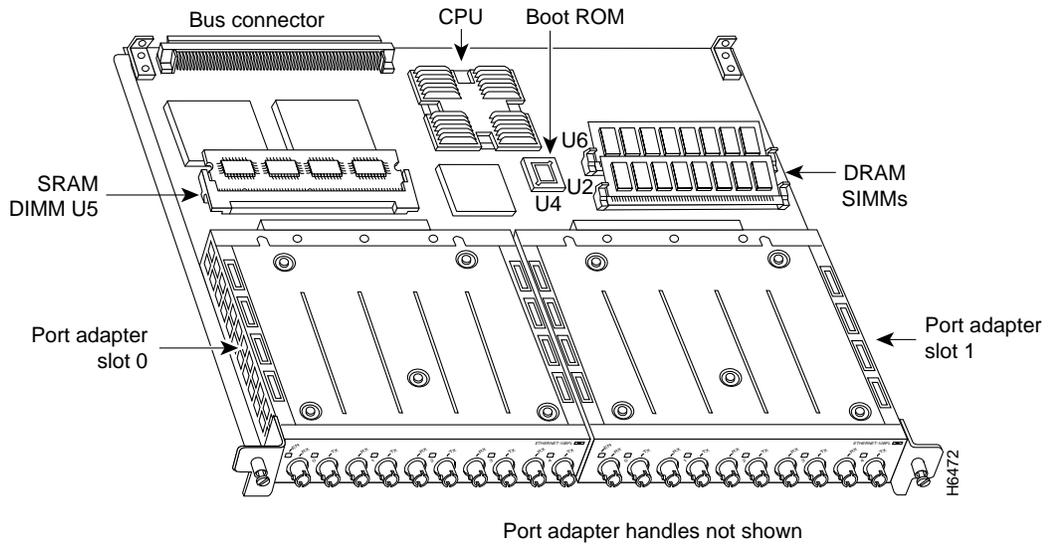
This section describes the 5EFL port adapter and its use with the VIP2.

The following sections provide additional information specific to the 5EFL port adapter and its use on the VIP2 in Cisco 7000 series and Cisco 7500 series routers:

- Installing or Replacing a Port Adapter on a VIP2, page 13
- Attaching 5EFL Port Adapter Interface Cables, page 17
- Configuring the 5EFL Interfaces, page 17
 - Selecting Chassis Slot, Port Adapter, and Ethernet 10BASE-FL Interface Port Numbers, page 18
 - Configuring the 5EFL Interfaces, page 17
 - Checking the Configuration, page 20

The 5EFL port adapter can be installed on the VIP2 in port adapter slot 0 and port adapter slot 1. Figure 7 shows two 5EFL port adapters installed in port adapter slots 0 and 1 on a VIP2-15 or VIP2-40.

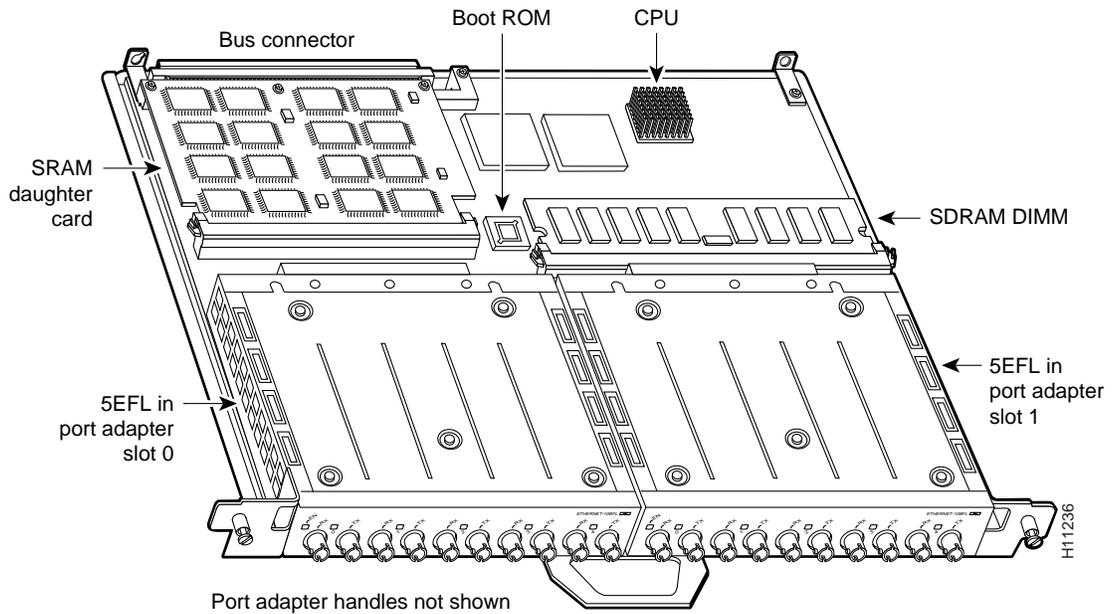
Figure 7 VIP2-15 or VIP2-40 with Two 5EFL Port Adapter Installed (Horizontal Orientation Shown)



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

Figure 8 shows two 5EFL port adapters installed in port adapter slots 0 and 1 on a VIP2-50.

Figure 8 VIP2-50 with Two 5EFL Port Adapters Installed (Horizontal Orientation Shown)



Installing or Replacing a Port Adapter on a VIP2

This section provides the standard procedures for installing or replacing a port adapter on the VIP2.

Depending on the circumstances, you might need to install a new port adapter on a VIP2 motherboard or replace a failed port adapter in the field. In either case, you need a number 1 Phillips screwdriver, an antistatic mat onto which you can place the removed interface processor, and an antistatic container into which you can place a failed port adapter for shipment back to the factory.



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

Note Each port adapter circuit board is mounted to a metal carrier and is sensitive to ESD damage. Each port adapter has one Phillips-head screw that secures it to its port adapter slot. We strongly recommend that the following procedures be performed by a Cisco-certified service provider; however, this is not a requirement.

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



Caution To prevent interface reconfiguration requirements, you *should* replace a port adapter with the same type of port adapter you removed, but this is not a requirement.

When only one port adapter is installed on a VIP2, a blank port adapter must fill the empty slot to allow the VIP2 and router chassis to conform to electromagnetic interference (EMI) emissions requirements, and so that air flows through the chassis properly. If you plan to install a new port adapter, you must first remove the blank port adapter.

Use the following standard procedure to remove and replace any type of port adapter on a VIP2:

Step 1 Attach an ESD-preventive wrist strap between you and an unfinished chassis surface.

Note If you want to install a new port adapter on a VIP2 with a single port adapter, you must first remove the blank port adapter from the port adapter slot in which you want to install the new port adapter.

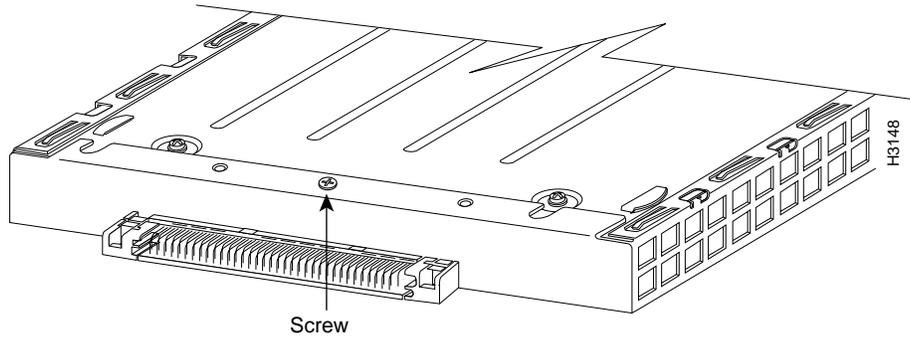
Step 2 For a new port adapter installation or a port adapter replacement, disconnect any interface cables from the ports on the front of the port adapter, although, this is not required. You can remove VIP2s with cables attached; however, we do not recommend it.

Step 3 Remove the VIP2 from the system. (Follow the steps in the section “Removing a VIP2” in the configuration note *Second-Generation Versatile Interface Processor (VIP2) Installation and Configuration*, which shipped with your VIP2.)

Step 4 Place the removed VIP2 on an antistatic mat.

Step 5 Locate the screw at the rear of the port adapter (or blank port adapter) to be replaced. (See Figure 9.) This screw secures the port adapter (or blank port adapter) to its slot.

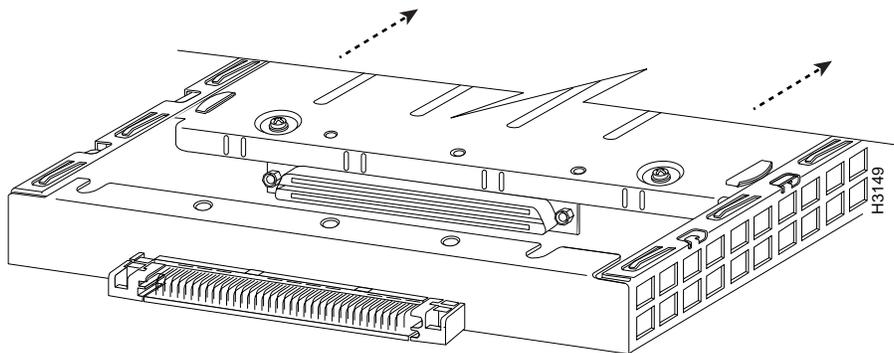
Figure 9 Location of Port Adapter Screw (Partial Port Adapter View)



Step 6 Remove the screw that secures the port adapter (or blank port adapter).

Step 7 With the screw removed, grasp the handle on the front of the port adapter (or blank port adapter) and carefully pull it out of its slot, away from the edge connector at the rear of the slot. (See Figure 10.)

Figure 10 Pulling a Port Adapter Out of a Slot (Partial Port Adapter View)



Step 8 If you removed a port adapter, place it in an antistatic container for safe storage or shipment back to the factory. If you removed a blank port adapter, no special handling is required; however, store the blank port adapter for potential future use.

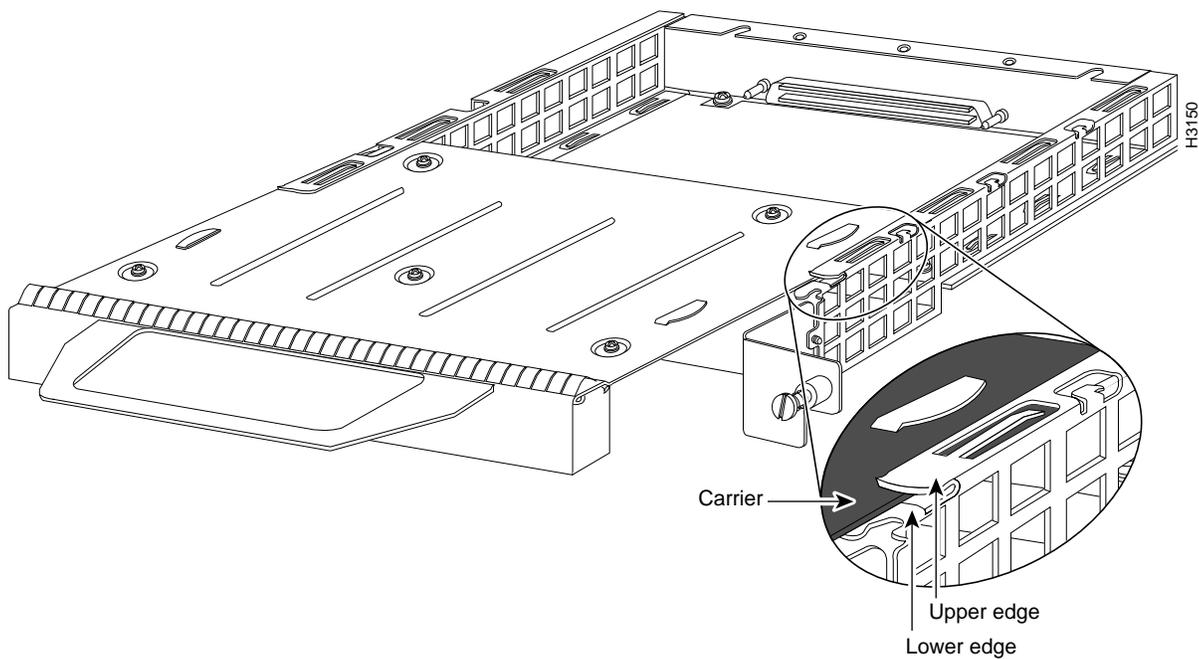
Step 9 Remove the new port adapter from its antistatic container and position it at the opening of the slot. (See Figure 11.)

Step 10 Carefully align the port adapter carrier between the upper and lower edges of the port adapter slot, as shown in Figure 11.



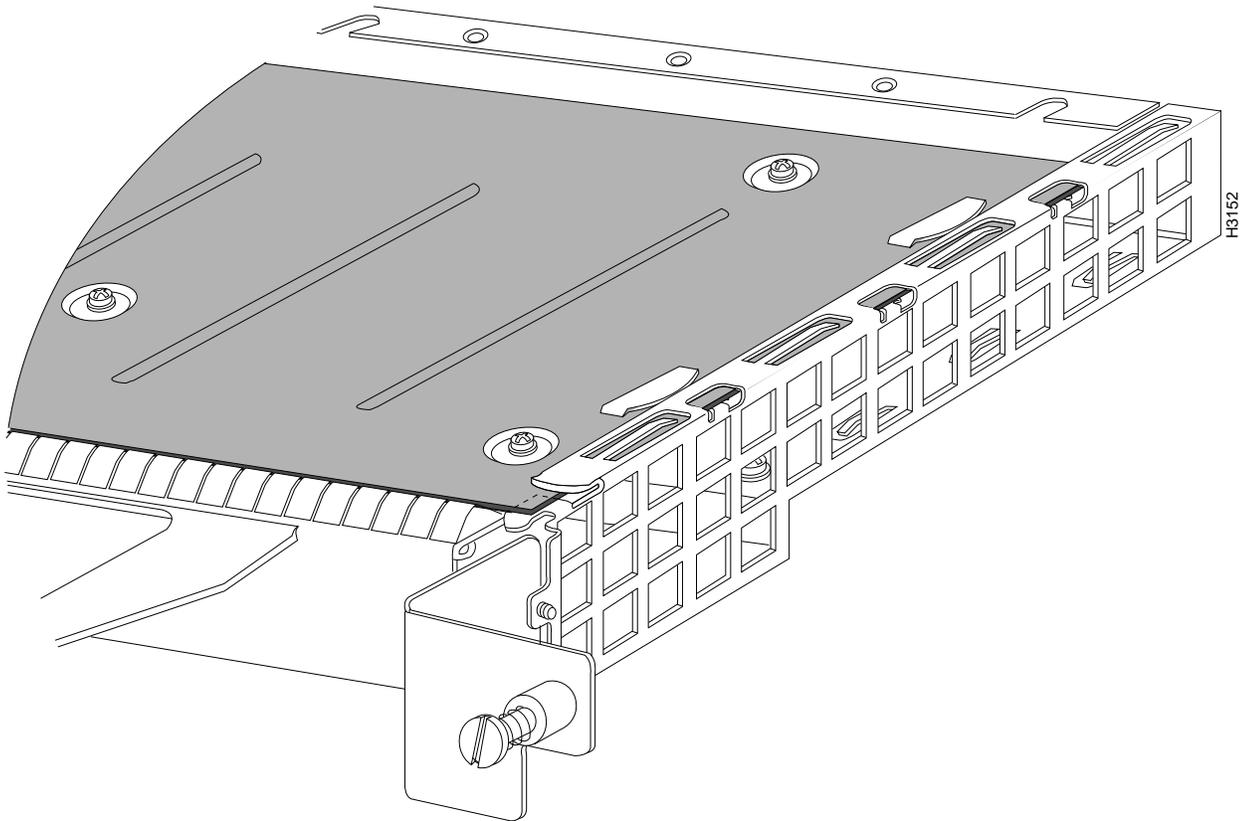
Caution To prevent jamming the carrier between the upper and lower edges of the port adapter slot, and to assure that the edge connector at the rear of the port adapter mates with the connector at the rear of the port adapter slot, make certain that the leading edges of the carrier are between the upper and lower slot edges, as shown in the cutaway in Figure 11.

Figure 11 Aligning a Port Adapter in a Port Adapter Slot



- Step 11** Carefully slide the new port adapter into the port adapter slot until the connector on the port adapter is completely mated with the connector on the motherboard.

Figure 12 Port Adapter Installed in a Port Adapter Slot (Partial Port Adapter View)



- Step 12** Replace the screw in the rear of the port adapter slot. (See Figure 9 for its location.) Do not overtighten this screw.
- Step 13** Reinstall the VIP2 in the system. (Follow the steps in the section “Installing a VIP2” in the configuration note *Second-Generation Versatile Interface Processor (VIP2) Installation and Configuration*, which shipped with your VIP2.)
- Step 14** If disconnected, reconnect the interface cables to the port adapters.

This completes the procedure for installing a new port adapter or replacing a port adapter on a VIP2.

Attaching 5EFL Port Adapter Interface Cables

On a single 5EFL port adapter, you can use up to five pairs of ST fiber-optic connections. The 5EFL port adapter is an end station device and not a repeater. You *must* connect the 5EFL port adapter to a 10BASE-FL repeater or hub. ST-type fiber-optic cables are not available from Cisco Systems; they are available from outside commercial cable vendors.

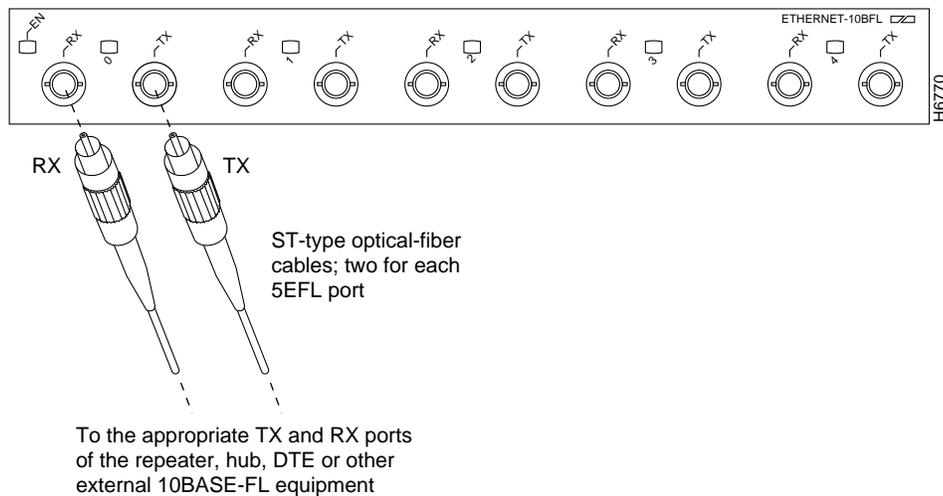
Use the following procedure to connect ST fiber-optic cables to the 5EFL port adapter:

Step 1 Attach the RX multimode fiber-optic cable directly to the RX port on the 5EFL port adapter. (See Figure 13.)

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

Step 2 Attach the TX multimode fiber-optic cable directly to the TX port on the 5EFL port adapter. (See Figure 13.)

Figure 13 Connecting 5EFL Port Adapter ST Cable Pairs



Step 3 Connect a 5EFL RX port to the appropriate TX port of the repeater, hub, DTE or other external 10BASE-FL equipment.

Step 4 Connect a 5EFL TX port to the appropriate RX port of the repeater, hub, DTE or other external 10BASE-FL equipment.

Step 5 Repeat Steps 1 and 4 for each additional 5EFL interface connection you require.

This completes cable connection to the 5EFL port adapter.

Configuring the 5EFL Interfaces

If you installed a new 5EFL port adapter or if you want to change the configuration of an existing interface, you must enter configuration mode using the **configure** command. If you replaced a 5EFL port adapter that was previously configured, the system will recognize the new 5EFL interfaces and bring them up in their existing configuration.

After you verify that the new 5EFL port adapter is installed correctly (the enabled LED goes on), use the privileged-level **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.
- Internet protocol (IP) addresses if you plan to configure the interfaces for IP routing.
- Whether the new interfaces will use bridging.

For a summary of the configuration options available and instructions for configuring the 5EFL interfaces on the VIP2, refer to the appropriate configuration publications listed in the section “If You Need More Information” on page 2.

The **configure** command requires privileged-level access to the EXEC command interpreter, which usually requires a password. Contact your system administrator if necessary to obtain EXEC-level access.

Selecting Chassis Slot, Port Adapter, and Ethernet 10BASE-FL Interface Port Numbers

The following section describes how to identify chassis slot, port adapter, and Ethernet 10BASE-FL interface port numbers.

Note Although the processor slots in the seven-slot Cisco 7000 and Cisco 7507 and 13-slot Cisco 7513 are vertically oriented and those in the five-slot Cisco 7010 and Cisco 7505 are horizontally oriented, all models use the same method for slot and port numbering.

In the router, physical port addresses specify the actual physical location of each interface port on the router interface processor end. (See Figure 14.) This address is composed of a three-part number in the format *chassis slot number/port adapter number/interface port number*, as follows:

- The first number identifies the chassis slot in which the VIP2 is installed (as shown in the example system in Figure 14).
- The second number identifies the physical port adapter number on the VIP2, and is either 0 or 1.
- The third number indicates the interface ports on each 5EFL port adapter are always numbered in sequence as interface 0 through 4.

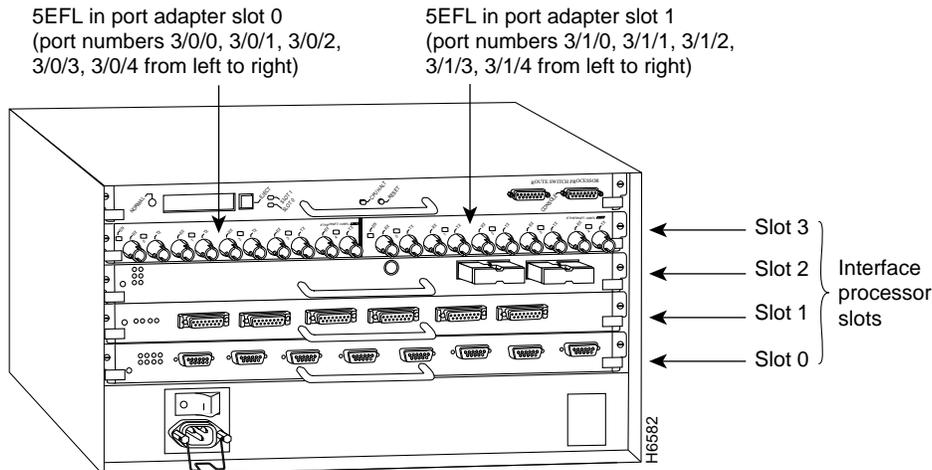
Interface ports on the VIP2 maintain the same address regardless of whether other interface processors are installed or removed. However, when you move a VIP2 to a different slot, the first number in the address changes to reflect the new slot number.

Figure 14 shows some of the slot port adapter and interface ports of a sample Cisco 7505 system. For example, on a VIP2 equipped with a 5EFL port adapter in slot 3, the addresses of the first 5EFL port adapter are 3/0/0 through 3/0/4 (chassis slot 3, port adapter slot 0, and interface ports 0–4), and the addresses of the second 5EFL port adapter are 3/1/0 through 3/1/4 (chassis slot 3, port adapter slot 0, and interface ports 0–4)

The first port adapter slot number is always 0. The second port adapter slot number is always 1. The individual interface port numbers always begin with 0. For example, in Figure 14, the five 10BASE-FL interface ports on the 5EFL port adapter in the first port adapter slot in chassis slot 3, have the following addresses: 3/0/0, 3/0/1, 3/0/2, 3/0/3, and 3/0/4. (See Figure 14.) The interfaces on the second 5EFL port adapter have the following addresses: 3/1/0, 3/1/1, 3/1/2, 3/1/3, and 3/1/4.

Note If you remove the 5EFL-equipped VIP2 from slot 3 and install it in slot 2, the addresses of those same 10BASE-FL ports become 2/0/0 through 2/0/4 and 2/1/0 through 2/1/4.

Figure 14 10BASE-FL Interface Port Number Example (Cisco 7505 Shown)



You can identify interface ports by physically checking the slot/port adapter/interface port location on the back of the router or by using **show** commands to display information about a specific interface or all interfaces in the router.

Configuring Interfaces

The following steps describe a basic configuration. 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>
```

Use the following procedure to perform a basic configuration:

Step 1 At the privileged-level prompt, enter configuration mode and specify that the console terminal will be 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 At the prompt, specify the first interface to configure by entering the subcommand **interface**, followed by the *type (ethernet) and slot/port adapter/interface* (interface processor slot number). The example that follows is for the first interface of the first port adapter, on a VIP2 in interface processor slot 1:

```
Router(config)# interface e 1/0/0
```

- Step 3** If IP routing is enabled on the system, you can assign an IP address and subnet mask to the interface with the **ip address** configuration subcommand, as in the following example:

```
Router(config-int)# ip address 1.1.1.10 255.255.255.0
```

- Step 4** Add any additional configuration subcommands required to enable routing protocols and set the interface characteristics.

- Step 5** Change the shutdown state to up and enable the interface as follows:

```
Router(config-int)# no shutdown
```

- Step 6** Configure additional interfaces as required.

- Step 7** When you have included all of the configuration subcommands to complete the configuration, press **Ctrl-Z** to exit configuration mode.

- Step 8** Write the new configuration to nonvolatile memory as follows:

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

To check the interface configuration using **show** commands, proceed to the section “Checking the Configuration.”

Checking the Configuration

After configuring the new interface, use the **show** commands to display the status of the new interface or all interfaces and the **ping** command to check connectivity.

Using show Commands to Verify the VIP2 Status

The following steps use **show** commands to verify that the new interfaces are configured and operating correctly.

- Step 1** Display the system hardware configuration with the **show version** command. Ensure that the list includes the new serial interfaces.
- Step 2** Display all the current interface processors and their interfaces with the **show controllers cbus** command. Verify that the new VIP2 appears in the correct slot.
- Step 3** Specify one of the new serial interfaces with the **show interfaces type slot/port adapter/interface** command and verify that the first line of the display specifies the interface with the correct slot number. Also verify that the interface and line protocol are in the correct state: up or down.
- Step 4** Display the protocols configured for the entire system and specific interfaces with the **show protocols** command. If necessary, return to configuration mode to add or remove protocol routing on the system or specific interfaces.
- Step 5** Display the running configuration file with the **show running-config** command. Display the configuration stored in NVRAM using the **show startup-config** command. Verify that the configuration is accurate for the system and each interface.

If the interface is down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, ensure that the network interface is properly connected and terminated. If you still have problems bringing the interface up, contact a service representative for assistance.

Using show Commands to Display Interface Information

To display information about a specific interface, use the **show interfaces** command with the interface type and port address in the format **show interfaces** *[type slot/port adapter/port]*.

Following is an example of how the **show interfaces** *[type slot/port adapter/port]* command displays status information (including the physical slot and port address) for the interfaces you specify. In these examples, most of the status information for each interface is omitted, and the five Ethernet 10BASE-FL interfaces (0–4) are in chassis slot 3, in port adapter slot 0. (Interfaces are administratively shut down until you enable them.)

```
Router# sh int e 3/0/0
Ethernet3/0/1 is administratively down, line protocol is down
  Hardware is cyBus Ethernet, address is 0000.0ca5.2300 (bia 0000.0ca5.2389)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
```

```
Router# sh int e 3/0/1
Ethernet3/0/2 is administratively down, line protocol is down
  Hardware is cyBus Ethernet, address is 0000.0ca5.2301 (bia 0000.0ca5.238a)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
```

```
Router# sh int e 3/0/2
Ethernet3/0/3 is administratively down, line protocol is down
  Hardware is cyBus Ethernet, address is 0000.0ca5.2302 (bia 0000.0ca5.238b)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
```

```
Router# sh int e 3/0/3
Ethernet3/0/3 is administratively down, line protocol is down
  Hardware is cyBus Ethernet, address is 0000.0ca5.2303 (bia 0000.0ca5.238c)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
```

```
Router# sh int e 3/0/4
Ethernet3/0/4 is administratively down, line protocol is down
  Hardware is cyBus Ethernet, address is 0000.0ca5.2304 (bia 0000.0ca5.238d)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
```

With the **show interfaces** *type slot/port adapter/port* command, use arguments such as the interface type (ethernet, and so forth) and the slot, port adapter, and port numbers (slot/port adapter/port) to display information about a specific Ethernet 10BASE-FL interface only.

The following example of the **show interfaces ethernet slot/port adapter/port** command shows all of the information specific to the first 5EFL interface port (interface port 0) in chassis slot 3, port adapter slot 1:

```
Router# sh int e 3/1/0
Ethernet3/1/0 is administratively down, line protocol is down
Hardware is cyBus Ethernet, address is 0000.0ca5.2305 (bia 0000.0ca5.238e)
MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
Encapsulation ARPA, loopback not set, keepalive set (10 sec)
ARP type: ARPA, ARP Timeout 4:00:00
Last input never, output never, output hang never
Last clearing of "show interface" counters 2:56:26
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  0 packets input, 0 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  0 input packets with dribble condition detected
  0 packets output, 0 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets, 0 restarts
  0 output buffer failures, 0 output buffers swapped out
```

Note For complete VIP2 command descriptions and examples, refer to the publications listed in the section “If You Need More Information” on page 2.

The **show version** (or **show hardware**) command displays the configuration of the system hardware (the number of each interface processor type installed), the software version, the names and sources of configuration files, and the boot images. Following is an example of the **show version** command used with a Cisco 7500 series system:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-A), Version 11.1(472) [mpo 105]
Copyright (c) 1986-1995 by cisco Systems, Inc.
Compiled Fri 06-Oct-95 12:22 by mpo
Image text-base: 0x600088A0, data-base: 0x605A4000

ROM: System Bootstrap, Version 5.3(16645)

honda uptime is 4 hours, 22 minutes
System restarted by reload
System image file is "slot0:rsp-a111-1", booted via slot0

cisco RSP2 (R4600) processor with 32768K bytes of memory.
R4600 processor, Implementation 32, Revision 2.0
Last reset from power-on
G.703/E1 software, Version 1.0.
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
Chassis Interface.
1 VIP2 controllers (5 Ethernet)(4 Serial).
5 Ethernet/IEEE 802.3 interfaces.
4 Serial network interfaces.
125K bytes of non-volatile configuration memory.

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

For complete descriptions of interface subcommands and the configuration options available for VIP2-related interfaces, and which support VIP2 functionality, refer to the publications listed in the section “If You Need More Information” on page 2.

To determine which type of port adapter is installed on a VIP2 in your system, use the **show diag slot** command. Specific port adapter information is displayed, as shown in the following example of a 5EFL port adapter in chassis slot 1:

```
Router# show diag 1
Slot 1:
Physical slot 1, ~physical slot 0xE, logical slot 1, CBus 0
Microcode Status 0xC
Master Enable, LED, WCS Loaded
Board is analyzed
Pending I/O Status: Console I/O
EEPROM format version 1
VIP2 controller, HW rev 2.2, board revision UNKNOWN
Serial number: 03508056 Part number: 73-1554-02
Test history: 0x00 RMA number: 43-27-00
Flags: cisco 7000 board; 7500 compatible

EEPROM contents (hex):
 0x20: 01 15 02 02 00 35 87 58 49 06 12 02 00 2B 1B 00
 0x30: 12 2B 00 2A 1A 00 00 00 00 00 00 00 00 00 00 00

Slot database information:
Flags: 0x4 Insertion time: 0x10DC (00:01:17 ago)

Controller Memory Size: 8 MBytes
PA Bay 1 Information:
Ethernet PA, 5 ports
EEPROM format version 1
HW rev 1.0, Board revision 6
Serial number: 03522225 Part number: 73-1679-01
```

Using the ping Command

The *packet internet groper* (**ping**) command allows you to verify that an interface port is functioning properly and to check the path between a specific port and connected devices at various locations on the network. This section provides brief descriptions of the **ping** command. After you verify that the system and VIP2 have booted successfully and are operational, you can use this command to verify the status of interface ports. Refer to the publications listed in the section “If You Need More Information” on page 2, for detailed command descriptions and examples.

The **ping** command sends an echo request out to a remote device at an IP address that you specify. After sending a series of signals, the command waits a specified time for the remote device to echo the signals. Each returned signal is displayed as an exclamation point (!) on the console terminal; each signal that is not returned before the specified time-out 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 the connection failed.

Following is an example of a successful **ping** command to a remote server with the address 1.1.1.10:

```
Router# ping 1.1.1.10 <Return>
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 1.1.1.10, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/15/64 ms
Router#
```

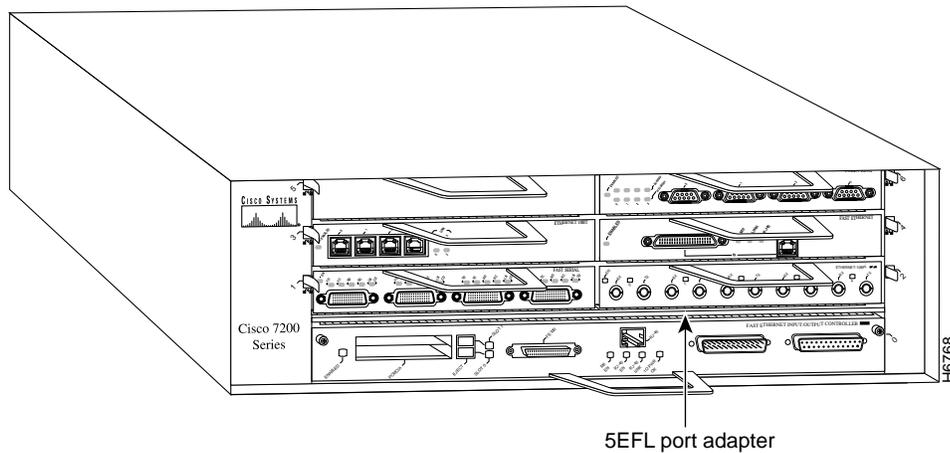
If the connection fails, verify that you have the correct IP address for the server and that the server is active (powered on), and repeat the **ping** command.

For complete descriptions of interface subcommands and the configuration options available for VIP2-related interfaces, and which support VIP2 functionality, refer to the publications listed in the section “If You Need More Information” on page 2.

Cisco 7200 Series and the 5EFL Port Adapter

The 5EFL port adapter is used in the Cisco 7200 series routers and can be installed in any of the available port adapter slots. Figure 15 shows a Cisco 7206 with a 5EFL port adapter installed in port adapter slot 2.

Figure 15 Cisco 7206 with a 5EFL Port Adapter in Port Adapter Slot 2



The following sections discuss information that is specific to the 5EFL port adapter and its use in the Cisco 7200 series routers:

- Installing or Replacing a Port Adapter in Cisco 7200 Series Routers, page 26
- Attaching 5EFL Port Adapter Interface Cables, page 30
- Configuring the 5EFL Interfaces, page 31
 - Selecting Port Adapter Slot and Ethernet 10BASE-FL Interface Port Numbers, page 31
 - Configuring Interfaces, page 32
 - Checking the Configuration, page 33

Installing or Replacing a Port Adapter in Cisco 7200 Series Routers

This section provides the standard procedures for installing or replacing port adapters in a Cisco 7200 series router.

Depending on your circumstances, you might need to install a new port adapter in a Cisco 7200 series router or replace a failed port adapter in the field. In either case no tools are necessary; all port adapters available for the Cisco 7200 series connect directly to the router midplane and are locked into position by a port adapter lever. When removing and replacing a port adapter, you will need an antistatic mat onto which you can place a removed port adapter and an antistatic container into which you can place a failed port adapter for shipment back to the factory.

Note The Cisco 7200 series routers support OIR; therefore, you do not have to power down the Cisco 7200 series routers when removing and replacing a port adapter.

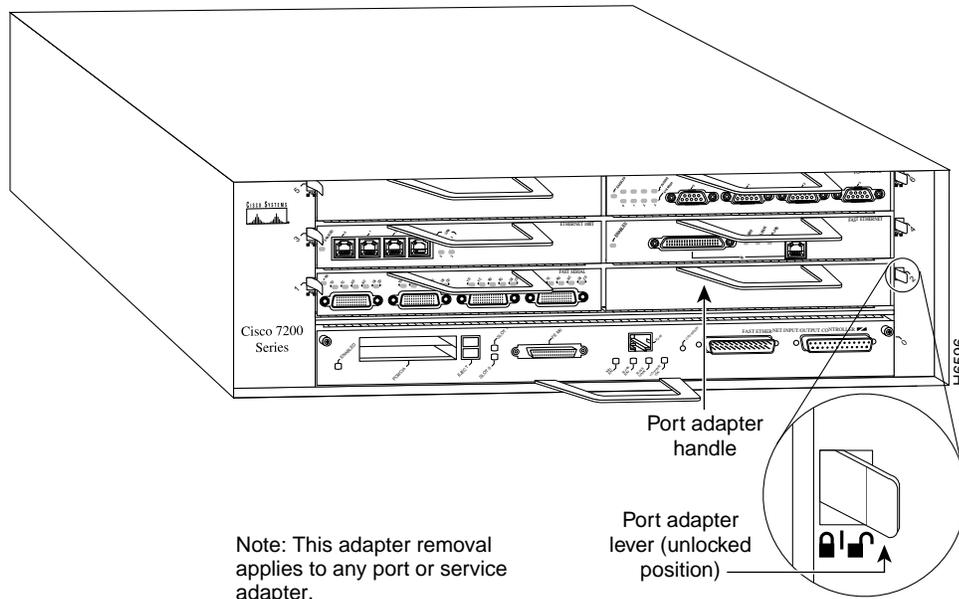
When a port adapter slot is not in use, a blank port adapter must fill the empty slot to allow the router to conform to EMI emissions requirements and to allow proper air flow across the port adapters. If you plan to install a new port adapter in a slot that is not in use, you must first remove a blank port adapter.

Removing a Port Adapter

Use the following standard procedure to remove a port adapter from a Cisco 7200 series router:

- Step 1** Attach an ESD-preventative wrist strap between you and an unfinished chassis surface.
- Step 2** Place the port adapter lever for the desired port adapter slot in the unlocked position. The port adapter lever remains in the unlocked position. (Refer to Figure 16.)

Figure 16 Placing the Port Adapter Lever in the Unlocked Position (Cisco 7206 shown)



Step 3 Grasp the handle on the port adapter and pull the port adapter from the midplane, about halfway out of its slot. If you are removing a blank port adapter, pull the blank port adapter from the port adapter slot.

Note As you disengage the port adapter from the router midplane, OIR administratively shuts down all active interfaces on the port adapter.

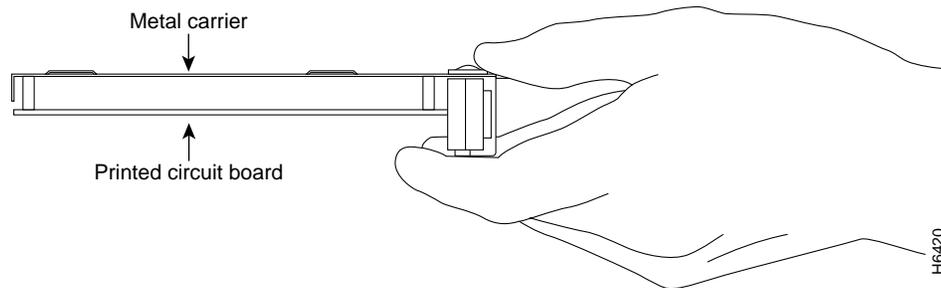
Step 4 With the port adapter halfway out of the slot, disconnect all cables from the port adapter.

Step 5 After disconnecting the cables, pull the port adapter from its port adapter slot.



Caution Always handle the port adapter by the carrier edges and handle; never touch the port adapter's components or connector pins. (Refer to Figure 17.)

Figure 17 Handling a Port Adapter



Step 6 Place the port adapter on an antistatic surface with its components facing upward, or in a static shielding bag. If the port adapter will be returned to the factory, immediately place it in a static shielding bag.

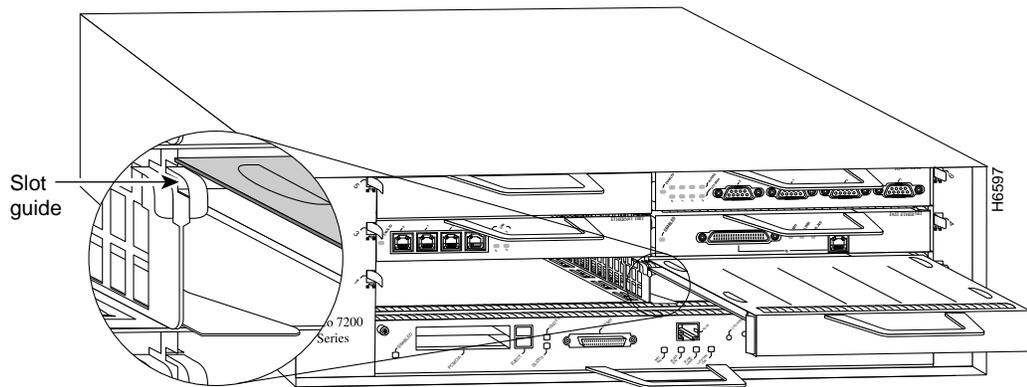
This completes the procedure for removing a port adapter from a Cisco 7200 series router.

Replacing a Port Adapter

Use the following standard procedure to install a new port adapter in a Cisco 7200 series router:

- Step 1** Attach an ESD-preventative wrist strap between you and an unfinished chassis surface.
- Step 2** Use both hands to grasp the port adapter by its metal carrier edges and position the port adapter so that its components are downward. (Refer to Figure 17).
- Step 3** Align the left and right edge of the port adapter metal carrier between the guides in the port adapter slot. (Refer to Figure 18.)

Figure 18 Aligning the Port Adapter Metal Carrier Between the Slot Guides (Cisco 7206 shown)



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

- Step 4** With the metal carrier aligned in the slot guides, gently slide the port adapter halfway into the slot.



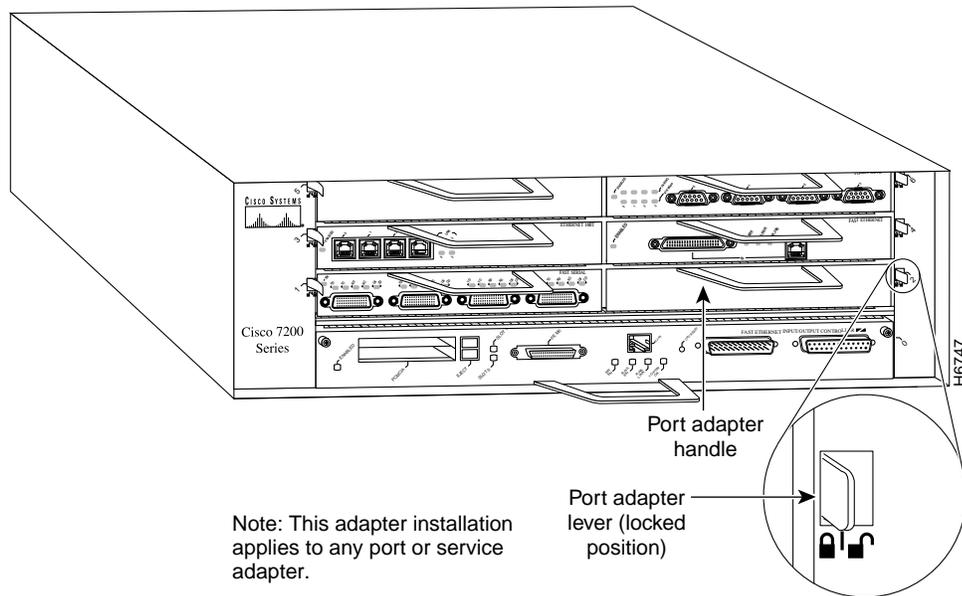
Caution Copy this entire text line and anchored frame marker and paste it on the body page. If you have only one line of text, enter a soft return at the end of the text so that the icon isn't too close to the next paragraph.

- Step 5** With the port adapter halfway in the slot, connect all required cables to the port adapter.
- Step 6** After connecting all required port adapter cables, carefully slide the port adapter all the way into the slot until you feel the port adapter's connectors mate with the midplane.

Step 7 Move the port adapter lever to the locked position. Figure 19 shows the port adapter lever in the locked position.

Note If the port adapter lever 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 to the locked position.

Figure 19 Placing the Port Adapter Lever in the Locked Position (Cisco 7206 shown)



This completes the procedure for installing a new port adapter in a Cisco 7200 series router.

Attaching 5EFL Port Adapter Interface Cables

On a single 5EFL port adapter, you can use up to five pairs of ST fiber-optic connections. The 5EFL port adapter is an end station device and not a repeater; you *must* connect the 5EFL port adapter to a 10BASE-FL repeater or hub. ST-type fiber-optic cables are not available from Cisco Systems; they are available from outside commercial cable vendors.

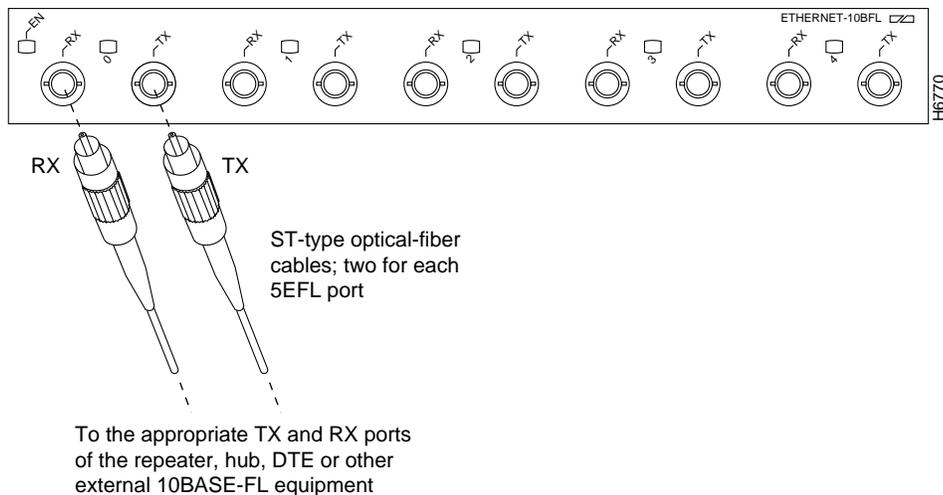
Connect ST fiber-optic cables to the 5EFL port adapter as follows:

Step 1 Attach the RX multimode fiber-optic cable directly to the RX port on the 5EFL port adapter. (See Figure 20.)

Note Port adapters have a handle attached, but it is not shown in Figure 20 to allow a full view of the detail on each port adapter's faceplate.

Step 2 Attach the TX multimode fiber-optic cable directly to the TX port on the 5EFL port adapter. (See Figure 20.)

Figure 20 Connecting 5EFL Port Adapter ST Cable Pairs



Step 3 Connect a 5EFL RX port to the appropriate TX port of the repeater, hub, DTE, or other external 10BASE-FL equipment.

Step 4 Connect a 5EFL TX port to the appropriate RX port of the repeater, hub, DTE, or other external 10BASE-FL equipment.

Step 5 Repeat Steps 1 and 4 for each additional 5EFL interface connection you require.

This completes cable connection to the 5EFL port adapter.

Configuring the 5EFL Interfaces

If you installed a new 5EFL port adapter or if you want to change the configuration of an existing interface, you must enter configuration mode using the **configure** command. If you replaced a 5EFL port adapter that was previously configured, the system will recognize the new 5EFL interfaces and bring them up in their existing configuration.

After you verify that the new 5EFL port adapter is installed correctly (the enabled LED goes on), use the privileged-level **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.
- Internet protocol (IP) addresses if you plan to configure the interfaces for IP routing.
- Whether the new interfaces will use bridging.

For a summary of the configuration options available and instructions for configuring the 4E interfaces on a Cisco 7200 series router, refer to the appropriate configuration publications listed in the section “If You Need More Information” on page 2.

The **configure** command requires privileged-level access to the EXEC command interpreter, which usually requires a password. Contact your system administrator if necessary to obtain EXEC-level access.

Selecting Port Adapter Slot and Ethernet 10BASE-FL Interface Port Numbers

The following section describes how to identify port adapter slot and Ethernet 10BASE-FL interface port numbers.

Physical port addresses specify the actual physical location of each interface port on the router. (See Figure 21.) This address is composed of a two-part number in the format *port adapter slot number/interface port number*, as follows:

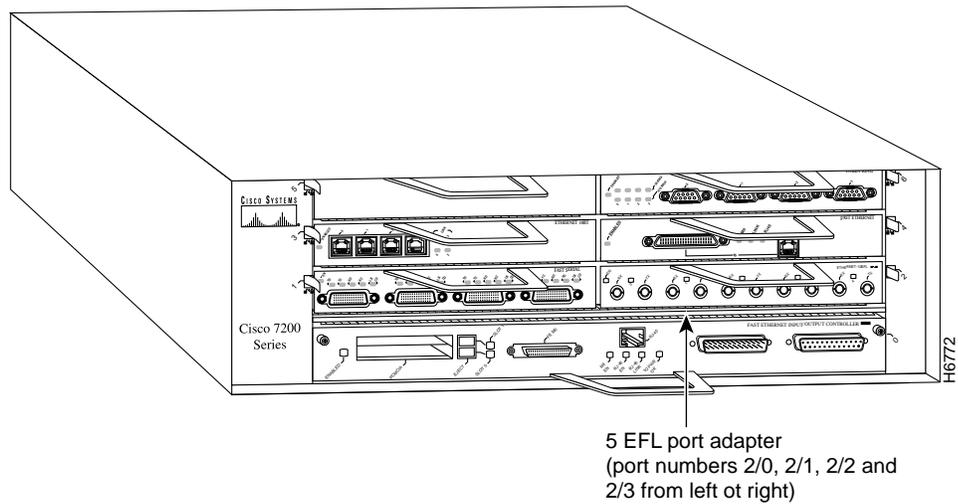
- The first number identifies the chassis slot in which the in which the 5EFL is installed.
- The second number identifies the interface ports on each 5EFL port adapter, which are always numbered in sequence as interface 0 through 4.

Interface ports maintain the same address regardless of whether other port adapters are installed or removed from the slot. However, when you move a port adapter to a different slot, the first number in the address changes to reflect the new chassis slot number.

Figure 21 shows the port adapter slots and interface ports of a Cisco 7206. The port adapter slot numbers start with 1 and continue through 6 (slot 0 is always reserved for the Fast Ethernet port on the I/O controller—if present). The individual interface port numbers always begin with 0. The number of additional ports depends on the number of ports on a port adapter.

For example, the five interface ports on a 5EFL port adapter in port adapter slot 1 would have the addresses 1/0 through 1/4. (See Figure 21.) If the 5EFL port adapter was in port adapter slot 5, these same interface ports would be numbered 5/0 through 5/4. Port adapters can occupy any port adapter slot. There are no restrictions.

Figure 21 10BASE-FL Interface Port Number Example



You can identify interface ports by physically checking the slot/interface port location on the front of the router or by using **show** commands to display information about a specific interface or all interfaces in the router.

Configuring Interfaces

The following steps describe a basic interface configuration. 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>
```

Use the following procedure to perform a basic configuration:

Step 1 At the privileged-level prompt, enter configuration mode and specify that the console terminal will be 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** At the prompt, specify the first interface to configure by entering the subcommand **interface**, followed by the *type (ethernet) and slot/interface* (port adapter slot number and interface number). The example that follows is for the first interface of the port adapter in slot 2:

```
Router(config)# interface e 2/0
```

- Step 3** If IP routing is enabled on the system, you can assign an IP address and subnet mask to the interface with the **ip address** configuration subcommand, as in the following example:

```
Router(config-int)# ip address 1.1.1.10 255.255.255.0
```

- Step 4** Add any additional configuration subcommands required to enable routing protocols and set the interface characteristics.

- Step 5** Change the shutdown state to up and enable the interface as follows:

```
Router(config-int)# no shutdown
```

- Step 6** Configure additional interfaces as required.

- Step 7** When you have included all of the configuration subcommands to complete the configuration, press **Ctrl-Z** to exit configuration mode.

- Step 8** Write the new configuration to nonvolatile memory as follows:

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

To check the interface configuration using **show** commands, proceed to the section “Checking the Configuration.”

Checking the Configuration

After configuring the new interface, use the **show** commands to display the status of the new interface or all interfaces and the **ping** command to check connectivity.

Using show Commands to Verify the New Interface Status

The following steps use **show** commands to verify that the new interfaces are configured and operating correctly.

- Step 1** Display the system hardware configuration with the **show version** command. Ensure that the list includes the new serial interfaces.
- Step 2** Display all the current interface processors and their interfaces with the **show controllers** command. Verify that the new 5EFL port adapter appears in the correct slot.
- Step 3** Specify one of the new interfaces with the **show interfaces port adapter type slot/interface** command and verify that the first line of the display specifies the interface with the correct slot number. Also verify that the interface and line protocol are in the correct state: up or down.
- Step 4** Display the protocols configured for the entire system and specific interfaces with the **show protocols** command. If necessary, return to configuration mode to add or remove protocol routing on the system or specific interfaces.

Step 5 Display the running configuration file with the **show running-config** command. Display the configuration stored in NVRAM using the **show startup-config** command. Verify that the configuration is accurate for the system and each interface.

If the interface is down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, ensure that the network interface is properly connected and terminated. If you still have problems bringing the interface up, contact a service representative for assistance.

Using show Commands to Display Interface Information

To display information about a specific interface, use the **show interfaces** command with the interface type and port address in the format **show interfaces [type slot/port]**.

Following is an example of how the **show interfaces [type slot/port]** command displays status information (including the physical slot and port address) for the interfaces you specify. In these examples, most of the status information for each interface is omitted, and the five Ethernet 10BASE-FL interfaces (0–4) are in port adapter slot 2. (Interfaces are administratively shut down until you enable them.)

```
Router# sh int e 2/0
Ethernet2/0 is administratively down, line protocol is down
  Hardware is AmdP2 Ethernet, address is 1.1.1.10 (bia 0000.0ca5.2389)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)

Router# sh int e 2/1
Ethernet2/1 is administratively down, line protocol is down
  Hardware is AmdP2 Ethernet, address is 1.1.1.11 (bia 0000.0ca5.238a)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)

Router# sh int e 2/2
Ethernet2/2 is administratively down, line protocol is down
  Hardware is AmdP2 Ethernet, address is 1.1.1.12 (bia 0000.0ca5.238b)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
Router# sh int e 2/3
Ethernet2/3 is administratively down, line protocol is down
  Hardware is AmdP2 Ethernet, address is 1.1.1.13 (bia 0000.0ca5.238c)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)

Router# sh int e 2/4
Ethernet2/4 is administratively down, line protocol is down
  Hardware is AmdP2 Ethernet, address is 1.1.1.14 (bia 0000.0ca5.238d)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
```

With the **show interfaces type slot/port** command, use arguments such as the interface type (ethernet, and so forth), slot, and the port number (slot/port) to display information about a specific Ethernet 10BASE-FL interface only.

The following example of the **show interfaces ethernet slot/port** command shows all of the information specific to the first 5EFL interface port (interface port 0) in port adapter slot 2:

```
Router# sh int e 2/0
Ethernet2/0 is administratively down, line protocol is down
  Hardware is AmdP2 Ethernet, address is 1.1.1.10 (bia 0000.0ca5.238e)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 4:00:00
  Last input never, output never, output hang never
  Last clearing of "show interface" counters 2:56:26
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    0 input packets with dribble condition detected
    0 packets output, 0 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets, 0 restarts
    0 output buffer failures, 0 output buffers swapped out
```

The **show version** (or **show hardware**) command displays the configuration of the system hardware (the number of each interface processor type installed), the software version, the names and sources of configuration files, and the boot images. Following is an example of the **show version** command:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-J-M), Version 11.1(472) [biff 105]
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Fri 06-Oct-96 12:22 by
Image text-base: 0x600088A0, data-base: 0x605A4000

ROM: System Bootstrap, Version 11.1(10979) RELEASED SOFTWARE

Router uptime is 8 hours, 22 minutes
System restarted by reload
System image file is "slot0:c7200-j-mz.960421", booted via slot0

cisco 7200 (R4700) processor with 22528K/10240K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
Chassis Interface.
5 Ethernet/IEEE 802.3 interfaces.
1 Serial network interfaces.
125K bytes of non-volatile configuration memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2
```

To determine which type of port adapter is installed in your Cisco 7206, use the **show diag slot** command. Specific port adapter information is displayed, as shown in the following example of a 5EFL port adapter in chassis slot 2:

```
Slot 2:
Ethernet port adapter, 5 ports
Port adapter is analyzed
Port adapter insertion time 2d09h ago
Hardware revision 1.5          Board revision A0
Serial number 4294967295      Part number 73-1556-04
Test history 0x0              RMA number 00-00-00
EEPROM format version 1
EEPROM contents (hex):
0x20:01 03 01 05 FF FF FF FF 49 06 14 04 00 00 00 00
0x30:50 00 00 00 FF FF
```

Note Port adapters used with the 7200 VXR routers require the correct base hardware revision in order to function. The following error message will occur on bootup if the incorrect hardware revision is used:

```
> PA-3-REVNOTSUPPORTED:PA in slot 1 (Ethernet) requires base h/w revision of (1.5)
for this chassis
```

Use the **sh diag** command to display the hardware revision.

For complete Cisco 7206 command descriptions and examples, refer to the publications listed in the section “If You Need More Information” on page 2.

Using the ping Command

The *packet internet groper* (**ping**) command allows you to verify that an interface port is functioning properly and to check the path between a specific port and connected devices at various locations on the network. This section provides brief descriptions of the **ping** command. After you verify that the system has booted successfully and is operational, you can use this command to verify the status of interface ports. Refer to the publications listed in the section “If You Need More Information” on page 2, for detailed command descriptions and examples.

The **ping** command sends an echo request out to a remote device at an IP address that you specify. After sending a series of signals, the command waits a specified time for the remote device to echo the signals. Each returned signal is displayed as an exclamation point (!) on the console terminal; each signal that is not returned before the specified time-out 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 the connection failed.

Following is an example of a successful **ping** command to a remote server with the address 1.1.1.10:

```
Router# ping 1.1.1.10 <Return>
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 1.1.1.10, 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 server and that the server is active (powered on), and repeat the **ping** command.

For complete descriptions of interface subcommands and the configuration options available for Cisco 7200 series-related interfaces and functionality, refer to the publications listed in the section “If You Need More Information” on page 2.

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- Telnet: cco.cisco.com
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and connection rates up to 28.8 kbps.

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