Doc. No. 78-2657-02

PA-4E Ethernet 10BASE-T Port Adapter Installation and Configuration

Product Numbers: PA-4E and PA-4E=

This configuration note describes the installation and configuration of the PA-4E(=) Ethernet 10BASE-T port adapter, which can be used in the Cisco 7200 series routers, and on the 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). (Refer to the section "Software and Hardware Requirements" on page 3.)

Note For VIP2 users, use this configuration note in conjunction with the configuration note *Second-Generation Versatile Interface Processor (VIP2) Installation and Configuration* (Document Number 78-2658-xx), which shipped with your VIP2.

For Cisco 7200 series router users, use this configuration note in conjunction with the *Cisco 72xx Installation and Configuration Guide* that shipped with your Cisco 7200 series router.

For complete descriptions of interface subcommands and the configuration options available for interfaces, and which support 4E port adapter functionality, refer to the appropriate software configuration publication listed in the section "If You Need More Information."

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Document Contents

This configuration note is organized into the following three parts.

1. The following sections include general information and information about port adapter installation:
   - If You Need More Information, page 2
   - Port Adapter Installation Prerequisites, page 3
2. The following section includes information specific to the 4E port adapter:
   - What Is the 4E Port Adapter?, page 7
3. The following sections include information specific to the 4E port adapter's use with the VIP2 in Cisco 7000 family routers and in the Cisco 7200 series routers:
   - VIP2 and the 4E Port Adapter, page 11
   - Cisco 7200 Series and the 4E Port Adapter, page 24

The following sections include general reference information: "SELV Circuit Warning Translations," on page 36, and "Cisco Connection Online" on page 37.

If You Need More Information

The Cisco Internetwork Operating System (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 the Cisco 7000 family routers and VIP2, or the Cisco 7200 series, the following documentation resources are available to you:

- Cisco Connection Documentation, Enterprise Series CD-ROM

  This publication and additional Cisco Systems publications are available on a CD-ROM called Cisco Connection Documentation, Enterprise Series, which is Cisco's online library of product information. The CD-ROM is updated and shipped monthly, so it might be more up to date than printed documentation. To order Cisco Connection Documentation, Enterprise Series CD-ROM, contact a Cisco Sales or Customer Service representative.

- Refer to the following modular configuration and modular command reference publications, as appropriate for your configuration:
  - *Configuration Fundamentals Configuration Guide*
  - *Configuration Fundamentals Command Reference*
  - *Wide-Area Networking Configuration Guide*
  - *Wide-Area Networking Command Reference*
  - *Network Protocols Configuration Guide*
  - *Network Protocols Command Reference*
  - *Bridging and IBM Networking Configuration Guide*
  - *Bridging and IBM Networking Command Reference*
  - *Configuration Builder Getting Started Guide*
  - *Troubleshooting Internetworking Systems*

- For hardware installation and maintenance information on the Cisco 7000 family routers, and the VIP2, refer to the following publications:
  - *Cisco 7000 Hardware Installation and Maintenance*
  - *Cisco 7010 Hardware Installation and Maintenance*
  - *Cisco 7505 Hardware Installation and Maintenance*
  - *Cisco 7507 Hardware Installation and Maintenance*
  - *Cisco 7513 Hardware Installation and Maintenance*
  - Second-Generation Versatile Interface Processor (VIP2) Installation and Configuration
- For hardware installation and maintenance information on the Cisco 7200 series routers, refer to the *Cisco 72xx Installation and Configuration Guide* that shipped with your Cisco 7200 series router.
- To obtain information about documentation, refer to the Cisco Connection Documentation, Enterprise Series CD-ROM, the section "Cisco Connection Online," on page 37, 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`. You can also refer to the *Cisco Information Packet* that shipped with your router.

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
- List of Parts and Tools
- Safety Guidelines, page 4
- Ethernet 10BASE-T Overview, page 5
- IEEE 802.3 10BASE-T Specifications, page 6

Software and Hardware Requirements

The 4E port adapter requires that the host Cisco 7000 family router is running Cisco IOS Release 11.1(472) or later.

Note The Cisco 7000 family includes the Cisco 7000 series, Cisco 7200 series, and Cisco 7500 series routers.

Caution 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.

List of Parts and Tools

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-4E(=) port adapter
- Cables appropriate for the port adapter's interfaces (RJ-45 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 (for VIP2 installation only)
- Your own ESD-prevention equipment or the disposable grounding wrist strap included with all upgrade kits, FRUs, and spares

Safety Guidelines

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

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 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.

Ethernet 10BASE-T 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 4E 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.

Stations on a CSMA/CD LAN can access the network at any time. Before sending data, the station *listens* to the network to see of 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 *Base*band or *Broad*band), and *segment length* is the maximum length between stations in hundreds of meters.

IEEE 802.3 10BASE-T Specifications

Table 1 summarizes the characteristics of IEEE 802.3 Ethernet and Ethernet Version 2 for 10BASE-T.

Table 1 IEEE 802.3 and 10BASE-T Ethernet Version 2 Physical Characteristics

Parameter	IEEE 802.3 Ethernet	10BASE-T Ethernet Version 2
Data Rate (Mbps)	10	10
Signaling method	Baseband	Baseband
Max. segment length (m)	500	100 (UTP)
Media	50-ohm coax (thick)	Unshielded twisted-pair (UTP)
Topology	Bus	Star

Table 2 lists the cabling specifications for 10-Mbps transmission over UTP and STP cables.

Table 2 Cable Specifications for 10-Mbps 10BASE-T

Parameter	RJ-45
Cable specification	Category 5 UTP[1], 22 to 24 AWG[2]
Maximum segment length	100 m (328 ft.) for 10BASE-T
Maximum network length	200 m (656 ft) (with 1 repeater)

1. Cisco Systems does not supply Category 5 UTP RJ-45 cables; these cables are available commercially.
2. AWG = American Wire Gauge. This gauge is specified by the EIA/TIA-568 standard.

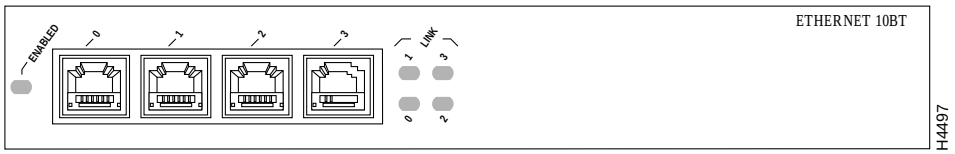
Note The IEEE 802.3 Ethernet specifications call the 4E device an end-station, and the 4E has a built-in transceiver. The 4E interfaces connect directly to a hub or repeater.

What Is the 4E Port Adapter?

The 4E port adapter (PA-4E) provides up to four IEEE 802.3 Ethernet 10BASE-T interfaces. (See Figure 1.) Each Ethernet 10BASE-T interface allows a maximum bandwidth of 10-Mbps, for a maximum aggregate bandwidth of 40 Mbps. All four ports run at line (wire) speed.

Note While the VIP2 supports online insertion and removal (OIR), individual port adapters do not. To replace port adapters, you must first remove the VIP2 from the chassis, then replace port adapters as required.

Figure 1 4E Port Adapter, Faceplate View



The 4E port adapter can be installed on the VIP2 in port adapter slot 0 and port adapter slot 1, or in the Cisco 7200 series routers in any of the chassis' port adapter slots: 1 through 6 for the Cisco 7206. Port adapters have a handle attached, but this handle is occasionally not shown to allow a full view of detail on the port adapter's faceplate.

The following additional sections discuss information specific to the 4E port adapter:

- Port Adapter Locations on the VIP2 and in the Cisco 7200 Series Router, page 8
- 4E Port Adapter LEDs, page 9
- 4E Port Adapter Receptacles, Cables, and Pinouts, page 9

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

Figure 2 shows a VIP2 with installed port adapters. With the VIP2 oriented as shown in Figure 2, the left port adapter is in port adapter slot 0, and the right port adapter is in port adapter slot 1. 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. 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 2 Two Port Adapters on the VIP2 (Horizontal Orientation Shown)

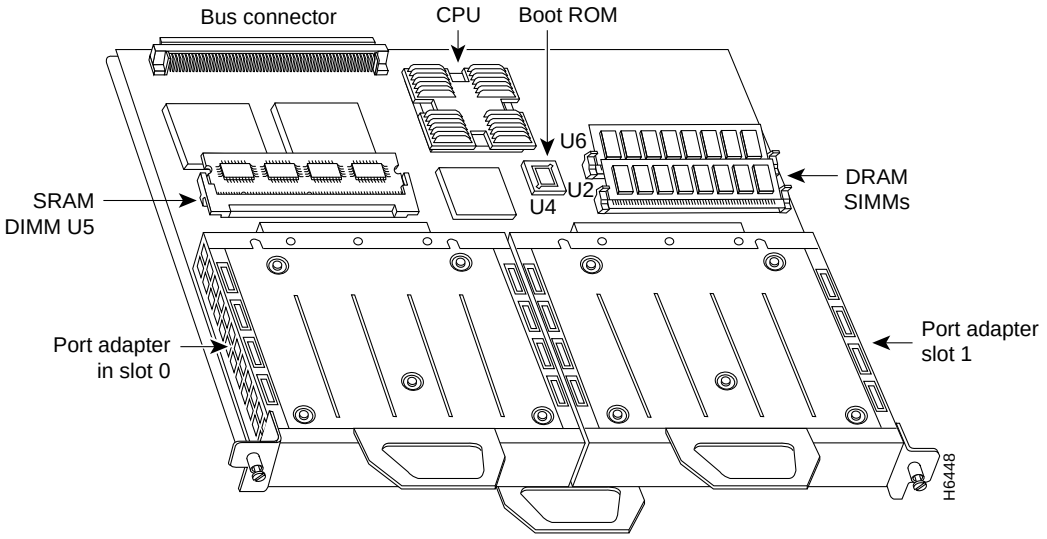
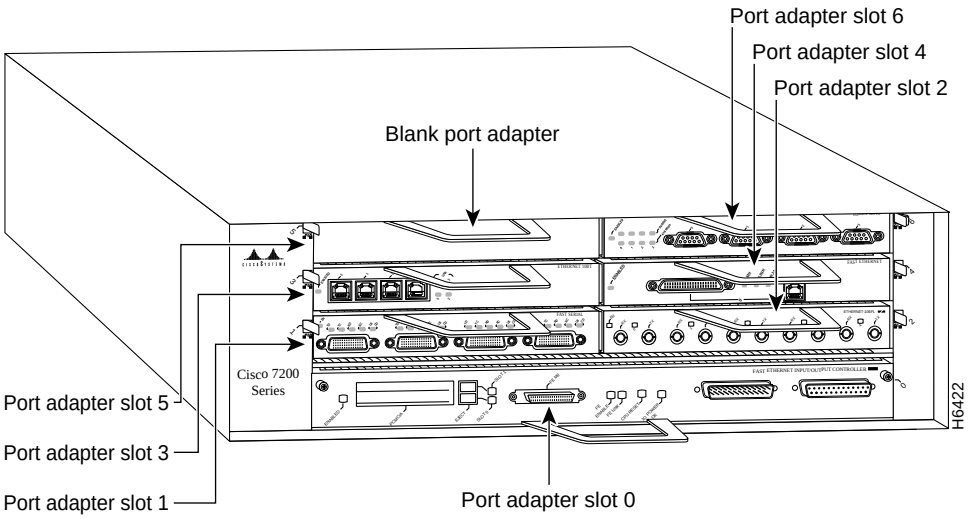


Figure 3 shows a Cisco 7206 with port adapters installed. In the Cisco 7206, port adapter slot 1 is in the lower left position and port adapter slot 6 is in the upper right position.

Figure 3 Port Adapters in the Cisco 7206



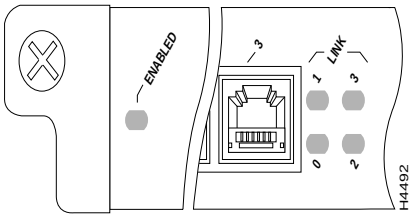
4E Port Adapter LEDs

The 4E 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 4E port adapter has been enabled for operation.When a 10BASE-T port is active, its link LED is on when a port on the 4E port adapter is receiving a carrier signal from the network. (The LEDs are shown in Figure 4.) The following conditions must be met before the enabled LED goes on:

- The 4E port adapter is correctly connected and receiving power
- The 4E-equipped card or chassis contains a valid microcode version that has been downloaded successfully
- The bus recognizes the 4E port adapter or 4E-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.

Figure 4 LEDs on the 4E Port Adapter

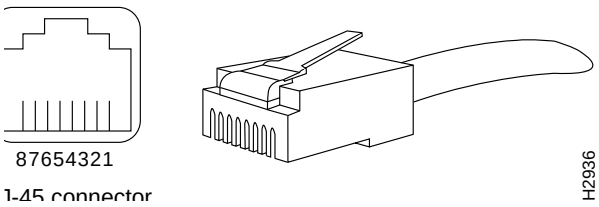


4E Port Adapter Receptacles, Cables, and Pinouts

The interface connectors on the 4E port adapter are four individual RJ-45 receptacles. You can use all four simultaneously. Each connection supports IEEE 802.3 and Ethernet 10BASE-T interfaces compliant with appropriate standards. The RJ-45 connections require external transceivers. Cisco Systems does not supply Category 5 UTP RJ-45 cables; these cables are available commercially.

Figure 5 shows the RJ-45 connectors. Table 3 lists the pinouts and signals for the RJ-45 connectors.

Figure 5 4E RJ-45 Connections, Plug and Receptacle



Warning The ports labeled “Ethernet,” “10BASE-T,” “Token Ring,” “Console,” and “AUX” are safety extra-low voltage (SELV) circuits. SELV circuits should only be connected to other SELV circuits. Because the BRI circuits are treated like telephone-network voltage, avoid connecting the SELV circuit to the telephone network voltage (TNV) circuits. (For translated versions of this warning, refer to the section “SELV Circuit Warning Translations” on page page 36.)

Table 3 4E RJ-45 Connector Pinout

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

Note Referring to the RJ-45 pinout in Table 3, proper common-mode line terminations should be used for the unused Category 5, UTP cable pairs 4/5 and 7/8. Common-mode termination reduces the contributions to electromagnetic interference (EMI) and susceptibility to common-mode sources. Wire pairs 4/5 and 7/8 are actively terminated in the RJ-45 port circuitry in the 4E port adapter.

Depending on your 4E, RJ-45 interface cabling requirements, use the pinouts in Figure 6 and Figure 7.

Figure 6 Straight-Through Cable Pinout, 4E RJ-45 Connection to a Hub or Repeater

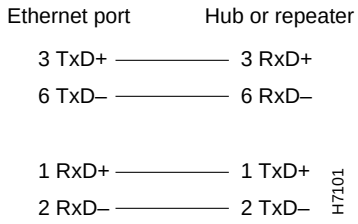
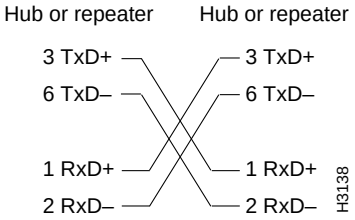


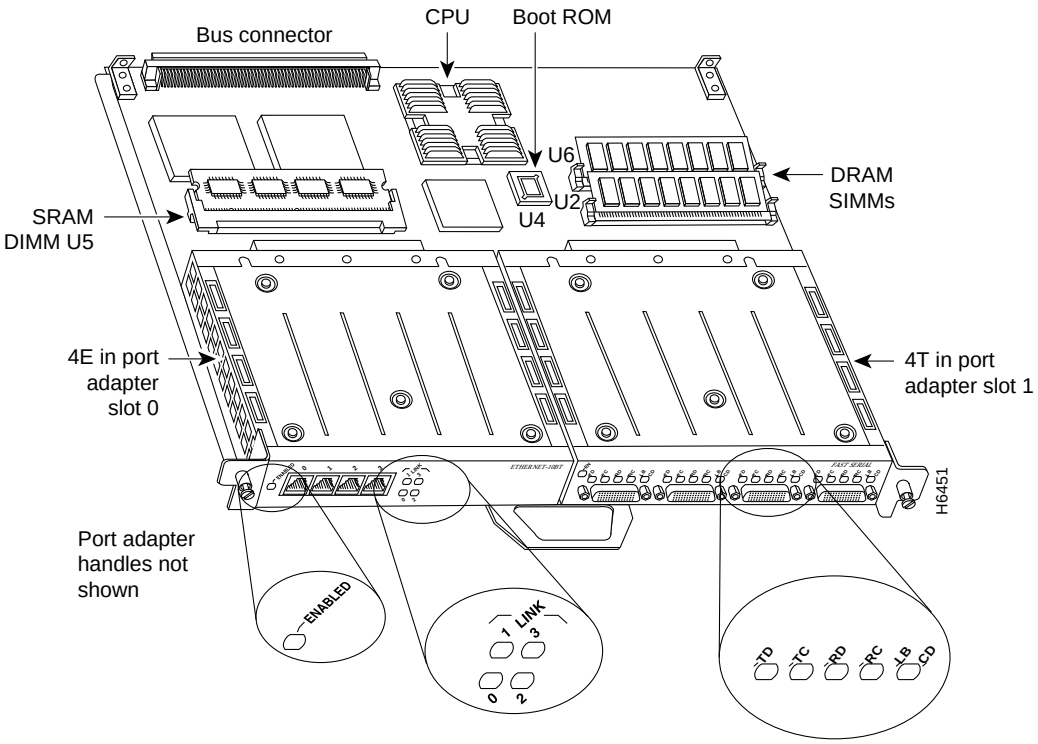
Figure 7 Crossover Cable Pinout, 4E RJ-45 Connections Between Hubs and Repeaters



VIP2 and the 4E Port Adapter

The 4E port adapter is used on the VIP2, and can be installed in either port adapter slot 0 or port adapter slot 1. Figure 8 shows a 4E port adapter installed on a VIP2 in port adapter slot 0.

Figure 8 VIP2 with a 4E Port Adapter in Port Adapter Slot 0



The following sections include information specific to the 4E port adapter and its use on the VIP2 in Cisco 7000 family routers:

- Installing or Replacing a Port Adapter on a VIP2, page 12
- Attaching 4E Port Adapter Interface Cables, page 16
- Configuring the 4E Interfaces, page 17
  - Selecting Chassis Slot, Port Adapter, and Ethernet 10BASE-T Interface Port Numbers, page 17
  - Configuring Interfaces, page 19
  - Checking the Configuration, page 20

Installing or Replacing a Port Adapter on a 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. The following procedures should be performed by a Cisco-certified service provider only. While the VIP2 supports online insertion and removal (OIR), 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.

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.

Following is the standard procedure for removing and replacing any type of port adapter on the 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.

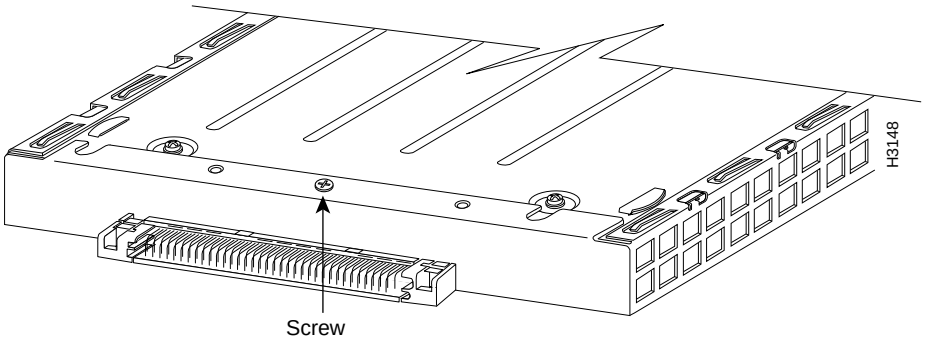
Step 2 For a new port adapter installation or a port adapter replacement, disconnect any interface cables from the ports on the front of the port adapter, although, this is not required. You can remove VIP2s with cables attached; however, we do not recommend it.

Step 3 To remove the VIP2 from the chassis, follow the steps in the section “Removing a VIP2” in the configuration note *Second-Generation Versatile Interface Processor (VIP2) Installation and Configuration* (Document Number 78-2658-xx), 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.

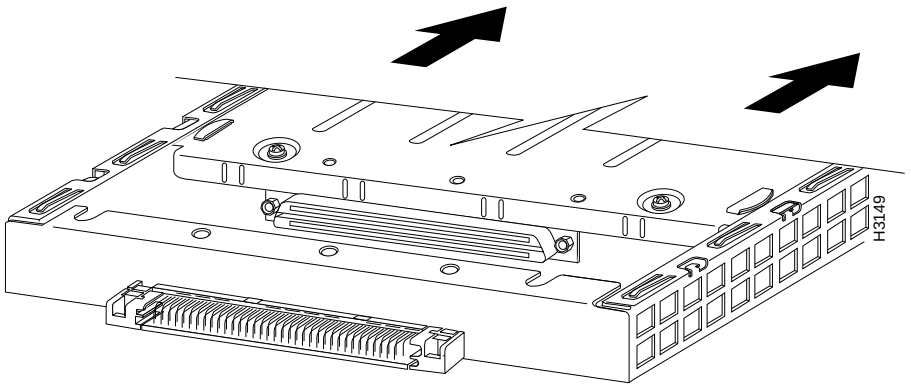
Figure 9 Location of Port Adapter Screw, Partial Port Adapter View



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

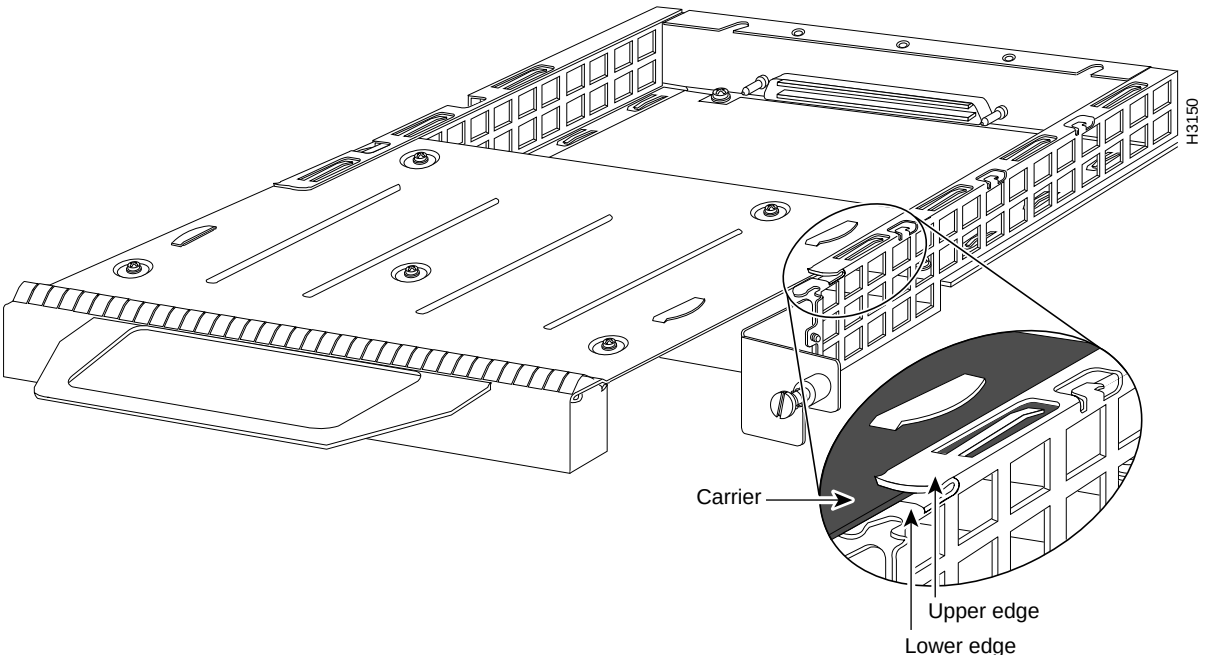


Step 8 If you removed a port adapter, place it in an antistatic container for safe storage or shipment back to the factory. If you removed a blank port adapter, no special handling is required; however, store the blank port adapter for potential future use.

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

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 Removing a Port Adapter

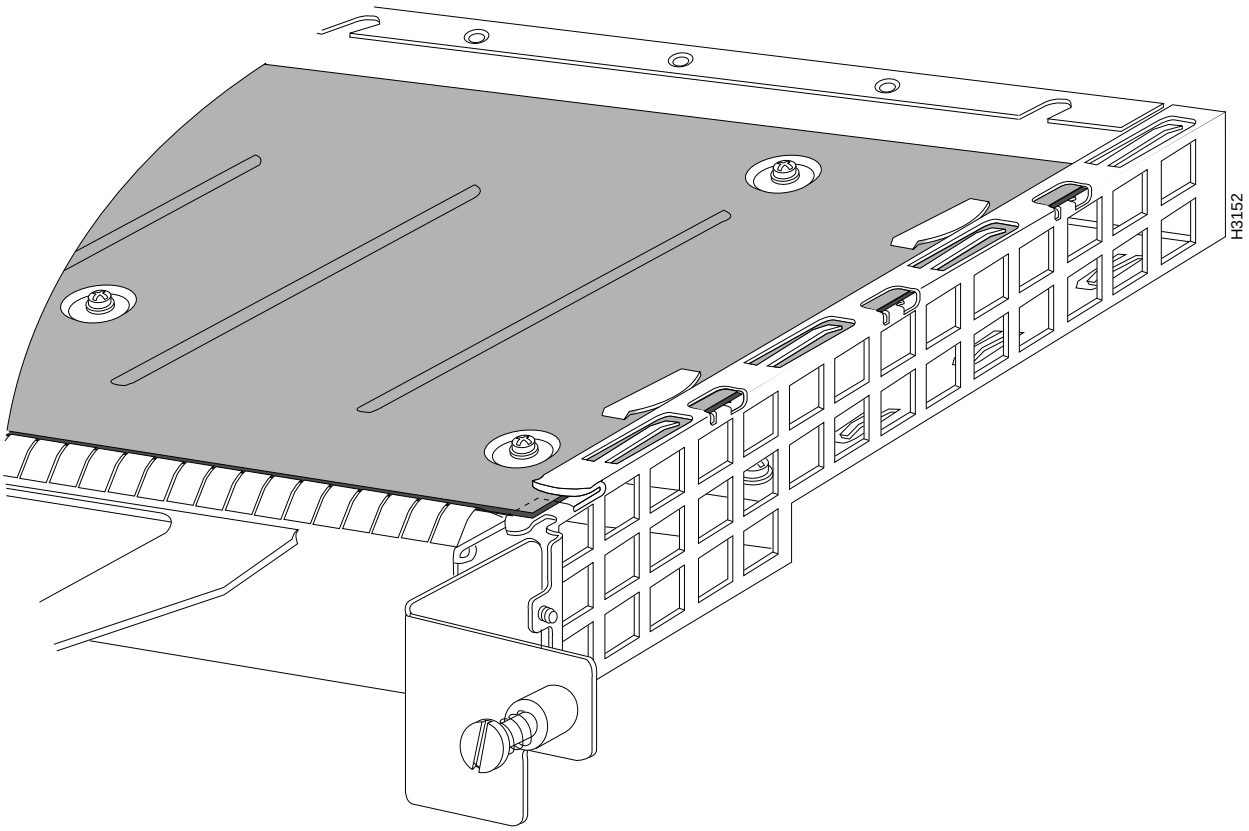


Step 10 Before you begin to insert the new port adapter in its slot, verify that the port adapter carrier should be between the upper and lower slot edges, as shown in Figure 12. Do not jam the carrier between the slot edges.

Caution To ensure a positive ground attachment between the port adapter carrier and the VIP2 motherboard and port adapter slot, and to ensure that the connectors at the rear of the port adapter and slot mate properly, the carrier must be between the upper and lower slot edges, as shown in Figure 12.

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 Aligning the Carrier Edge with Upper and Lower Slot Edges, Partial View



Step 12 Install the screw in the rear of the port adapter slot. (See Figure 9 for its location.) Do not overtighten this screw.

Step 13 To replace the VIP2 in the chassis, follow the steps in the section "Installing a VIP2," in the configuration note *Second-Generation Versatile Interface Processor (VIP2) Installation and Configuration* (Document Number 78-2658-xx), which shipped with your VIP2.

Step 14 If disconnected, reconnect the interface cables to the interface processor.

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

Attaching 4E Port Adapter Interface Cables

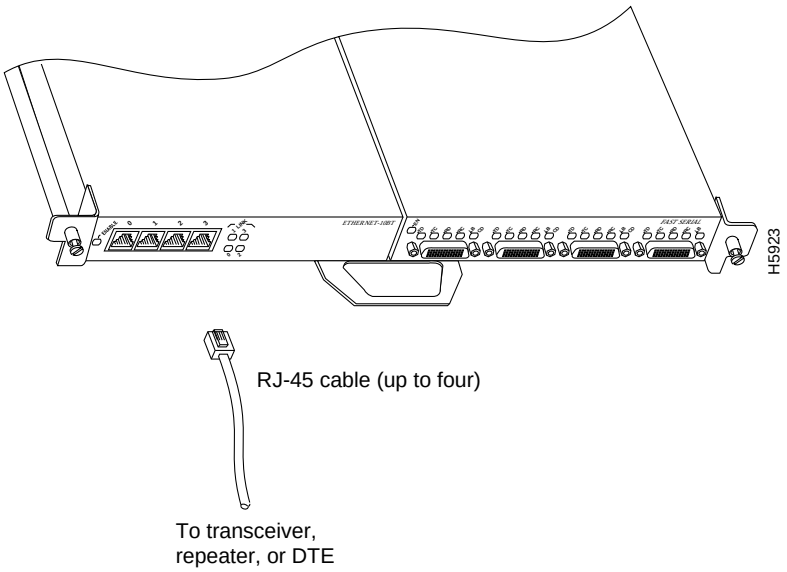
On a single 4E port adapter, you can use up to four RJ-45 connections. RJ-45 cables are not available from Cisco Systems; they are available from outside commercial cable vendors.

Connect RJ-45 cables to the 4E port adapter as follows:

Step 1 Attach the Category 5 UTP cable directly to the RJ-45 port on the 4E port adapter. (See Figure 13.)

The 4E port adapter is an end station device and not a repeater. You *must* connect the 4E port adapter to a repeater or hub.

Figure 13 Connecting 4E RJ-45 Cables (Horizontal Orientation—Shown without Handles)



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 network end of your RJ-45 cable to your 10BASE-T hub or repeater, DTE, or other external 10BASE-T equipment.

Step 3 Repeat Steps 1 and 2 for each of the remaining 10BASE-T interfaces you want to install.

This completes the 4E port adapter installation.

Configuring the 4E Interfaces

If you installed a new 4E 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 4E port adapter that was previously configured, the system will recognize the new 4E interfaces and bring them up in their existing configuration.

After you verify that the new 4E 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 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.

Note The 4E interfaces on a VIP2 can be configured at 10 Mbps, half duplex (HDX), for a maximum aggregate bandwidth of 40 Mbps.

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

The following section describes how to identify chassis slot, port adapter, and Ethernet 10BASE-T 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 identifies the interface ports on each 4E port adapter, which are always numbered in sequence as interface 0 through 3.

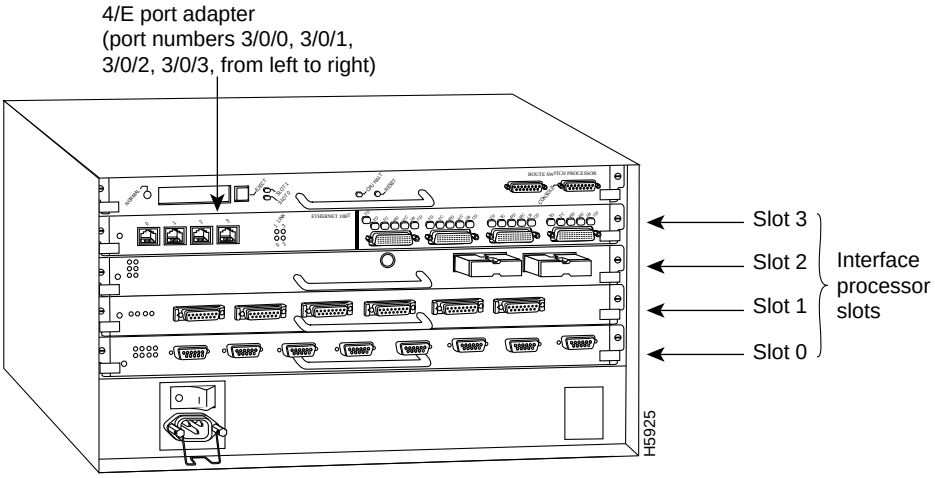
Interface ports on the VIP2 maintain the same address regardless of whether other interface processors are installed or removed. However, when you move a VIP2 to a different slot, the first number in the address changes to reflect the new chassis slot number.

Figure 14 shows the port adapter slots and interface ports of a sample Cisco 7505 system. On the VIP2, 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. The number of additional ports depends on the number of ports on a port adapter.

For example, the four 10BASE-T interface ports on a 4E port adapter in the first port adapter slot in chassis slot 3, would have the following addresses: 3/0/0, 3/0/1, 3/0/2, and 3/0/3. (See Figure 14.) If the 4E port adapter was in port adapter slot 1, these same interface ports would be numbered 3/1/0 through 3/1/3. Port adapters can occupy either port adapter slot. There are no restrictions.

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

Figure 14 10BASE-T 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>
```

Following is an example of a basic configuration procedure:

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 Use the **show version** command to display the system hardware configuration. Ensure that the list includes the new 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 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 four Ethernet 10BASE-T interfaces (0–3) 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
Ethernet3/0/0 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
Ethernet3/0/1 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
Ethernet3/0/2 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)
```

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-T interface only.

The following example of the **show interfaces ethernet** *slot/port adapter/port* command shows all of the information specific to the first 4E 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 0000.0ca5.2304 (bia 0000.0ca5.2388)
  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(471) [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)
ROM: GS Bootstrap Software (RSP-BOOT-M), Version 11.1(1.2), MAINTENANCE INTERIME

honda uptime is 4 hours, 22 minutes
System restarted by reload
System image file is "slot0:rsp-a111-471", 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 (4 Ethernet)(4 Serial).
4 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
```

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 an 4E port adapter in chassis slot 11:

```
Router# show diag 11
Slot 11:
        Physical slot 11, ~physical slot 0x4, logical slot 11, 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: 03507967  Part number: 73-1684-02
        Test history: 0x00        RMA number: 00-00-00
        Flags: cisco 7000 board; 7500 compatible

        EEPROM contents (hex):
          0x20: 01 15 02 02 00 35 86 FF 49 06 94 02 00 00 00 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: 0x3E50 (6d14h ago)

        Controller Memory Size: 8 MBytes

        PA Bay 1 Information:
                Ethernet PA, 4 ports
                EEPROM format version 1
                HW rev 1.0, Board revision 160
                Serial number: 02023164  Part number: 73-1556-03
```

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:

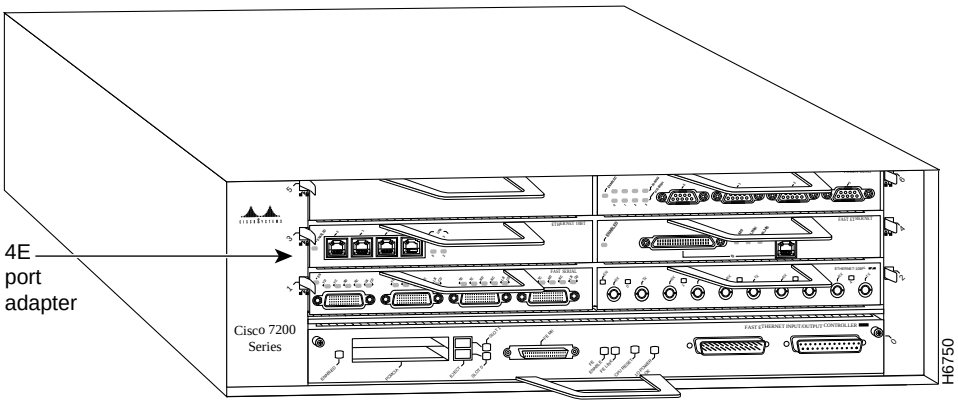
```
Router# ping 1.1.1.10 <Return>
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 1.1.1.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/15/64 ms
Router#
```

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 4E Port Adapter

The 4E 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 4E port adapter installed in port adapter slot 3 of a Cisco 7206.

Figure 15 Cisco 7206 with a 4E Port Adapter in Port Adapter Slot 3



The following sections include information that is specific to the 4E port adapter and its use in the Cisco 7200 series routers:

- Installing or Replacing a Port Adapter in Cisco 7200 Series Routers, page 24
- Attaching 4E Port Adapter Interface Cables, page 28
- Configuring the 4E Interfaces, page 29
  - Selecting Port Adapter Slot and Ethernet 10BASE-T Interface Port Numbers, page 29
  - Configuring Interfaces, page 31
  - Checking the Configuration, page 32

Installing or Replacing a Port Adapter in Cisco 7200 Series Routers

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 4E 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.

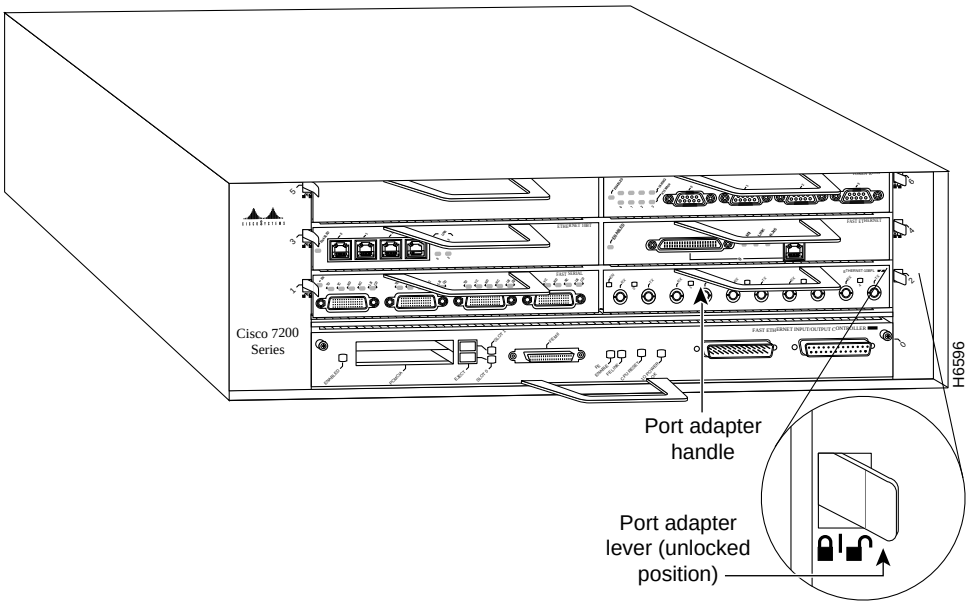
Removing a Port Adapter

Following is the procedure for removing 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 half way out of its slot. If you are removing a blank port adapter, pull the blank port adapter from the chassis slot.

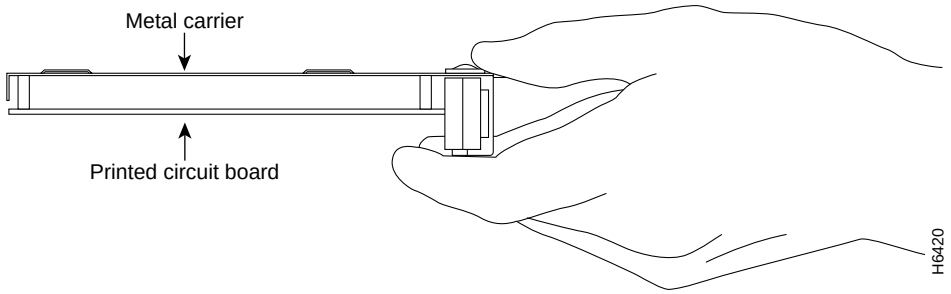
Note As you disengage the port adapter from the router midplane, OIR administratively shuts down all active interfaces on the port adapter.

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

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

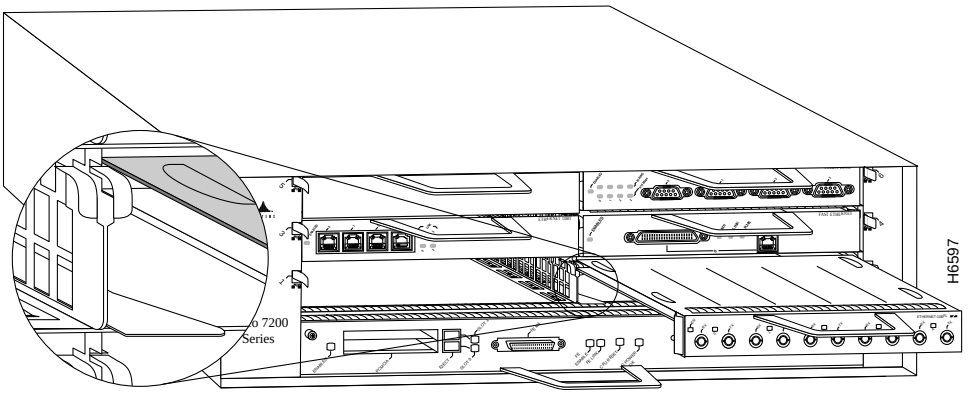
Following is the procedure for installing a new port adapter in a Cisco 7200 series router:

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)



Step 4 With the metal carrier aligned in the slot guides, gently slide the port adapter half way into the slot.

Caution Do not slide the port adapter all the way into the slot until you have connected all required cables. Trying to do so will disrupt normal operation of the router.

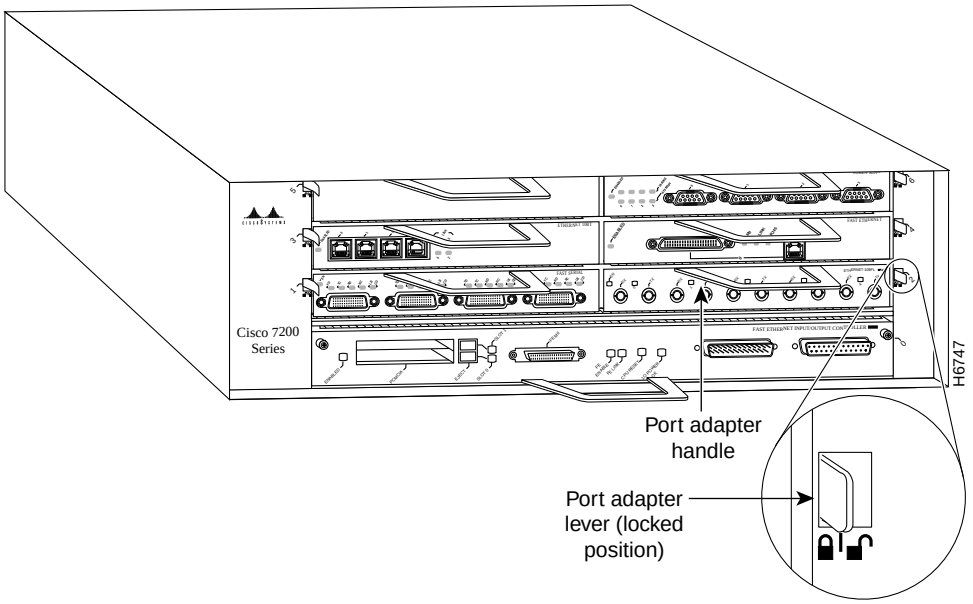
Step 5 With the port adapter half way in the slot, connect all required cables to the port adapter.

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 After feeling the connector's mate, 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 half way 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 4E Port Adapter Interface Cables

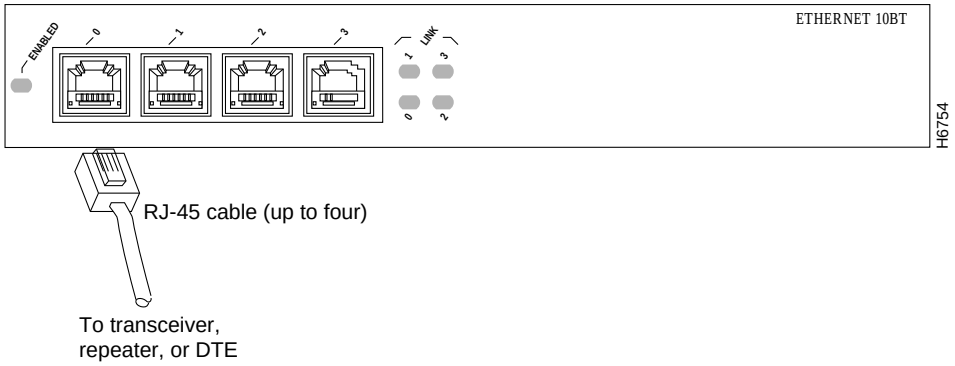
On a single 4E port adapter, you can use up to four RJ-45 connections. RJ-45 cables are not available from Cisco Systems; they are available from outside commercial cable vendors.

Connect RJ-45 cables to the 4E port adapter as follows:

Step 1 Attach the Category 5 UTP cable directly to the RJ-45 port on the 4E port adapter. (See Figure 20.)

The 4E port adapter is an end station device and not a repeater. You *must* connect the 4E port adapter to a repeater or hub.

Figure 20 Connecting 4E RJ-45 Cables



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 network end of your RJ-45 cable to your 10BASE-T hub or repeater, DTE, or other external 10BASE-T equipment.

Step 3 Repeat Steps 1 and 2 for each of the remaining 10BASE-T interface you want to install.

This completes the procedure for attaching 4E port adapter interface cables.

Configuring the 4E Interfaces

If you installed a new 4E 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 4E port adapter that was previously configured, the system will recognize the new 4E interfaces and bring them up in their existing configuration.

After you verify that the new 4E 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.

Note The 4E interfaces installed in a Cisco 7206 can be configured at 10 Mbps, half duplex, for a maximum aggregate bandwidth of 40 Mbps.

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

The following section describes how to identify port adapter slot and Ethernet 10BASE-T 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:

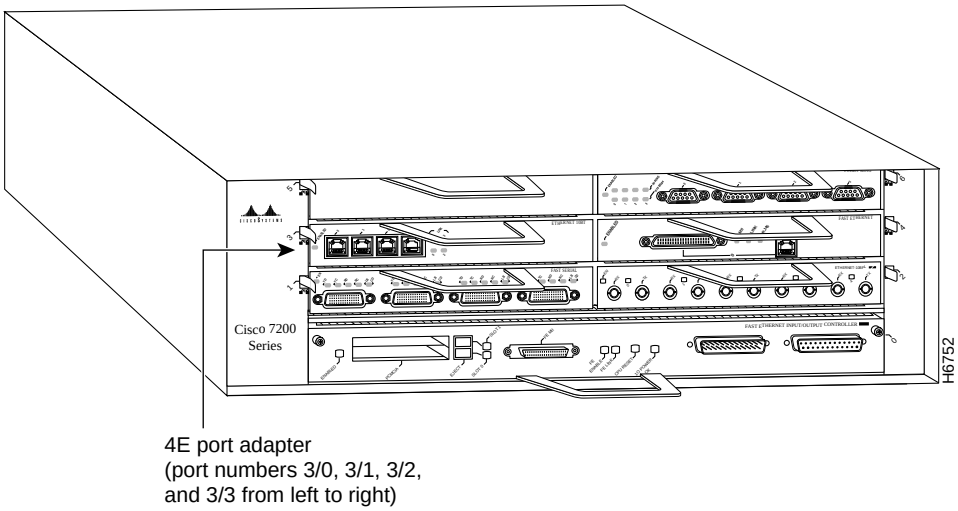
- The first number identifies the chassis slot in which the 4E port adapter is installed.
- The second number identifies the interface ports on each 4E port adapter, which are always numbered in sequence as interface 0 through 3.

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 four 10BASE-T interface ports on a 4E port adapter in port adapter slot 3 would have the following addresses: 3/0, 3/1, 3/2, and 3/3. (See Figure 21.) If the 4E port adapter was in port adapter slot 1, these same interface ports would be numbered 1/0 through 1/3. Port adapters can occupy any port adapter slot. There are no restrictions.

Figure 21 Cisco 7206 10BASE-T 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>
```

Following is an example of a basic configuration procedure:

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 use 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 Use the **show version** command to display the system hardware configuration. Ensure that the list includes the new interfaces.

Step 2 Display all the current port adapters and their interfaces with the **show controllers** command. Verify that the new 4E 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 four Ethernet 10BASE-T interfaces (0–3) are in port adapter slot 3. (Interfaces are administratively shut down until you enable them.)

```
Router# sh int e 3/0
Ethernet3/0 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)
(display text omitted]

Router# sh int e 3/1
Ethernet3/1 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)
(display text omitted]

Router# sh int e 3/2
Ethernet3/1 is administratively down, line protocol is down
  Hardware is AmdP2 Ethernet, address is 1.1.1.12 (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)
(display text omitted]

Router# sh int e 3/3
Ethernet3/3 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)
(display text omitted]
```

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-T interface only.

The following example of the **show interfaces ethernet** *slot/port* command shows all of the information specific to the first 4E interface port (interface port 0) in port adapter slot 3:

```
Router# sh int e 3/0
Ethernet3/0 is administratively down, line protocol is down
  Hardware is AmdP2 Ethernet, address is 1.1.1.10 (bia 0000.0ca5.2388)
  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 port adapter 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 Sun 21-Apr-95 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 (Level 2 Cache)
Last reset from power-on
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
Chassis Interface.
4 Ethernet/IEEE 802.3 interfaces.
5 FastEthernet/IEEE 802.3 interfaces.
125K bytes of non-volatile configuration memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2
```

To determine which type of port adapter is installed in your system, use the **show diag** *slot* command. Specific port adapter information is displayed, as shown in the following example of an 4E port adapter in chassis slot 1:

```
Router# show diag 1

Slot 1:
Ethernet port adapter, 4 ports
Port adapter is analyzed
Port adapter insertion time 2d09h ago
Hardware revision 1.1           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 02 01 01 FF FF FF FF 49 06 14 04 00 00 00 00
0x30: 50 00 00 00 FF FF FF FF FF FF FF FF FF FF FF FF
```

For complete command descriptions and examples for the Cisco 7200 series routers, 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.

SELV Circuit Warning Translations

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

Waarschuwing De poorten die "Ethernet", "10BASE-T", "Token Ring", "Console" en "AUX" zijn gelabeld, zijn veiligheidscircuits met extra lage spanning (genaamd SELV = Safety Extra-Low Voltage). SELV-circuits mogen alleen met andere SELV-circuits verbonden worden. Omdat de BRI-circuits op dezelfde manier als telefoonnetwerkspanning behandeld worden, mag u het SELV-circuit niet verbinden met de telefoonnetwerkspanning (TNV) circuits.

Varoitus Portit, joissa on nimet "Ethernet", "10BASE-T", "Token Ring", "Console" ja "AUX", ovat erityisen pienen jännityksen omaavia turvallisuuspiirejä (SELV-piirejä). Tällaiset SELV-piirit tulee yhdistää ainoastaan muihin SELV-piireihin. Koska perusluokan liitäntöjen (Basic Rate Interface- eli BRI-liitännät) jännite vastaa puhelinverkoston jännitettä, vältä SELV-piirin yhdistämistä puhelinverkoston jännitepiireihin (TNV-piireihin).

Attention Les ports étiquetés « Ethernet », « 10BASE-T », « Token Ring », « Console » et « AUX » sont des circuits de sécurité basse tension (Safety Extra-Low Voltage ou SELV). Les circuits SELV ne doivent être interconnectés qu'avec d'autres circuits SELV. Comme les circuits BRI sont considérés comme des sources de tension de réseau téléphonique, éviter de connecter un circuit SELV à un circuit de tension de réseau téléphonique (telephone network voltage ou TNV).

Warnung Die mit "Ethernet", "10BASE-T", "Token Ring", "Console" und "AUX" beschrifteten Buchsen sind Sicherheitskreise mit Sicherheitskleinspannung (Safety Extra-Low Voltage, SELV). SELV-Kreise sollten ausschließlich an andere SELV-Kreise angeschlossen werden. Da die BRI-Kreise wie Telefonnetzspannungen behandelt werden, ist der SELV-Kreis nicht an Telefonnetzspannungskreise (TNV) anzuschließen.

Avvertenza Le porte contrassegnate da "Ethernet", "10BASE-T", "TokenRing", "Console" e "AUX" sono circuiti di sicurezza con tensione molto bassa (SELV). I circuiti SELV devono essere collegati solo ad altri circuiti SELV. Dato che i circuiti BRI vengono trattati come tensioni di rete telefonica, evitare di collegare il circuito SELV ai circuiti in cui è presente le tensione di rete telefonica (TNV).

Advarsel Utgangene merket "Ethernet", "10BASE-T", "Token Ring", "Console" og "AUX" er lavspentkretser (SELV) for ekstra sikkerhet. SELV-kretser skal kun kobles til andre SELV-kretser. Fordi BRI-kretsene håndteres som telenettspenning, unngå å koble SELV-kretsen til kretser for telenettspenning (TNV).

Aviso As portas "Ethernet", "10BASE-T", "Token Ring", "Console", and "AUX" são circuitos de segurança de baixa tensão (SELV). Estes circuitos deverão ser apenas ligados a outros circuitos SELV. Devido ao facto de os circuitos BRI (Interface de Ritmo Básico) serem tratados como sendo de tensão equivalente à da rede telefónica, evite ligar o circuito SELV aos circuitos TNV (tensão de rede telefónica).

¡Advertencia! Los puertos "Ethernet", "10BASE-T", "Token Ring", "Console" y "AUX" son circuitos de muy baja señal que garantizan ausencia de peligro (Safety Extra-Low Voltage = SELV). Estos circuitos SELV deben ser conectados exclusivamente con otros también de tipo SELV. Puesto que los circuitos tipo BRI se comportan como aquéllos con voltajes de red telefónica, debe evitarse conectar circuitos SELV con circuitos de voltaje de red telefónica (TNV).

Varning! De portar som är märkta "Ethernet", "10BASE-T", "Token Ring", "Console" och "AUX" är SELV-kretsar, d.v.s. skyddskretsar med extra låg spänning (SELV: Safety Extra-Low Voltage = skyddsklenspänning). SELV-kretsar får endast anslutas till andra SELV-kretsar. Eftersom BRI-kretsar behandlas liksom telefonnätsspänning bör SELV-kretsen inte anslutas till telefonnätsspänningskretsar (TNV-kretsar).

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- WWW: http://www.cisco.com.
- WWW: http://www-europe.cisco.com.
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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 baud rates up to 14.4 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact cco-help@cisco.com. For additional information, contact cco-team@cisco.com.

Note If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or `tac@cisco.com`. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or `cs-rep@cisco.com`.

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