Doc. No. 78-3224-02

Cisco 7200 Series Input/Output Controller Replacement Instructions

Product Numbers: C7200-I/O-FE-MII=, C7200-I/O=

This document explains how to remove and replace the Input/Output (I/O) controller in the Cisco 7200 series routers. It includes instructions for powering down a router, removing an installed I/O controller, and installing a new I/O controller in the router. This document also includes steps for verifying the initialization of the installed I/O controller after you power up the router.

Note Use this configuration note in conjunction with the *Cisco 72xx Installation and Configuration Guide* that shipped with your Cisco 7200 series router.

The following sections are included in this document:

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA

Additional Information

The Cisco Internetwork Operating System (Cisco IOS) software running your router contains extensive features and functionality. The effective use of many of these features is easier if you have more information at hand.

Cisco documentation and additional literature are available on a CD-ROM called Cisco Connection Documentation, Enterprise Series, which ships with your chassis. The CD is updated and shipped monthly, so it might be more up to date than printed documentation. To order additional copies of the Cisco Connection Documentation, Enterprise Series CD, contact a Cisco Sales or Customer Service representative. You can also access Cisco technical documentation on the World Wide Web URL http://www.cisco.com.

For additional information on configuring the Cisco 7200 series routers, the following documentation resources are available to you:

- Cisco Connection Documentation, Enterprise Series CD-ROM
- For systems with Cisco IOS Release 11.1(6), a Cisco-approved Release 11.1(6) beta software version, or a later Cisco IOS release, 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 7200 series routers, refer to the *Cisco 72xx Installation and Configuration Guide* that shipped with your router.

- To obtain general information about documentation, refer to the section "Cisco Connection Online," on page 26, 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 Cisco-observed 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.

Product Overview

The following sections give brief overviews of the Cisco 7200 series routers and the I/O controllers.

Cisco 7200 Series Overview

The Cisco 7200 series consists of the four-slot Cisco 7204 and the six-slot Cisco 7206. The Cisco 7200 series routers support multiprotocol, multimedia routing and bridging with a wide variety of protocols and any combination of Ethernet, Fast Ethernet, Token Ring, Fiber Distributed Data Interface (FDDI), and serial media. Network interfaces reside on port adapters that provide a connection between the routers' three Peripheral Component Interconnect (PCI) buses and external networks. Port adapters can be placed in any available port adapter slot, in any desired combination.

The front of the Cisco 7200 series routers provides access to an Input/Output (I/O) controller and up to four or six network interface port adapters. The I/O controller has a local console port for connecting a data terminal (or data terminal equipment [DTE]) and an auxiliary port for connecting a modem (or other data communications equipment [DCE]) or other devices for configuring and managing the router; two Personal Computer Memory Card International Association (PCMCIA) slots for Flash memory cards; and an optional Fast Ethernet port. The Fast Ethernet port provides a 100-Mbps connection to the network. Figure 1 shows the Cisco 7204. Figure 2 shows the Cisco 7206.

Note The I/O controller is available with or without a Fast Ethernet port. Figure 1 and Figure 2 show an I/O controller with a Fast Ethernet port.

Figure 1 Cisco 7204—Front View

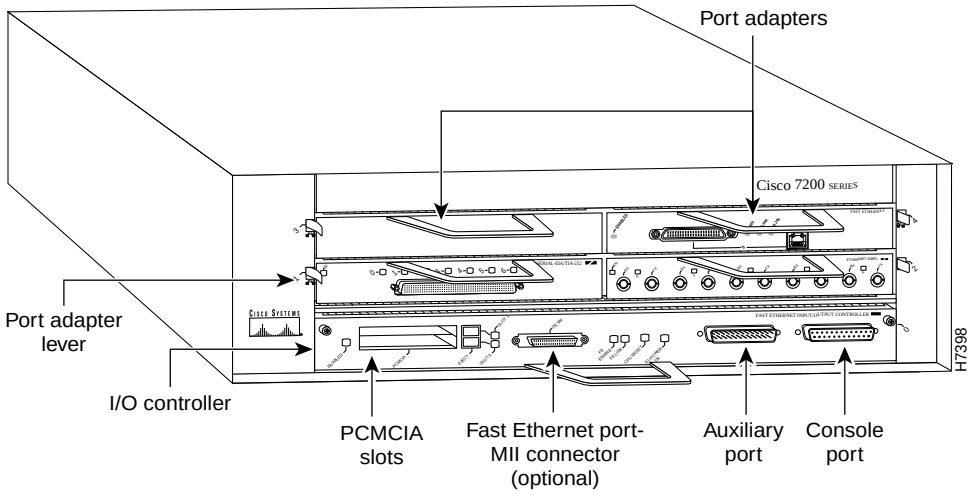
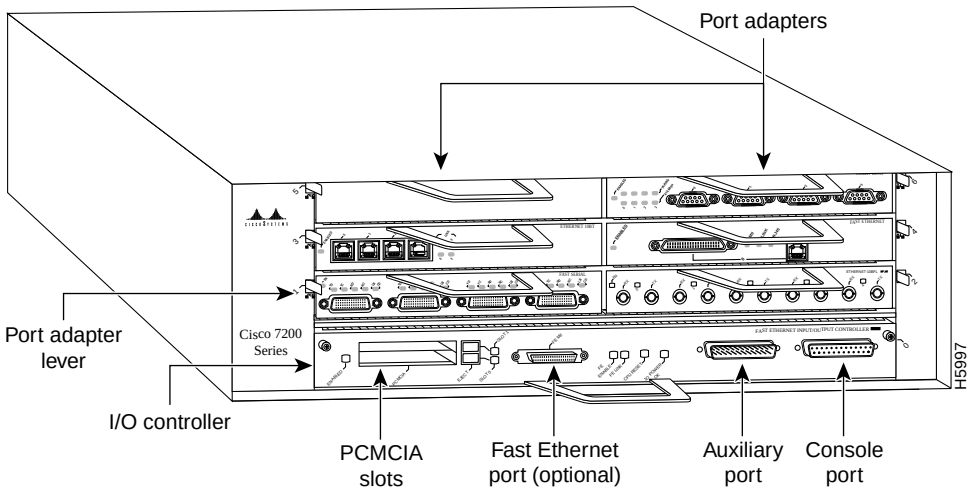


Figure 2 Cisco 7206—Front View

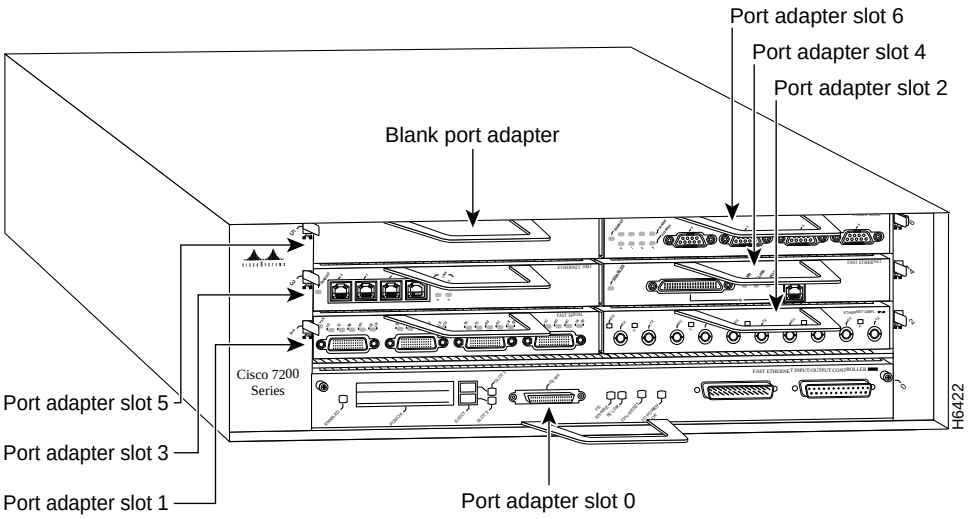


The port adapters installed in the Cisco 7200 series routers are of the same type as those installed on the second-generation Versatile Interface Processors (VIP2s) in the Cisco 7000 family routers. The port adapters installed in the Cisco 7200 series routers support online insertion and removal (OIR).

Port adapter slots in the Cisco 7200 series are numbered from left to right, beginning with port adapter slot 1 and continuing through port adapter slot 4 for the Cisco 7204, and slot 6 for the Cisco 7206. Port adapter slot 0 is the Fast Ethernet port on the I/O controller. Figure 3 shows the port adapter slot numbering for the Cisco 7206.

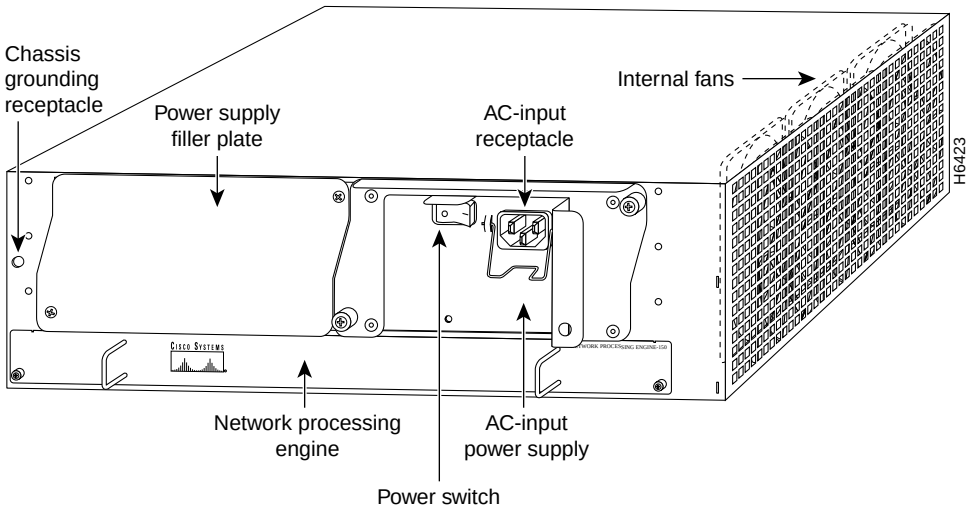
Note In Figure 3, a blank port adapter is installed in port adapter slot 5. To ensure adequate airflow across the router's internal components, ensure that each port adapter slot is filled with either a port adapter or a blank port adapter.

Figure 3 Port Adapter Slot Numbering—Cisco 7206 Shown



The rear of the Cisco 7200 series routers provides access to the network processing engine and up to two 280W, AC-input or DC-input power supplies (refer to Figure 4).

Figure 4 Cisco 7200 Series Router—Rear View



The network processing engine has no external connectors or LEDs. There are two handles for removing and installing the network processing engine and two captive installation screws for securing it to the chassis.

A fully configured Cisco 7200 series router operates with only one installed power supply; however, a second, optional power supply provides hot-swappable, load-sharing, redundant power. The power supply has the router's main power switch and either an AC-input power receptacle, or a hardwired DC-input power cable (depending on the type of installed power supply). Adjacent to the power supply bays there is a 10 x 32-inch chassis ground receptacle that provides a chassis ground connection for ESD equipment or a grounding wire (refer to Figure 4).

Note The Cisco 7200 routers come equipped with either one 280W AC-input or one 280W DC-input power supply; a second 280W AC-input or DC-input power supply is available for the router. Figure 4 shows the rear of a Cisco 7200 series router that is configured with a single 280W AC-input power supply. (A power supply filler plate is installed over the second power supply bay.)

Three internal fans draw cooling air into the chassis interior and across internal components to maintain an acceptable operating temperature (refer to Figure 4). The three fans are enclosed in a tray that is located in the subchassis.

The I/O controller, port adapters, power supplies, and network processing engine slide into their respective chassis slots and connect directly to the router's midplane; there are no internal cables to connect. The midplane distributes DC power from the power supplies to the I/O controller, port adapters, fan tray, and network processing engine.

Input/Output Controller Overview

The Input/Output controller shares the system memory functions and the environmental monitoring functions for the Cisco 7200 series routers with the network processing engine.

The I/O controller is available with an optional Fast Ethernet port. Figure 5 shows an I/O controller without the Fast Ethernet port. Figure 6 shows an I/O controller with the Fast Ethernet port. The I/O controller consists of the following components:

- Dual EIA/TIA-232 channels for local console and auxiliary ports. The console port has full data communications equipment (DCE) functionality and a DB-25 receptacle. The auxiliary port has full data terminal equipment (DTE) functionality and a DB-25 plug.
- An optional Fast Ethernet port with a single female MII receptacle that is configurable for use at 100 megabits per second (Mbps).
- Nonvolatile random-access memory (NVRAM) for storing the system configuration and environmental monitoring logs. When replacing the I/O controller, be sure to copy the router's running configuration to a Trivial File Transfer Protocol (TFTP) file server so that you can retrieve it later; otherwise, you will have to reenter your configuration manually. NVRAM uses lithium batteries to maintain its contents when disconnected from power.
- Two Personal Computer Memory Card International Association (PCMCIA) slots for Type II Flash memory cards.
- Flash memory SIMM and Flash memory cards for storing the boot helper image and the default Cisco IOS software image.
- Erasable programmable read-only memory (EPROM) for storing sufficient code for booting the Cisco IOS software.
- Two environmental sensors for monitoring the cooling air as it enters and leaves the Cisco 7206 chassis.

Figure 5 Input/Output Controller—Without the Fast Ethernet Port

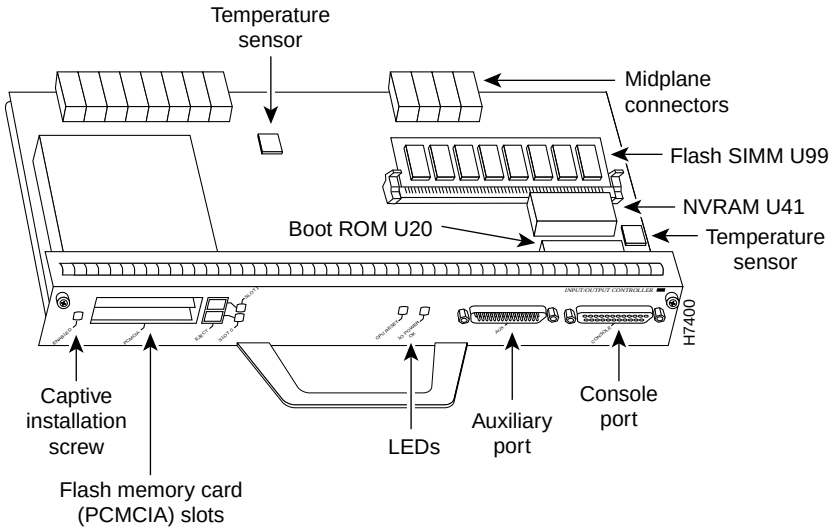


Figure 6 Input/Output Controller—With the Fast Ethernet Port

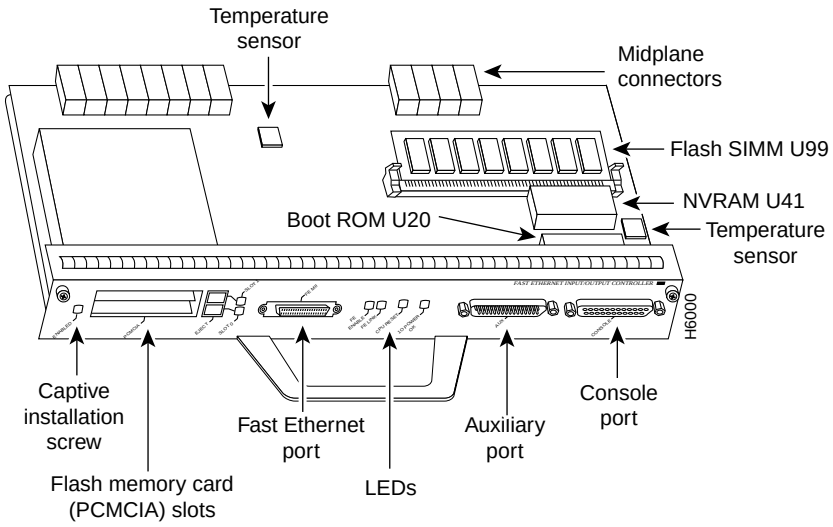


Table 1 lists the I/O controller memory components.

Table 1 Input/Output Controller Memory Components

Type	Size	Quantity	Description	Location
Boot ROM	256 KB	1	EPROM for the ROM monitor program	Socket U20
Flash SIMM	4 MB	1	Contains the default boot helper image	Socket U99
Flash memory card	8 MB to 20 MB	Up to 2	Contains the default Cisco IOS image	PCMCIA Slot 0 and slot 1
NVRAM	128 KB	1	Nonvolatile EPROM for the system configuration file	Socket U41

Depending on whether the Fast Ethernet port is present, either two or four LEDs on the I/O controller faceplate indicate system status; two additional LEDs indicate the status of the Flash memory cards installed in either PCMCIA slot.

Figure 7 shows the LEDs of an I/O controller that does not have the Fast Ethernet port. Figure 8 shows the LEDs of an I/O controller that has the Fast Ethernet port. Table 2 lists I/O controller LEDs and their functions.

Next to the IO power OK LED on the I/O controller faceplate is the CPU reset button. The CPU reset button resets the entire system.

Caution To prevent system errors and problems, use the CPU reset button only at the direction of your service representative.

Figure 7 I/O Controller LEDs and CPU Reset Button—Without the Fast Ethernet Port

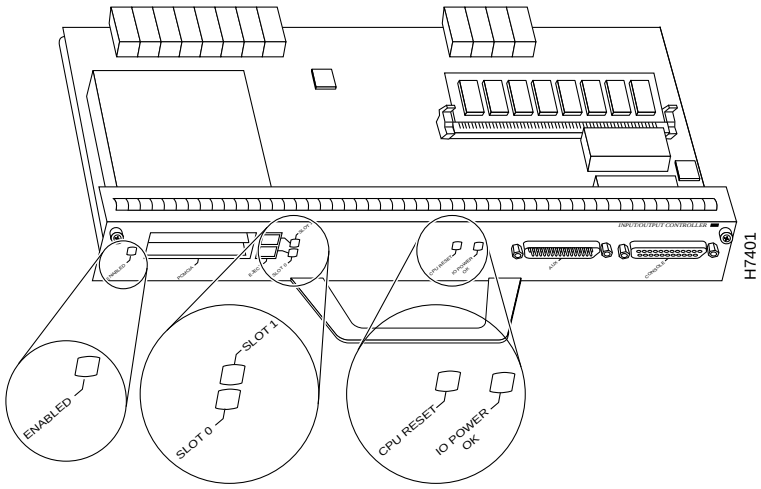
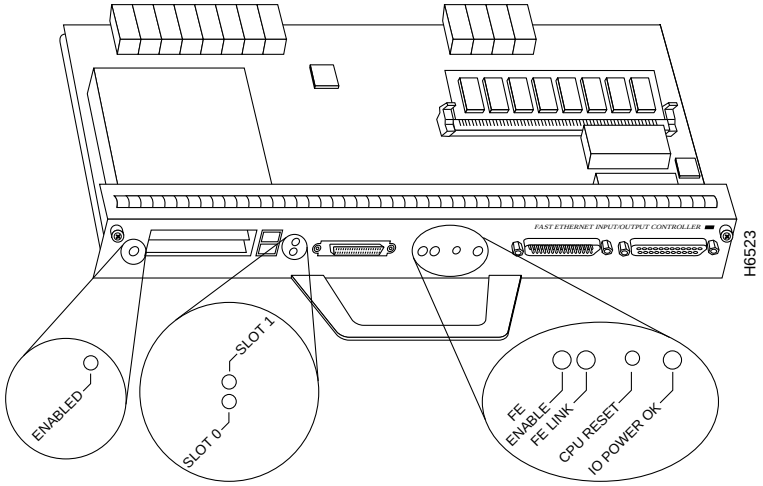


Figure 8 I/O Controller LEDs and CPU Reset Button—With the Fast Ethernet Port



Caution To prevent system errors and problems, use the CPU reset button only at the direction of your service representative.

Table 2 I/O Controller LEDs

LED	Function
IO Power OK	Indicates that the I/O controller is on and receiving DC power from the router midplane. This LED comes on during a successful router boot and remains on during normal operation of the router.
Enabled	Indicates that the network processing engine and the I/O controller are enabled for operation by the system; however, it does not mean that the Fast Ethernet port on the I/O controller is functional or enabled. This LED comes on during a successful router boot and remains on during normal operation of the router.
FE ENABLE	Indicates that the Fast Ethernet port on the I/O controller is initialized and enabled for operation by the system. This LED comes on after the I/O controller has been enabled and remains on during normal operation of the router.
FE LINK	Indicates that the Fast Ethernet port on the I/O controller is receiving a carrier signal from the network. This LED remains off during normal operation of the router, unless there is an incoming carrier signal.
Slot 0 Slot 1	The slot 0 and slot 1 LEDs indicate which PCMCIA slot is in use and blink when either slot is being accessed by the system.

Installation Prerequisites

This section provides a list of parts and tools you need to remove and replace the I/O controller in the Cisco 7200 series routers. This section also includes safety and ESD-prevention guidelines to help you avoid injury to yourself and damage to the equipment.

List of Parts and Tools

You need the following tools and parts to remove and replace the I/O controller. If you need additional equipment, contact a service representative for ordering information:

- A new I/O controller
- Number 2 Phillips screwdriver
- 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
- An antistatic mat or surface

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.
- 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) damages equipment and impairs electrical circuitry. ESD occurs when printed circuit boards are improperly handled and results in complete or intermittent failures.

The network processing engine, I/O controller, and port adapters consist of a printed circuit board that is fixed in a metal carrier. Electromagnetic interference (EMI) shielding, connectors, and a handle are integral components of the carrier. Handle the network processing engine, I/O controller, and port adapters by their carrier edges and handle; never touch the printed circuit board or connector pins.

Figure 9 shows the location of a printed circuit board when it is installed in a network processing engine or I/O controller metal carrier. Do not touch the printed circuit board when handling either component.

Figure 9 Handling the Network Processing Engine and the I/O Controller—Side View

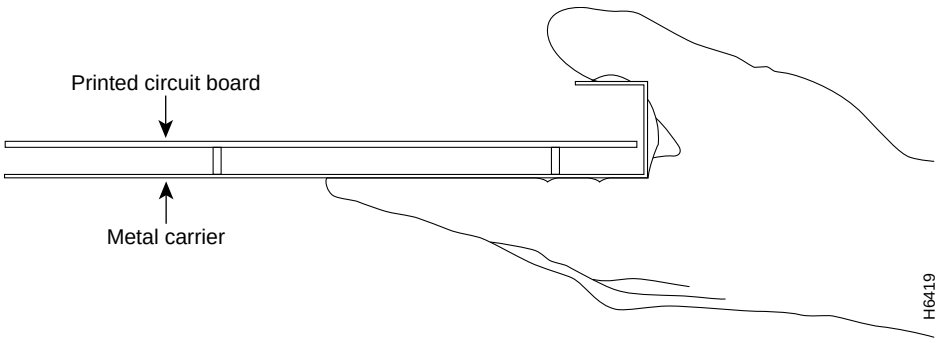
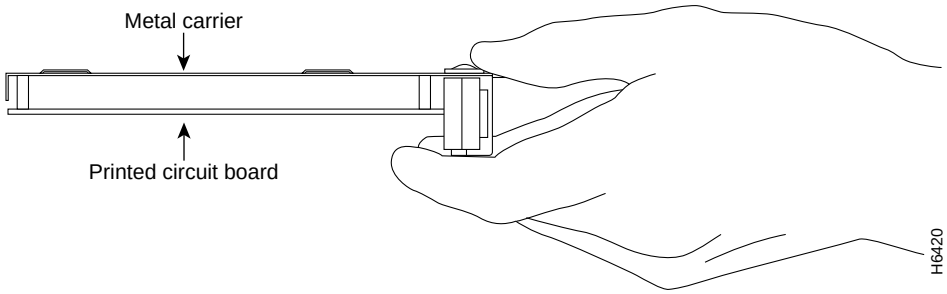


Figure 10 shows the location of a printed circuit board when it is installed in a port adapter metal carrier. Do not touch the printed circuit board when handling a port adapter.

Figure 10 Handling a Port Adapter—Side View



Although the metal carrier helps to protect the printed circuit boards from ESD, wear a preventive antistatic strap whenever handling the network processing engine, I/O controller, or port adapters. Ensure that the strap makes good skin contact and connect the strap's clip to an unpainted chassis surface to safely channel unwanted ESD voltages to ground.

If no wrist strap is available, ground yourself by touching the metal part of the chassis.

Caution Make sure to tighten the captive installation screws on the network processing engine and the I/O controller (use a number 2 Phillips's screwdriver). These screws prevent accidental removal, provide proper grounding for the router, and help to ensure that the network processing engine and the I/O controller are properly seated in the router midplane.

Following are guidelines for preventing ESD damage:

- Always use an ESD wrist strap or ankle strap when installing or replacing the network processing engine, I/O controller, or port adapters. Ensure that the ESD strap makes contact with your skin.
- Handle the network processing engine, I/O controller, or port adapters by their metal carrier edges and handles only; avoid touching the printed circuit board components or any connector pins.
- When removing the network processing engine, I/O controller, or port adapters, place them on an antistatic surface with the printed circuit board components facing upward, or in a static shielding bag. If you are returning an I/O controller, network processing engine, or port adapter to the factory, immediately place it in a static shielding bag.

Caution Periodically check the resistance value of the antistatic strap. The measurement should be within the range of 1 and 10 megohms.

Removing and Replacing the Input/Output Controller

The following sections explain how to remove and replace an I/O controller in the Cisco 7200 series routers. It involves the following tasks:

1. Copying the Configuration File to a TFTP Server
2. Powering Down the Router and Disconnecting Input Power
3. Removing the Input/Output Controller
4. Replacing an Input/Output Controller
5. Reconnecting Input Power and Powering Up the Router
6. Downloading the Saved Configuration from the TFTP Server

These tasks are described in detail in the following subsections.

Note The tasks for removing and replacing an I/O controller in the Cisco 7204 and the Cisco 7206 are the same. Therefore, the illustrations in the following sections show the Cisco 7206, unless indicated otherwise.

Copying the Configuration File to a TFTP Server

Before you replace the I/O controller, copy the router's running configuration to a Trivial File Transfer Protocol (TFTP) file server so that you can retrieve it later; otherwise, you will have to reenter your configuration manually.

Before copying the router's configuration file to a TFTP file server, check the following items:

- A console terminal is connected to the console port on the I/O controller, or a Telnet session is established to the router
- The router is connected to a network supporting a file server (remote host)
- The remote host supports the TFTP application
- You have the name or address of the remote host

Complete the following steps to copy the router's configuration file to a remote host:

Step 1 Make sure you are at the privileged level of the EXEC command interpreter (check the system prompt for a pound sign [#]). If the system prompt does not have a pound sign (#), enter **enable**, and then your password.

Step 2 Use the **ping** command to check the connection between the router and the remote host.

Step 3 Issue the **show running-config** command to display the router's running configuration. Ensure that the configuration information is complete and correct. If it is not, use the **configure** command to add or modify the existing configuration. Then, issue the **copy running-config startup-config** command to save the retrieved configuration in NVRAM. NVRAM uses lithium batteries to maintain its contents when disconnected from power.

Note Refer to the appropriate software documentation listed in the section "Additional Information" for descriptions of the configuration options available for the system and individual interfaces, and for specific configuration instructions.

Step 4 Issue the **copy startup-config tftp** command. The EXEC command interpreter prompts you for the name or IP address of the remote host that is to receive the configuration file. (The prompt might include the name or address of a default file server.)

```
Router# copy startup-config tftp
Remote host []?
```

Step 5 Enter the name or IP address of the remote host. In the following example, the name of the remote server is *servername*:

```
Router# copy startup-config tftp
Remote host []? servername
Translating "servername"...domain server (1.1.1.1) [OK]
```

Step 6 The EXEC command interpreter prompts you for the name of the file that will contain the configuration. By default, the system appends *-confg* to the router's name to create the new filename. Press **Return** to accept the default filename, or enter a different name for the file before pressing **Return**. In the following example, the default is accepted:

```
Name of configuration file to write [Router-confg]?
Write file Router-confg on host 1.1.1.1? [confirm]
Writing Router-confg .....
```

Step 7 Before the router executes the copy process, it displays the instructions you entered for confirmation. If the instructions are not correct, enter **n** (no), then **Return** to stop the process. To accept the instructions, press **Return**, or **y,** and then **Return**; the system begins the copy process. In the following example, the default is accepted:

```
Write file Router-confg on host 1.1.1.1? [confirm]
Writing Router-confg: !!!! [ok]
```

While the router copies the configuration to the remote host, it displays a series of exclamation points (! ! !) or periods (. . .). The !!!! and [ok] indicate that the operation is successful. A display of . . . [timed out] or [failed] indicates a failure, which would probably be due to a network fault or the lack of a writable, readable file on the remote file server.

Step 8 If the display indicates that the process was successful (with the series of ! ! ! and [ok]), the copy process is complete. The configuration file is safely stored in the temporary file on the remote file server.

If the display indicates that the process failed (with the series of . . . as shown in the following example):

```
Writing Router-confg .....
```

your configuration was not saved. Repeat the preceding steps, or select a different remote file server and repeat the preceding steps. If you are unable to copy the configuration to a remote host successfully, contact your network administrator or refer to the end of this document for instructions on contacting technical assistance.

This completes the procedure for copying the configuration file to a TFTP server. Proceed to the section "Powering Down the Router and Disconnecting Input Power."

Powering Down the Router and Disconnecting Input Power

To power down a Cisco 7200 series router that has an installed AC-input power supply, complete the following steps:

Step 1 Facing the rear of the router, place the power switch (on the power supply) in the OFF (0) position. Repeat this action if a second power supply is installed in the router.

Step 2 Observe the following items:

- The green OK LED on the power supply turns off
- The fans stop operating
- The LEDs on the I/O controller turn off
- The LEDs on the port adapters turn off

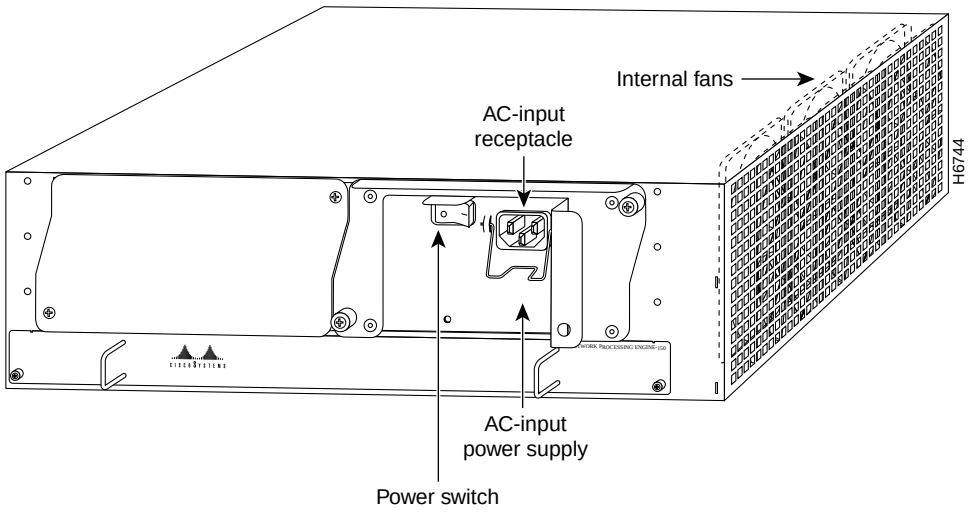
To disconnect AC-input power to a Cisco 7200 series router, complete the following steps:

Step 1 Unplug the input power cable from the power source.

Step 2 Push down on the cable-retention clip that secures the input power cable to the router's power supply.

Step 3 Unplug the other end of the input power cable from the power supply (refer to Figure 11).

Figure 11 Disconnecting Power from a Cisco 7200 Series AC-Input Power Supply



Step 4 Repeat Step 2 through Step 1 if a second power supply is installed.

This completes the procedure for powering down the router and disconnecting input power. Proceed to the section "Removing the Input/Output Controller."

Removing the Input/Output Controller

To remove an I/O controller from a Cisco 7200 series router, complete the following steps:

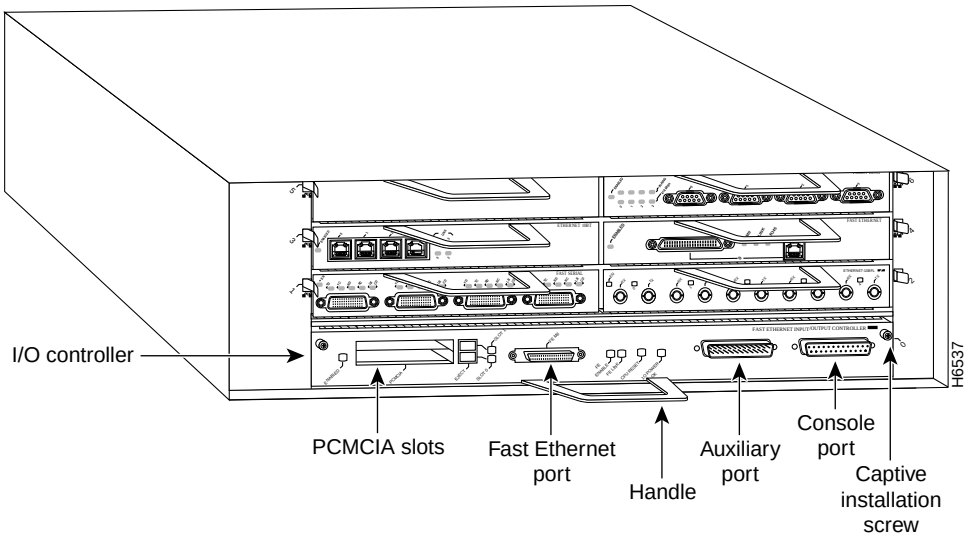
Note Before removing the I/O controller, save the router's configuration to a TFTP file server. Refer to the section "Copying the Configuration File to a TFTP Server" earlier in this document.

Step 1 Power down the router and disconnect the input power cable. Refer to the section "Powering Down the Router and Disconnecting Input Power" earlier in this document.

Step 2 Attach an ESD-preventative wrist strap between you and an unfinished chassis surface.

Step 3 Disconnect the cables from the I/O controller's console, auxiliary, and the Fast Ethernet (if present) ports (refer to Figure 12).

Figure 12 Cisco 7200 Series Input/Output Controller Ports, Handle, and Captive Screws



Step 4 Remove the Flash memory cards (if present) from the I/O controller's PCMCIA slots. Refer to the section "Installing and Removing a Flash Memory Card" later in this document.

Step 5 Using a number 2 Phillips screwdriver, loosen the two captive installation screws on the faceplate of the I/O controller (refer to Figure 12).

Step 6 Grasp the I/O controller handle and carefully pull the controller from its chassis slot.

Caution Handle the I/O controller by the carrier edges and handle only; never touch the printed circuit board components or connector pins (refer to Figure 9).

Step 7 Place the I/O controller on an antistatic surface with its components facing upward, or in a static shielding bag. If you are returning the I/O controller to the factory, immediately place it in a static shielding bag.

This completes the procedure for removing an installed I/O controller. Proceed to the section "Replacing an Input/Output Controller."

Replacing an Input/Output Controller

To install a new I/O controller in the router, complete the following steps:

Step 1 Ensure that the router is powered down and its input power cable is disconnected from the router and the power source. Refer to the section "Powering Down the Router and Disconnecting Input Power" earlier in this document.

Step 2 Attach an ESD-preventative wrist strap between you and an unfinished chassis surface.

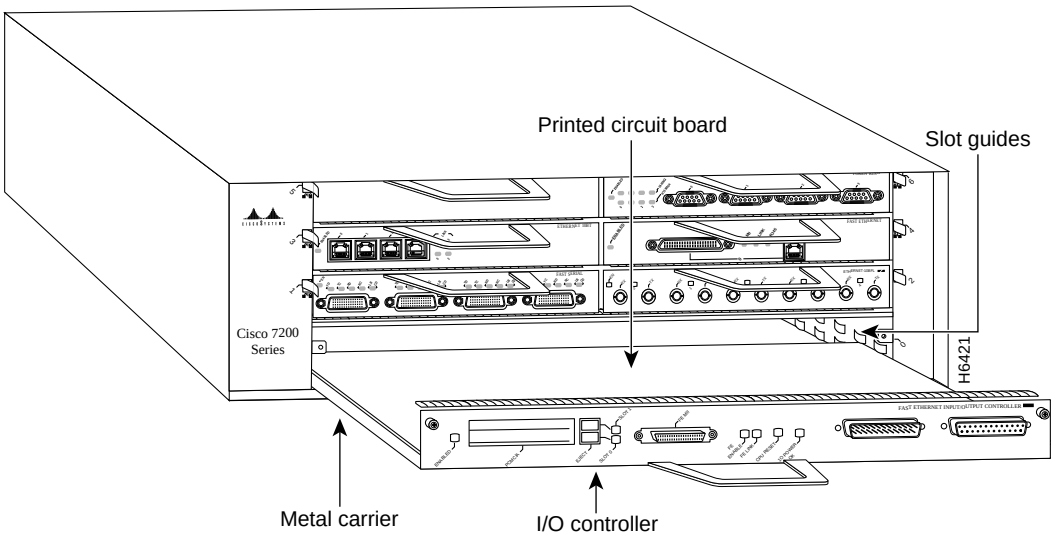
Step 3 Remove the I/O controller from its static shielding bag.

Step 4 Using both hands, grasp the I/O controller by its metal carrier edges and orient the I/O controller so that its printed circuit board components are upward (refer to Figure 9).

Caution Handle the I/O controller by the carrier edges and handle only; never touch the printed circuit board components or connector pins.

Step 5 Align the left and right edge of the I/O controller's printed circuit board between the I/O controller slot guides (refer to Figure 13).

Figure 13 Aligning the I/O Controller's Printed Circuit Board between the Slot Guides



Caution Do not align the I/O controller's *metal carrier* between the slot guides. Doing so will damage components on the I/O controller's printed circuit board as you slide the I/O controller into its chassis slot.

Step 6 Gently slide the I/O controller all the way into its chassis slot until you feel the connectors mate with the router midplane.

Step 7 Seat the I/O controller in the router midplane by tightening its captive installation screws with a number 2 Phillips screwdriver.

Note The I/O controller is not fully seated in the router midplane until you tighten its captive installation screws (use a number 2 Phillips screwdriver).

Step 8 Connect the cables to the I/O controller's console, auxiliary, and Fast Ethernet (if present) ports (refer to Figure 12). Refer to the section "I/O Controller Connection Equipment and Port Signaling" later in this document.

Step 9 Replace Flash memory cards (if present) in the PCMCIA slots. Refer to the section "Installing and Removing a Flash Memory Card" later in this document."

This completes the procedure for replacing the I/O controller in a Cisco 7200 series router. Proceed to the section "Reconnecting Input Power and Powering Up the Router."

Reconnecting Input Power and Powering Up the Router

The following sections explain how to reconnect AC-input power to a Cisco 7200 series router, power up the router, and verify a successful system boot.

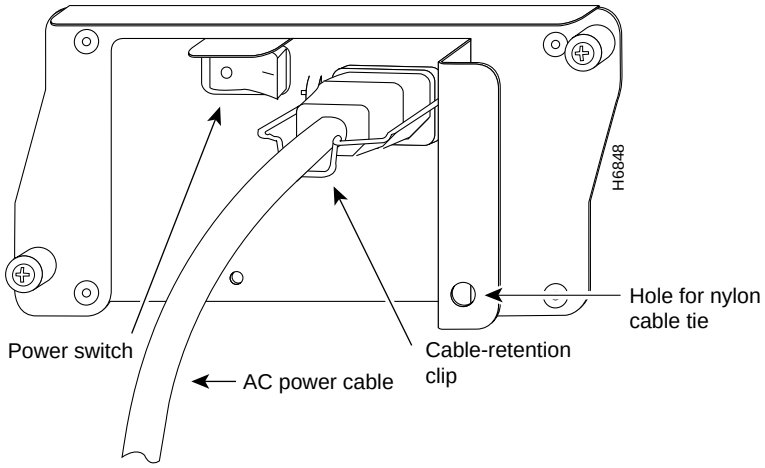
To connect AC-input power to a Cisco 7200 series router, complete the following steps:

Step 1 At the rear of the router, check that the power switch on the power supply is in the OFF (0) position.

Step 2 Slide the cable-retention clip down, away from the AC receptacle, and plug in the power cable.

Step 3 Secure the cable in the power supply AC receptacle by sliding the cable-retention clip up until it snaps around the connector. The cable-retention clip provides strain relief for the AC power cable (refer to Figure 14).

Figure 14 Connecting AC-Input Power to a Cisco 7200 Series Router



Step 4 Plug the AC power supply cable into the AC power source.

Note Each AC-input power supply operating at 120 VAC requires a minimum of 5A service. We recommend powering Cisco 7200 series routers from a 15A receptacle at the power source.

Step 5 Repeat Step 1 through Step 4 for the second power supply (if present).

This completes the steps for connecting input power to a Cisco 7200 series router. To power up a Cisco 7200 series router that has an installed AC-input power supply, complete the following steps:

Step 1 Check for the following:

- Each port adapter is inserted in its slot and its respective port adapter lever is in the locked position
- The network processing engine and the I/O controller are inserted in their respective slots, and their captive installation screws are tightened
- All network interface cables are connected to the port adapters
- A Flash memory card is installed in its PCMCIA slot (if present)
- Each power cable is connected and secured with the cable-retention clip
- The console terminal is turned on

Step 2 At the rear of the router, place the power switch on the power supply in the ON (|) position. Repeat this step if a second power supply is installed in the router. The green OK LED on the power supply turns on.

Step 3 Listen for the fans; you should immediately hear them operating.

Step 4 During the boot process, observe the system's LEDs. The LEDs on most of the port adapters go on and off in irregular sequence. Some may go on, go out, and go on again for a short time. On the I/O controller, the IO Power OK LED comes on immediately.

Step 5 Observe the initialization process. When the system boot is complete (a few seconds), the network processing engine begins to initialize the port adapters and the I/O controller. During this initialization, the LEDs on each port adapter behave differently (most flash on and off). The enabled LED on each port adapter goes on when initialization is completed, and the console screen displays a script and system banner similar to the following:

```
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-J-M), Version 11.1(6)CA [kpfjrgiu 100]
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Sun 21-Apr-96 04:10 by
```

This completes the procedures for reconnecting input power and powering up the router. Proceed to the section "Downloading the Saved Configuration from the TFTP Server" later in this document.

Downloading the Saved Configuration from the TFTP Server

After you install a new I/O controller in the router and verify a successful router boot, you must retrieve the router's configuration from the TFTP server and copy it to NVRAM. Use the **copy tftp running-config** command to copy the saved configuration from the TFTP file server. The system prompts you for a host name and address, the name of the configuration file stored on the host, and confirmation to reboot using the remote file.

Before retrieving the router's configuration file from the TFTP file server, check the following:

- A console terminal is connected to the console port on the I/O controller, or a Telnet session is established to the router
- The router is connected to a network supporting a file server (remote host)

- The remote host supports the TFTP application
- You have the name or address of the remote host

To retrieve the saved router configuration from the remote host, complete the following steps:

Step 1 Make sure you are at the privileged level of the EXEC command interpreter (check the system prompt for a pound sign [#]). If the system prompt does not have a pound sign (#), enter **enable**, and then your password.

Note Until you retrieve the saved configuration, the router will be running from the default configuration in NVRAM. Therefore, any passwords that were previously configured on the system will not be valid until you retrieve the configuration.

Step 2 Use the **ping** command to check the connection between the router and the remote host.

Step 3 At the system prompt, issue the **copy tftp running-config** command and press **Return** to enter Configuration mode. Specify that you will configure the system from a network device (instead of from the console terminal, which is the default).

```
Router# copy tftp running-config
```

Step 4 The system prompts you to select a host or network configuration file. The default is host; press **Return** to accept the default.

```
Host or network configuration file [host]?
```

Step 5 The system prompts you for the IP address of the host. Enter the IP address or name of the remote host (the remote file server to which you copied the configuration file).

```
IP address of remote host [255.255.255.255]? 1.1.1.1
```

Step 6 The system prompts you for the name of the configuration file. When copying the file to the server, the default is to use the name of the router with the suffix *-confg* (*router-confg* in the following example). If you specified a different filename when you copied the configuration, enter that filename; otherwise, press **Return** to accept the default.

```
Name of configuration file [router-confg]?
```

Step 7 Before the system reboots with the new configuration, it displays the instructions you entered for confirmation. If the instructions are not correct, enter **n** (no), then press **Return** to cancel the process. To accept the instructions, press **Return**, or **y**, and then **Return**.

```
Configure using router-confg from 1.1.1.1? [confirm]
Booting router-confg from 1.1.1.1: ! ! [OK - 874/16000 bytes]
```

While the router retrieves and boots from the configuration on the remote host, the console display indicates whether or not the operation was successful. A series of !!!! and [OK] (as shown in the preceding example) indicates that the operation was successful. A series of . . . and [timed out] or [failed] indicate a failure (which would probably be due to a network fault or an incorrect server name, address, or filename). The following is an example of a failed attempt to boot from a remote server:

```
Booting Router-confg ..... [timed out]
```

If the display indicates that the process was successful, proceed to the next step.

If the display indicates that the process failed, verify the name or address of the remote server and the filename, and repeat the preceding steps. If you are unable to retrieve the configuration, contact your network administrator or refer to the end of this document for instructions on contacting Cisco technical assistance.

Step 8 Issue the **show running-config** command to display the currently running configuration on the terminal. Review the display and ensure that the configuration information is complete and correct. If it is not, verify the filename and repeat the preceding steps to retrieve the correct file, or use the **configure** command to add or modify the existing configuration. (Refer to the appropriate software documentation for descriptions of the configuration options available for the system and individual interfaces and specific configuration instructions.)

Step 9 When you have verified that the currently running configuration is correct, issue the **copy running-config startup-config** command to save the retrieved configuration in NVRAM. Otherwise, the new configuration will be lost when you restart the system.

This completes the procedure for downloading the saved router configuration from the remote host. This also completes the procedure for replacing the I/O controller in a Cisco 7200 series router. Proceed to the following section "Reference Information" for additional information you might need when replacing an I/O controller in a Cisco 7200 series router.

Reference Information

This section includes additional information that you might need when replacing an I/O controller in a Cisco 7200 series router.

I/O Controller Connection Equipment and Port Signaling

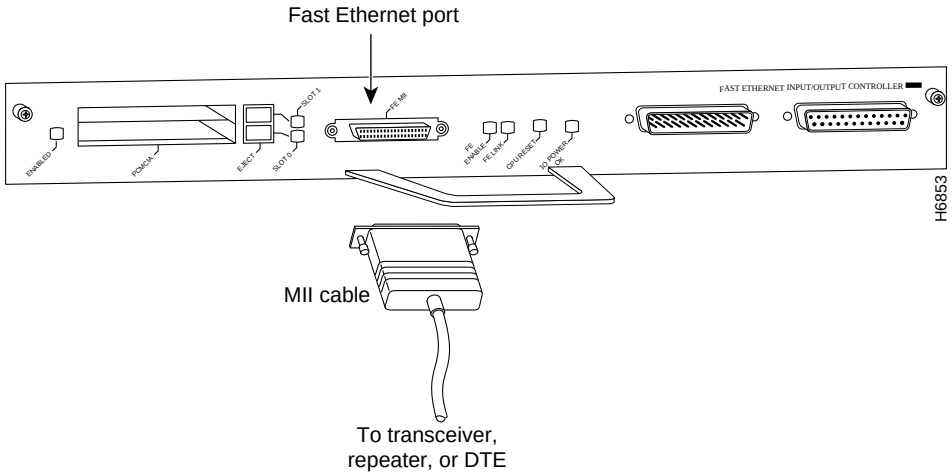
This section contains connection equipment and pinout information for the console, auxiliary, and Fast Ethernet ports on the I/O controller.

Fast Ethernet MII Connection Equipment

The optional Fast Ethernet port on the I/O controller has a single MII, 40-pin, D-shell type connector that is configurable for 100 megabits per second (Mbps). The MII connector supports IEEE 802.3u interfaces compliant with the 100BASE-X and 100BASE-T standards. The single MII connection requires an external transceiver that permits connection to multimode fiber for 100BASE-FX or 100BASE-T4 physical media (refer to Figure 15).

Caution Make sure input power to your Cisco 7200 series router is turned off and the router is completely powered down before connecting an external transceiver to the Fast Ethernet port on the I/O controller. If you connect an external transceiver to the Fast Ethernet port when the router is powered on, the system will reset and you could lose data.

Figure 15 Optional Fast Ethernet Port Connection



Depending on the type of media you use between the MII connection and your switch or hub, the network side of your 100BASE-T transceiver should be appropriately equipped with ST-type connectors (for optical fiber), BNC connectors, and so forth.

Figure 16 shows the pin orientation of the female MII receptacle on the Fast Ethernet port.

The MII receptacle uses 2-56 screw-type locks, called jackscrews, to secure the cable or transceiver to the MII port. MII cables and transceivers have knurled thumbscrews that you fasten to the jackscrews on the MII connector and tighten with your fingers. Use the jackscrews to secure your MII cable to the MII receptacle.

Figure 16 MII Receptacle

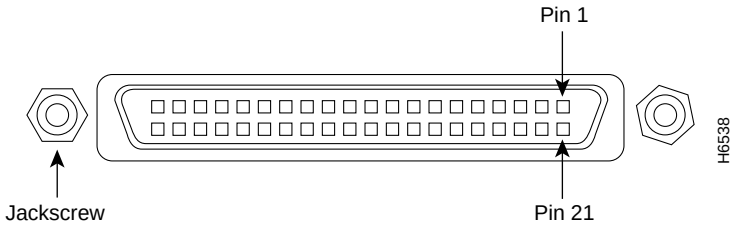


Table 3 lists the pinouts and signals for the I/O controller MII receptacle.

Table 3 MII Connector Pinout

Pin[1]	In	Out	I/O	Description
14–17	–	Yes	–	Transmit Data (TxD)
12	Yes	–	–	Transmit Clock (Tx_CLK)[2]
11	–	Yes	–	Transmit Error (Tx_ER)
13	–	Yes	–	Transmit Enable (Tx_EN)
3	–	Yes	–	MII Data Clock (MDC)
4–7	Yes	–	–	Receive Data (RxD)
9	Yes	–	–	Receive Clock (Rx_CLK)[2]
10	Yes	–	–	Receive Error (Rx_ER)
8	Yes	–	–	Receive Data Valid (Rx_DV)
18	Yes	–	–	Collision (COL)
19	Yes	–	–	Carrier Sense (CRS)
2	–	–	Yes	MII Data Input/Output (MDIO)
22–39	–	–	–	Common (ground)
1, 20, 21, 40	–	–	–	+5.0 volts (V)

1. Any pins not indicated are not used.
2. Tx_CLK and Rx_CLK are provided by the external transceiver.

Console and Auxiliary Port Connection Equipment

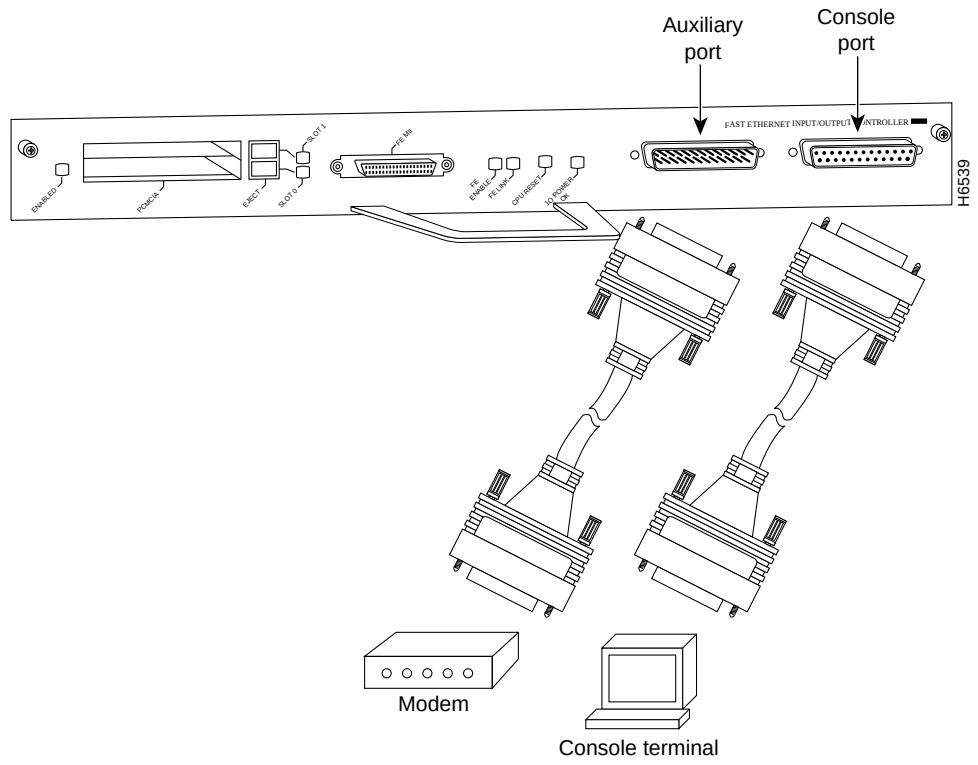
The I/O controller has two EIA/TIA-232 ports: a DCE-mode console port and a DTE-mode auxiliary port. The console port is a DCE DB-25 receptacle for connecting a data terminal. The auxiliary port is a DTE DB-25 plug for connecting a modem or other DCE device (such as a CSU/DSU or other router) to the Cisco 7206 (refer to Figure 17).

Note Both the console and auxiliary ports are asynchronous serial ports; any devices connected to these ports must be capable of asynchronous transmission. (Asynchronous is the most common type of serial device; for example, most modems are asynchronous devices.)

Before connecting a terminal to the console port, configure the terminal to match the router console port as follows: 9600 baud, 8 data bits, no parity, 2 stop bits (9600 8N2). You need an EIA/TIA-232 DCE console cable to connect the terminal to the console port. After you establish normal router operation, you can disconnect the terminal.

You must supply your own interface cable between the auxiliary port and the equipment you are connecting. For console and auxiliary port pinouts, refer to the sections “Console Port Signals” and “Auxiliary Port Signals” later in this document.

Figure 17 Console and Auxiliary Port Connections



Console Port Signals

Both Data Set ready (DSR) and Data Carrier Detect (DCD) are active when the system is running. The Request To Send (RTS) signal tracks the state of the Clear to Send (CTS) input. The console port does not support modem control or hardware flow control. Table 4 lists the signals used on the console port. The console port requires a straight-through EIA/TIA-232 cable.

Table 4 Console Port Signals

Pin	Signal	Direction	Description
1	GND	–	Ground
2	TxD	<—	Transmit Data
3	RxD	—>	Receive Data
6	DSR	—>	Data Set Ready (always on)
7	GND	–	Ground
8	DCD	—>	Data Carrier Detect (always on)

Auxiliary Port Signals

Table 5 lists the signals used on the auxiliary port. The auxiliary port supports hardware flow control and modem control.

Table 5 Auxiliary Port Signals

Pin	Signal	Direction	Description
2	TxD	—>	Transmit Data
3	RxD	<—	Receive Data
4	RTS	—>	Request To Send (used for hardware flow control)
5	CTS	<—	Clear To Send (used for hardware flow control)
6	DSR	<—	Data Set Ready
7	Signal Ground	–	Signal Ground
8	CD	<—	Carrier Detect (used for modem control)
20	DTR	—>	Data Terminal Ready (used for modem control only)

Installing and Removing a Flash Memory Card

The I/O controller has two PCMCIA slots: Slot 0 (lower) and Slot 1 (upper) (refer to Figure 18). To install a Flash memory card in either PCMCIA slot, complete the following steps:

Step 1 Orient the Flash memory card so that its connector end faces the appropriate slot (refer to Figure 18a).

Step 2 Carefully guide the card into the slot until it mates with the slot's connector and the eject button for the slot pops out toward you (refer to Figure 18b).

Note Flash memory cards do not insert all the way into the PCMCIA slots on the I/O controller; the end of the card protrudes from the I/O controller faceplate. Do *not* attempt to force the card past this point.

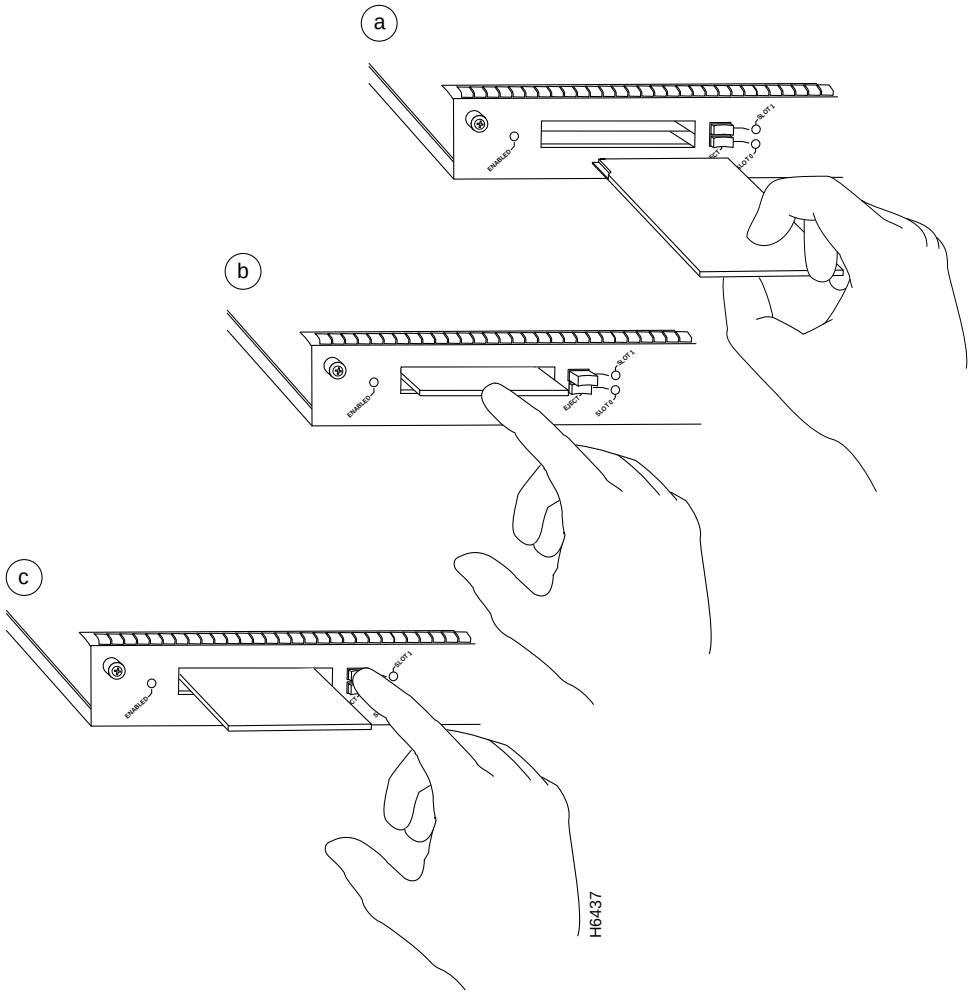
To remove a Flash memory card from either PCMCIA slot, complete the following steps:

Step 1 Press the ejector button on the slot. (See Figure 18c.)

Step 2 Grasp the card and pull it from the slot.

Step 3 Place the card in an antistatic bag.

Figure 18 Installing and Removing a Flash Memory Card



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- WWW: http://www-europe.cisco.com.
- WWW: http://www-china.cisco.com.
- 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.

This document is to be used in conjunction with the *Cisco 7204 Installation and Configuration Guide* and the *Cisco 7206 Installation and Configuration Guide* publications.

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