



## CHAPTER 6

# Maintaining the Cisco IP Transfer Point LinkExtender

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**Revised: December 3, 2009, OL-0800-12**

This chapter contains the recommended hardware maintenance procedures for the Cisco IP Transfer Point LinkExtender (ITP-L), which is designed to perform SS7 signal pre-processing for a Cisco PGW 2200 Softswitch. The Cisco ITP-L was named Cisco SLT formerly. The Cisco ITP-L consists of a custom Cisco IOS image running on a Cisco 2611 or 2651 router. For information on upgrading and maintaining Cisco ITP-L software, see the Cisco IP Transfer Point - LinkExtender documentation.

As part of an end-to-end telephony solution, the Cisco ITP-L provides reliable transport of Signaling System 7 (SS7) protocols across an IP network. The Cisco ITP-L uses the Cisco IOS SS7 Cisco ITP-L feature set, providing reliable interoperability with the Cisco PGW 2200 Softswitch. The Cisco ITP-L uses Cisco's Reliable User Datagram Protocol (RUDP) to backhaul upper-layer SS7 protocols across an IP network.

When used for Signal Link Terminal applications, the modular Cisco 2611 dual Ethernet port router can be configured with dual serial as well as Multiflex WAN interface cards with integrated E1 data service units (DSUs) or T1 channel service units (CSUs)/DSUs. For additional flexibility, the Multiflex WAN interface cards can also be ordered with a dual-port Drop and Insert capability.

The following interface cards are supported:

- 1-port high-speed serial interface (WIC-1T)
- 2-port high-speed serial interface (WIC-2T)
- 1-port T1 multiflex trunk interface (VWIC-1MFT-T1)
- 1-port E1 multiflex trunk interface (VWIC-1MFT-E1)
- 2-port T1 multiflex trunk interface (VWIC-2MFT-T1)
- 2-port E1 multiflex trunk interface (VWIC-2MFT-E1)
- 2-port T1 multiflex trunk interface with Drop and Insert (VWIC-2MFT-T1-DI)
- 2-port E1 multiflex trunk interface with Drop and Insert (VWIC-2MFT-E1-DI)

Only SS7 serial interfaces and protocols are supported. There is no support for non-SS7 serial WAN protocols. Up to four SS7 signaling links are supported per Cisco ITP-L.



**Note**

You must use the Cisco 2651 routers to achieve four SS7 signaling links. Using the Cisco 2611, you can have a maximum of two SS7 signaling links.

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This chapter describes Cisco ITP-L hardware maintenance and includes the following sections:

- [Checking Equipment Status, page 6-2](#)
- [Removing a Cisco ITP-L, page 6-6](#)
- [Replacing a Cisco ITP-L, page 6-6](#)
- [Replacing Hardware Components, page 6-15](#)
- [Additional Maintenance Tasks, page 6-17](#)

## Checking Equipment Status

You can check the status of the Cisco ITP-L devices using the following methods:

- Reading Cisco ITP-L LEDs
- Using Cisco IOS status queries
- Using CiscoWorks 2000, Cisco WAN Manager, or the Cisco MGC Node Manager (CMNM)

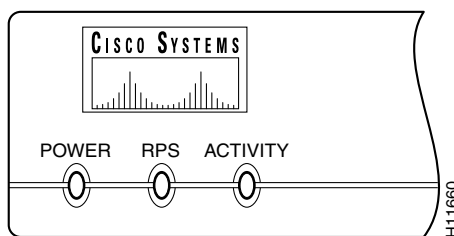
## Cisco ITP-L LEDs

LEDs indicate the current operating condition of the Cisco ITP-L.

### Front-Panel LEDs

[Figure 6-1](#) shows the location of the LEDs on the Cisco ITP-L. [Table 6-1](#) describes these LEDs.

**Figure 6-1** Cisco ITP-L Front-Panel LEDs



**Table 6-1** Cisco ITP-L Front-Panel LEDs

LED	Description
Power	Indicates the Cisco ITP-L operating status. Goes on when power is supplied to the Cisco ITP-L and the Cisco ITP-L is operational.

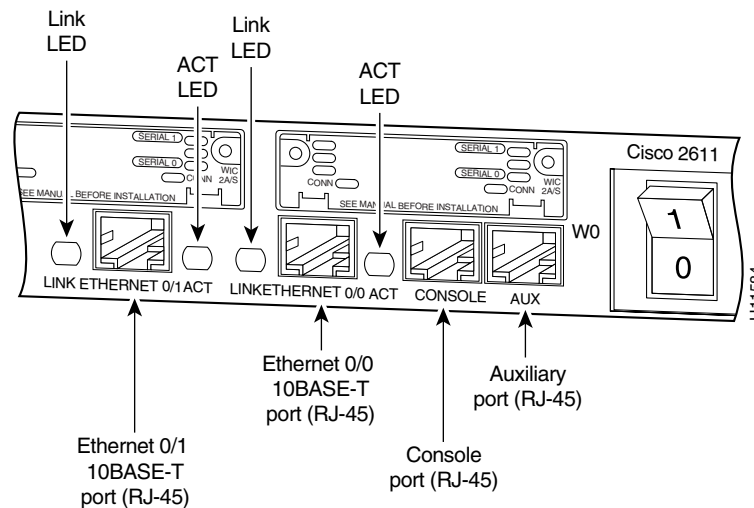
**Table 6-1** Cisco ITP-L Front-Panel LEDs (continued)

LED	Description
RPS	OFF—No RPS <sup>1</sup> is attached. ON—RPS is attached and operational. Blink—RPS is attached, but has a failure.
Activity	OFF—In the Cisco IOS software, but no network activity. Blink (500 ms ON, 500 ms OFF)—In Remote Monitor (ROMMON), no errors. Blink (500 ms ON, 500 ms OFF, 2 sec. between codes)—In ROMMON, error detected. Blink (less than 500 ms)—In the Cisco IOS software, the blink rate reflects the level of activity.

1. RPS = Redundant Power System.

## Rear-Panel LEDs

Figure 6-2 shows the location of the Cisco ITP-L rear-panel LEDs. Table 6-2 describes these LEDs.

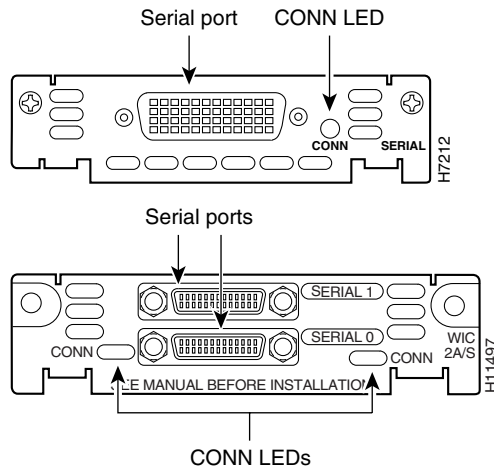
**Figure 6-2** Cisco ITP-L Rear-Panel LEDs**Table 6-2** Cisco ITP-L Rear-Panel LEDs

LED	Description
Link	When this LED is lit, a link has been established with the hub or switch at the other end of the cable.
ACT	When this LED is lit, packets are being transmitted or received on the Ethernet interface.

## WIC LEDs

Each serial card has one LED, labeled CONN for each port, which lights when the serial port is connected. When the port is in DTE mode, the CONN LED indicates that Data Set Ready (DSR), Data Carrier Detect (DCD), and Clear To Send (CTS) have been detected. When the port is in DCE mode, it indicates that Data Terminal Ready (DTR) and Request To Send (RTS) have been detected.

**Figure 6-3** 1- and 2-Port Serial WAN Interface Card LEDs



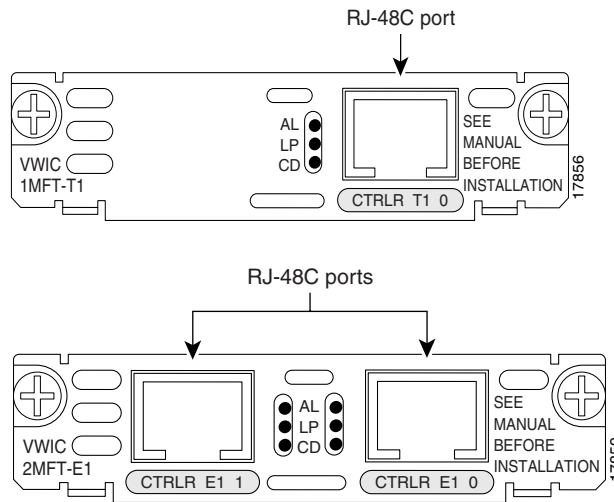
## VVIC LEDs

You can distinguish between T1 and E1 interface cards by the labeling on the faceplate, as shown in [Figure 6-4](#). Each multiflex trunk interface card has three LEDs, which are shown in [Figure 6-4](#) and described in [Table 6-3](#).

**Table 6-3** 1-Port Multiflex Trunk Interface Card LEDs

LED	Description	Color
LP LED	On means that a loopback or line state is detected or is manually set by the user. This LED is off during normal operation.	Yellow
AL LED	On means that there is a local or remote alarm state. This LED is off during normal operation.	Yellow
CD LED	On means that a carrier has been detected and the internal DSU/CSU in the WAN interface card is communicating with another DSU/CSU. This LED is on during normal operation.	Green

**Figure 6-4** 1- and 2-Port T1 and E1 Multiflex Trunk Interface Card LEDs



## Using the Cisco ITP-L Operating System to Check Status

The Cisco ITP-L operating system includes a series of commands that enable you to determine if the unit is functioning correctly or where problems have occurred. A few of the relevant commands for checking status are listed here. To learn how to find more information concerning these and other IOS commands, see the *Cisco IOS Software Documentation Organization*.

Status commands that may help to monitor the health and state of your Cisco ITP-L at any given time include the following:

- **show c2600**—Shows complex troubleshooting information that does not pertain to a specific interface, but to the platform's shared resources.
- **show context**—Displays information stored in nonvolatile random access memory (NVRAM) when an exception occurs.
- **show flash**—Shows information about the Flash memory device.
- **show interfaces**—Displays statistics for all interfaces configured on the Cisco ITP-L.
- **show ip route**—Displays the entries in the routing table.
- **show mem**—Shows statistics about the unit's memory, including memory free pool statistics.
- **show processes**—Displays information about the active processes.
- **show protocols**—Displays the configured protocols. This command shows the status of any configured Layer 3 (network) protocol.
- **show rudp failures**—Displays Reliable User Datagram Protocol (RUDP) failure statistics.
- **show rudp statistics**—Displays RUDP internal statistics.
- **show running-config**—Displays the active configuration parameters.
- **show SS7 mtp2**—Displays Message Transfer Part 2 (MTP 2) channel control-block data, MTP 2 link state information, MTP 2 statistics, MTP 2 timer information, protocol information for a channel, and the channel number. (The default is channel 0.)
- **show SS7 sm**—Displays session manager session information.

- **show startup-config**—Displays the backup configuration file.
- **show version**—Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

**Note**

The SS7-related commands (**show SS7 mtp2**, **show SS7 sm**, **show rudp failures**, and **show rudp statistics**) are part of Cisco's RUDP session manager. They are not available on other Cisco equipment running IOS.

## Removing a Cisco ITP-L

This section describes how to shut down a Cisco ITP-L and remove it. The assumption is that the system has been properly installed according to procedures described in the *Cisco PGW 2200 Softswitch Hardware Installation Guide (Release 7 & 9)*, most notably the following procedures:

- Safety recommendations
- General site requirements
- Preparations for connecting to the network

## Required Tools and Equipment

Following are the tools and parts that might be required for removing a Cisco ITP-L:

- Number 2 Phillips screwdriver
- Flat-blade screwdrivers: small, 3/16-inch (0.476 cm) and medium, 1/4-inch (0.625 cm)
- ESD-preventive wrist strap

It is also assumed that the cables and console terminal were installed during the original system installation.

## Procedure

To remove the Cisco ITP-L, complete the following steps:

- 
- Step 1** Power off the Cisco ITP-L.
  - Step 2** Attach the ESD-preventive wrist strap to the chassis of the Cisco ITP-L.
  - Step 3** Disconnect all cables from the rear panel of the Cisco ITP-L.
  - Step 4** Remove the front and rear mounting screws and remove the unit from the rack.
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## Replacing a Cisco ITP-L

This section describes how to install a new Cisco ITP-L or reinstall a repaired Cisco ITP-L.

## Required Tools and Equipment

Following are the tools and parts that might be required for replacing a Cisco ITP-L:

- Number 2 Phillips screwdriver
- Flat-blade screwdrivers: small, 3/16-inch (0.476 cm) and medium, 1/4-inch (0.625 cm)
- ESD-preventive wrist strap
- Screws to secure the rack-mount brackets to the Cisco ITP-L

It is assumed that cables, Ethernet hub, and the console terminal remain from the original installation.

## Mounting the Chassis in a Rack

This section describes the procedures for rack-mounting the chassis. A new chassis comes with brackets for use with a 19-inch rack or, if specified in your order, optional larger brackets for use with a 24-inch rack. The brackets are shown in [Figure 6-5](#).

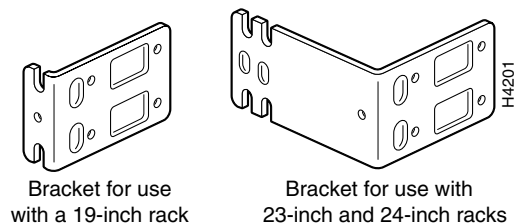


**Warning**

**To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

- If the rack contains only one unit, mount the unit at the bottom of the rack.
- If the rack is a partially filled rack, load the rack from the bottom to the top, with the heaviest component at the bottom of the rack.
- If the rack contains stabilizing devices, install the stabilizers prior to mounting or servicing the unit in the rack.

**Figure 6-5 Identifying the Brackets**



## Attaching the Brackets

To install the chassis in a rack, attach the brackets in one of the following ways:

- With the front panel forward (see [Figure 6-6](#) and [Figure 6-7](#))
- With the rear panel forward (see [Figure 6-8](#) and [Figure 6-9](#))
- In a center-mount rack, with the rear panel forward (see [Figure 6-10](#))



**Note**

Use the Cisco-supplied screws for this installation.

**Note**

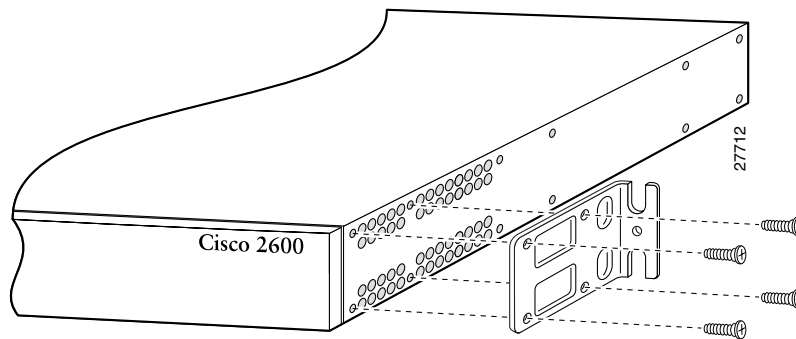
If you are installing a Cisco ITP-L in a 19-inch rack with a 17.5-inch opening, orient the rack-mount brackets so that, when installed, they do not increase the width of the chassis. (See [Figure 6-6](#).)

If you are installing a Cisco ITP-L in a 19-inch EIA-standard rack with a 17.75-inch opening or a 23- or 24-inch rack, orient the rack-mount brackets so that, when installed, they increase the width of the chassis. (See [Figure 6-7](#).)

**Note**

The following illustrations show how to connect the bracket to one side of the chassis. The second bracket connects to the opposite side of the chassis.

**Figure 6-6** Bracket Installation—Front Panel Forward (19-Inch Rack with a 17.5-Inch Opening)

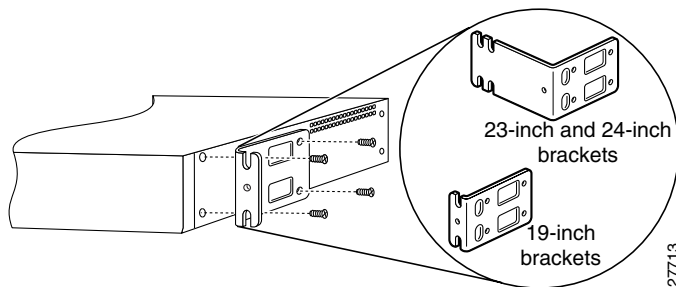


Note: The second bracket attaches to the other side of the chassis.

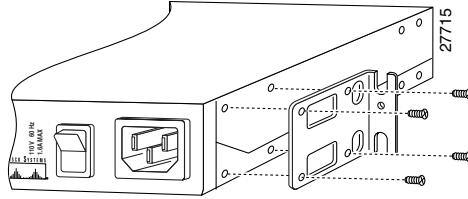
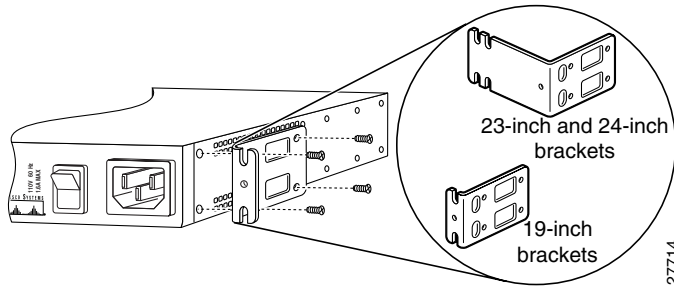
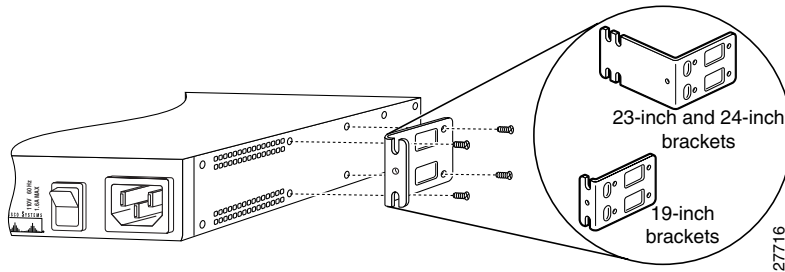
**Note**

When installed in a 19-inch rack with a 17.75-inch opening, the Cisco ITP-L protrudes beyond the front of the rack.

**Figure 6-7** Bracket Installation—Front Panel Forward (19-Inch Rack with a 17.75-Inch Opening or a 23-Inch or 24-Inch Rack)

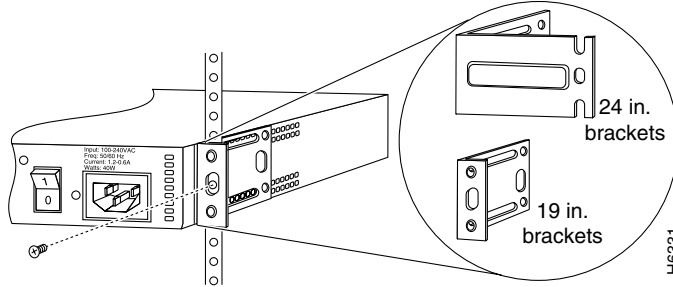




**Figure 6-8** Bracket Installation—Rear Panel Forward (19-Inch Rack with a 17.5-Inch Opening)**Figure 6-9** Bracket Installation—Rear Panel Forward (19-Inch Rack with a 17.75-Inch Opening or a 23-inch or 24-Inch Rack)**Figure 6-10** Center-Mount Bracket Installation—Rear Panel Forward

## Installing the Cisco ITP-L in a Rack

After the brackets are secured to the chassis, you can rack-mount the Cisco ITP-L. Using the screws you provide, attach the chassis to the rack as shown in [Figure 6-11](#).

**Figure 6-11 Attaching the Chassis to a Rack—Rear Panel Forward**

## Connecting the DC Power Supply

This section describes the DC power supply specifications and wiring.



### Warning

This unit is intended for installation in restricted access areas. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

## DC Power Specifications

The DC power supply is intended for use in DC-operating environments. [Table 6-4](#) lists the power supply specifications.

**Table 6-4 Power Supply Specifications**

Description	Design Specification
Power (input)	40W, -38 to -75 VDC
Wire gauge for power connections	14 AWG <sup>1</sup>

1. AWG = American Wire Gauge.

## Wiring the DC Power Supply

If you ordered a Cisco ITP-L with a DC power supply, follow the directions in this section to wire the terminal block.



### Warning

Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.



### Warning

**Figure 6-12** shows the DC power supply terminal block. The proper wiring sequence is ground to ground, positive to positive (line to L), and negative to negative (neutral to N). Note that the ground wire should always be connected first and disconnected last.

 **Caution**

Do not over torque the terminal block captive thumbscrew or terminal block contact screws. The recommended torque is  $8.2 \pm 0.4$  inch-lb.

 **Warning**

**After wiring the DC power supply, remove the tape from the circuit breaker switch handle and reinstate power by moving the handle of the circuit breaker to the ON position.**

 **Warning**

**Secure all power cabling when installing this unit to avoid disturbing field-wiring connections.**

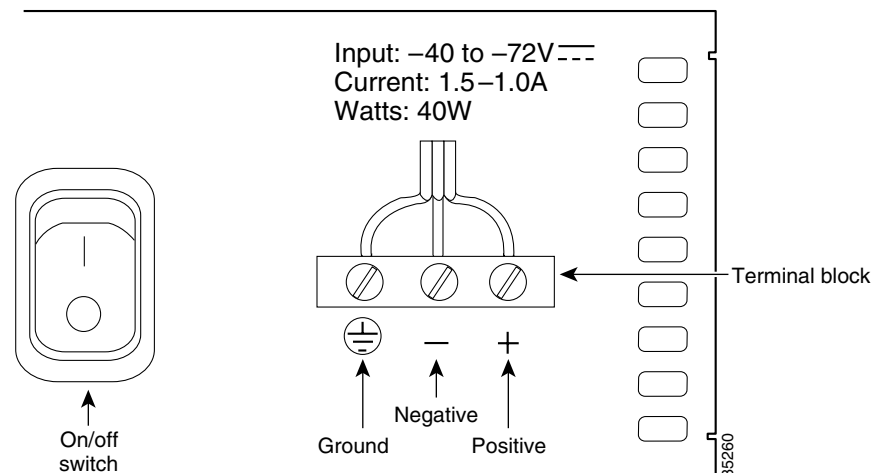
 **Note**

This product is intended for installation in restricted access areas and is approved for use with 14 AWG copper conductors only. The installation must comply with all applicable codes.

To wire the terminal block, complete the following steps:

- Step 1** Attach the appropriate lugs at the wire end of the power supply cord.
- Step 2** Wire the DC power supply to the terminal block, as shown in [Figure 6-12](#).

**Figure 6-12 DC Power Supply Connections**



## Connecting to a Network

This section explains how to connect the Cisco ITP-L to the control signaling LAN. It is assumed that the cables required to connect the Cisco ITP-L to the LAN are available from the Cisco ITP-L being replaced.

 **Warning**

**Do not work on the system, or connect or disconnect cables during periods of lightning activity.**

Connect your cables from the Ethernet 100BaseT ports to Ethernet 100BaseT ports on the LAN switch.

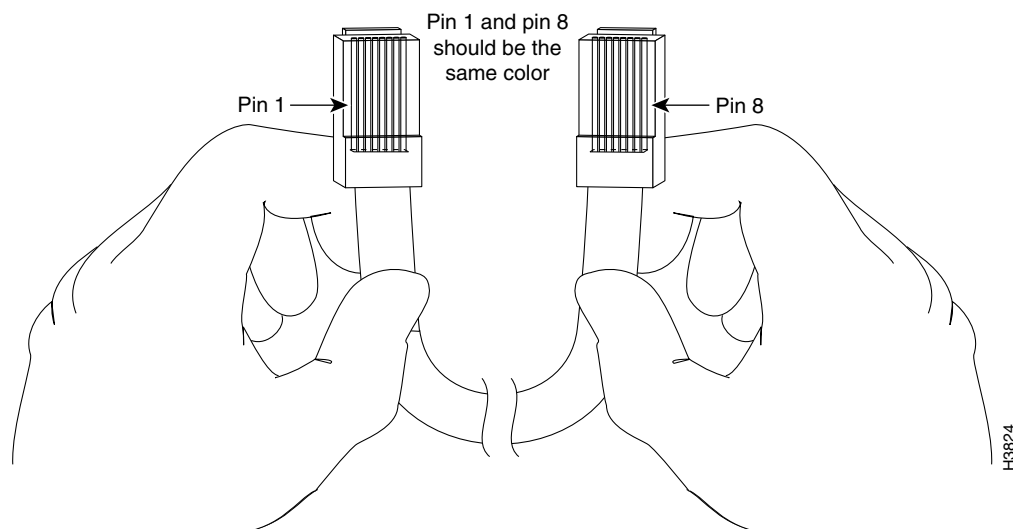
## Connecting the Console Terminal and Modem

Cisco ITP-Ls include asynchronous serial console and auxiliary ports. These ports provide local administrative access to your Cisco ITP-L (with a console terminal) or remote access (with a modem).

### Identifying a Rollover Cable

Use a rollover cable to connect to the asynchronous serial console and auxiliary ports. You can identify a rollover cable by comparing the two modular ends of the cable. When you hold the two cable ends side-by-side with the tab at the back, as shown in [Figure 6-13](#), the wire connected to the pin on the outside of the left plug should be the same color as the wire connected to the pin on the outside of the right plug. If your cable came from Cisco Systems, pin 1 is white on one connector, and pin 8 is white on the other (a rollover cable reverses pins 1 and 8, 2 and 7, 3 and 6, and 4 and 5).

**Figure 6-13** Identifying a Rollover Cable



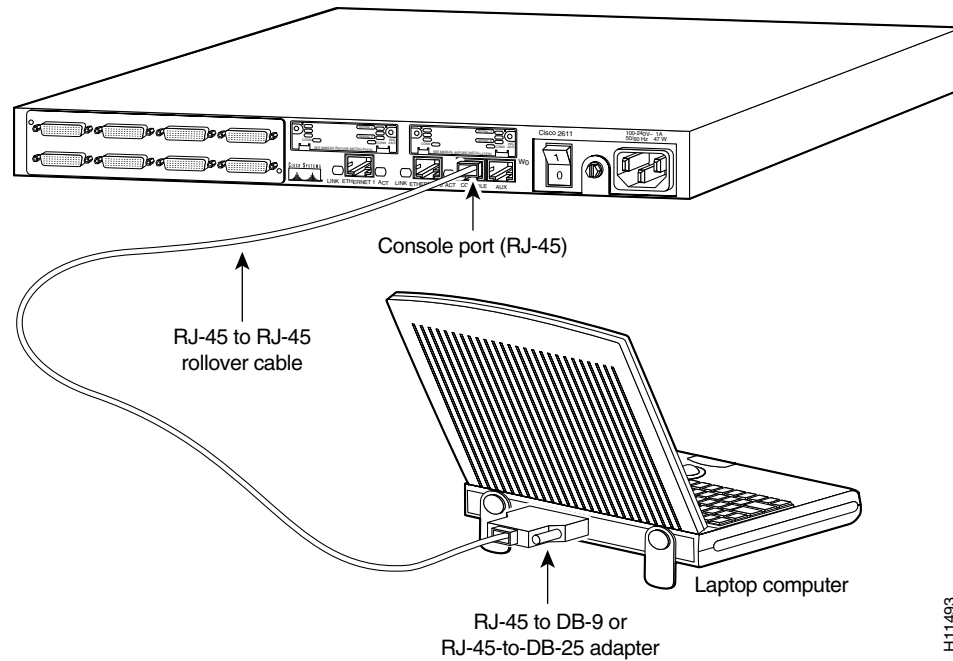
### Connecting to the Console Port

Take the following steps to connect a terminal (an ASCII terminal or a PC running terminal emulation software) to the console port on the Cisco ITP-L:

- Step 1** Connect the terminal using the thin, flat, RJ-45-to-RJ-45 rollover cable (looks like a telephone cable) and an RJ-45-to-DB-9 or RJ-45-to-DB-25 adapter (labeled TERMINAL) included with the Cisco ITP-L. (See [Figure 6-14](#).)
- Step 2** Configure your terminal or PC terminal emulation software for 9600 baud, 8 data bits, no parity, and 2 stop bits.

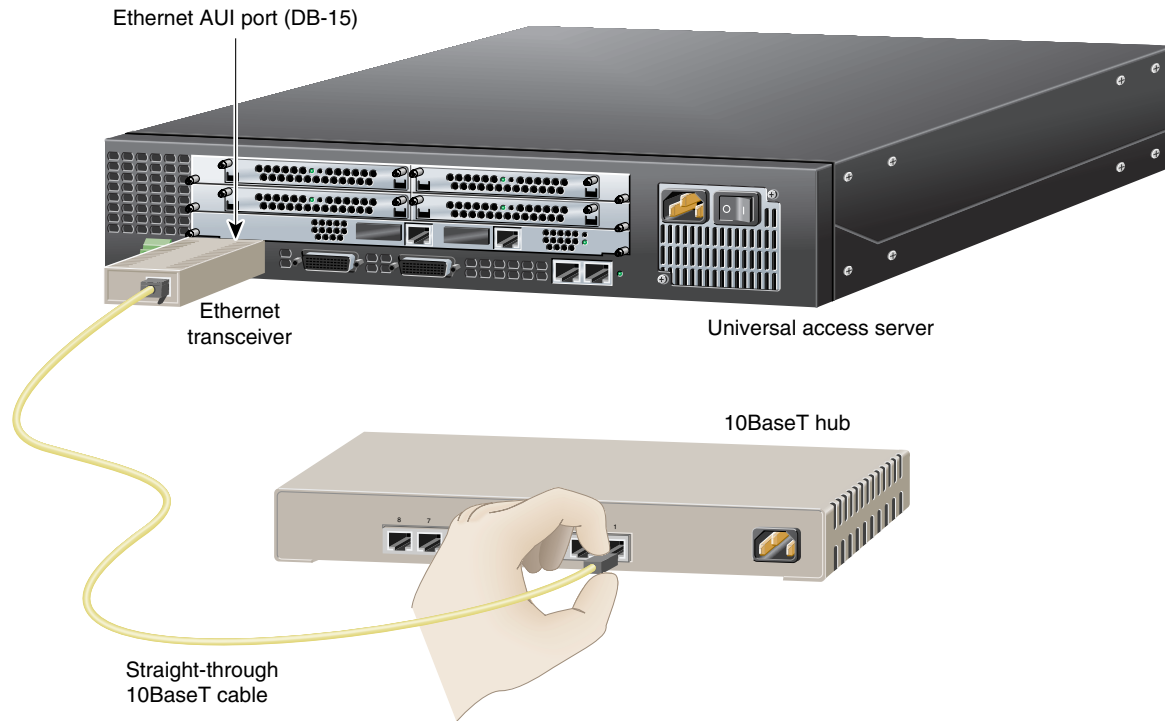
For information on console port pinouts, see the online document *Cisco Modular Access Router Cabling Specifications* on the Documentation CD-ROM that accompanied your Cisco ITP-L package.

**Figure 6-14** Connecting a Console Terminal



## Cisco ITP-L Interface Numbering

Each individual network interface on a Cisco ITP-L is identified by a slot number and a unit number. The Cisco ITP-L chassis contains one slot in which you can install a network module. [Figure 6-15](#) shows the slot location in the Cisco ITP-L chassis.

**Figure 6-15 Cisco ITP-L WAN Interface Card Chassis Slot Locations**

Unit numbers identify the interfaces on the modules installed in the unit. Unit numbers begin at 0 for each interface type, and continue from right to left and from bottom to top. Modules are identified by interface type, slot number (always 0), a forward slash (/), then the unit number. For example:

- First Ethernet interface is referred to as Ethernet 0/0
- Slot W0, serial interface 0 is referred to as serial 0/0
- Slot W1, serial interface 1 is referred to as serial 0/1

**Note**

WAN interface card slots (built into the chassis) are always numbered as slot 0, even if the interface card is installed in the slot labeled W1. For information about WAN interface slot and port numbering, see the *Cisco WAN Interface Cards Hardware Installation Guide*.

## Install the New Software

After you have installed the Cisco ITP-L, power it on. (If the Cisco ITP-L does not power on, proceed to [Appendix B, “Troubleshooting Cisco ITP-L Signaling.”](#))

After the hardware has been installed and powered on, you must configure the Cisco ITP-L. See the *Cisco PGW 2200 Softswitch Release 9.8 Software Installation and Configuration Guide*.

After the Cisco ITP-L has been configured, you must install a special release of the Cisco IOS software on the Cisco ITP-L. The filename of the current Cisco ITP-L image is `c2600-ipss7-mz.121-1.T.bin`.

To copy a system image from a Trivial File Transfer Protocol (TFTP) server to a Flash memory file system, use the following command in EXEC mode:

```
copy tftp:[[location]/directory]/filename] flash-filesystem:[filename]
```

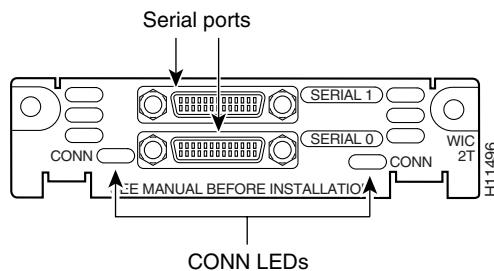
# Replacing Hardware Components

Each Cisco ITP-L is equipped with at least one WAN interface card. This section describes how to replace the WAN interface cards in the Cisco ITP-Ls, and contains the following subsections:

- [Required Tools and Equipment](#), page 6-15
- [Installing a WAN Interface Card](#), page 6-15

Figure 6-16 shows the WIC-2T WAN interface card.

**Figure 6-16** WIC-2T Dual Port Serial WAN Interface Card



## Required Tools and Equipment

In addition to the WIC and the Cisco ITP-L, you will need these items to install and connect your card:

- Number 1 Phillips screwdriver.
- Appropriate connecting cable—The cables should already be available. For more information on cable types, see the document *Cisco Modular Router Cable Specifications* on the Documentation CD-ROM that came with your Cisco ITP-L package, or on Cisco.com.
- Synchronous modem, channel service unit/data service unit (CSU/DSU), or other data circuit-terminating equipment (DCE) (serial card only)—Used to connect the WAN interface card to a digital WAN line.

## Installing a WAN Interface Card

This section describes the procedure for installing a WIC-2T WAN interface card in a Cisco ITP-L slot.

You can install the WIC-2T either before or after mounting the Cisco ITP-L, whichever is more convenient. Similarly, you can install the WIC-2T in the network module either before or after installing the network module in the Cisco ITP-L chassis.



### Caution

WICs do not support online insertion and removal (hot-swapping). Before inserting a card into the network module or Cisco ITP-L chassis, you must turn off electrical power and disconnect network cables.

**Warning**

**Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.**

To install WAN interface cards in a Cisco ITP-L WIC chassis slot, complete the following procedure:

- Step 1** Turn off power to the Cisco ITP-L. However, to channel ESD voltages to ground, do not unplug the power cable. Remove all network interface cables, including telephone cables, from the rear panel.



**Note** If you are installing a single WIC-2T, use slot W0 first (see [Figure 6-15](#)). The Cisco ITP-L checks slot W0 before it checks slot W1. If you fill slot W1 while leaving slot W0 vacant, your Cisco ITP-L configuration could be affected.

- Step 2** Use a screwdriver to remove the blank filler panel from the chassis card slot where you plan to install the card. Save the filler panel for future use.
- Align the card with the guides in the WAN interface card slot and slide it gently into the slot.
  - Push the card into place until you feel its edge connector mate securely with the connector in the WAN interface card slot.
  - Fasten the card's captive mounting screws into the holes in the WAN interface card slot, using the screwdriver.
  - Reinstall the network interface cables and turn on power to the Cisco ITP-L.

The following warning applies only to Cisco ITP-Ls that use a DC power supply:

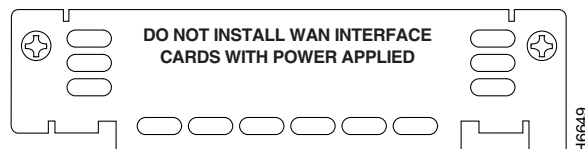
**Warning**

**After wiring the DC power supply, remove the tape from the circuit breaker switch handle and reinstate power by moving the handle of the circuit breaker to the ON position.**

## WIC Filler Panels

If any interface card slot (on the network module or chassis) is unoccupied, install a filler panel to enable proper airflow. (See [Figure 6-17](#).)

**Figure 6-17** WIC Slot Filler Panel





# Additional Maintenance Tasks

This section contains selected maintenance procedures you might need to perform on a Cisco ITP-L as your internetworking needs change, including the following:

- [Upgrading DRAM, page 6-17](#)
- [Opening the Chassis, page 6-18](#)
- [Replacing the System-Code SIMM, page 6-20](#)
- [Closing the Chassis, page 6-22](#)
- [Procedures for Recovering Boot and System Images, page 6-23](#)

Additional maintenance procedures are available on the Documentation CD-ROM that shipped with the Cisco ITP-L.

To see translated versions of warnings in this section, see the *Regulatory Compliance and Safety Information* document that accompanied your Cisco ITP-L.

**Caution**

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Before opening the chassis, be sure that you have discharged all static electricity from your body and the power is off.

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**Warning**

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**Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units.**

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## Upgrading DRAM

This section describes how to upgrade dynamic random-access memory (DRAM) on the system card. You might need to upgrade DRAM if you have loaded a new Cisco IOS software feature set or release.

To see how much memory is currently installed in the Cisco ITP-L, enter the **show version** command. Near the middle of the resulting output, a message similar to the following appears:

```
Cisco 2611(MPC860) processor (revision 0x200) with 28672K/4096K bytes of memory.
```

This line shows how much memory is installed (in this example, 28672 K/4096 K). The first number represents primary memory, and the second number represents shared memory.

For information about recommended DRAM part numbers for your Cisco ITP-L, see the *Cisco 2600 Series Hardware Installation Guide*.

## Cisco ITP-L DRAM

Cisco ITP-Ls contain two 100-pin dual in-line memory module (DIMM) sockets (or banks) for DRAM, numbered 0 and 1. (See [Figure 6-20](#).) Each socket can be filled with a 100-pin DRAM DIMM. You can use the **memory-size iomem** software command to configure DRAM as a mixture of shared memory, which is used for data transmitted or received by network modules and WAN interface cards, and primary or main memory, which is reserved for the CPU. For further information about this command, see the Cisco IOS configuration guides and command references.

## Opening the Chassis

This section describes the procedure for opening the chassis by removing the chassis cover.



### Warning

**Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is OFF and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected.**

## Tools Required

You will need the following tools to remove and replace the DRAM DIMMs on the Cisco ITP-L:

- Number 2 Phillips screwdriver
- ESD-preventive wrist strap
- DRAM DIMM required for your planned upgrade

## Removing the Chassis Cover

You must open the chassis to access the internal components.



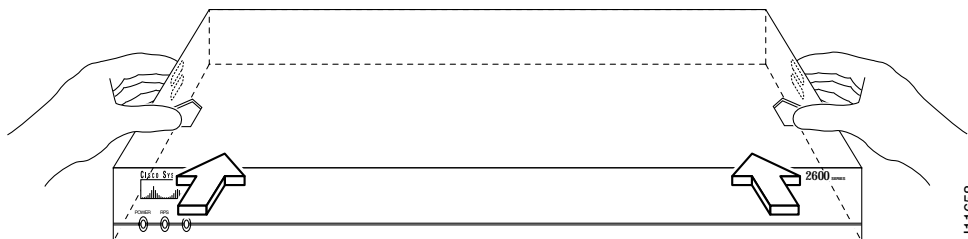
### Warning

**Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages.**

To remove the chassis cover, complete the following steps:

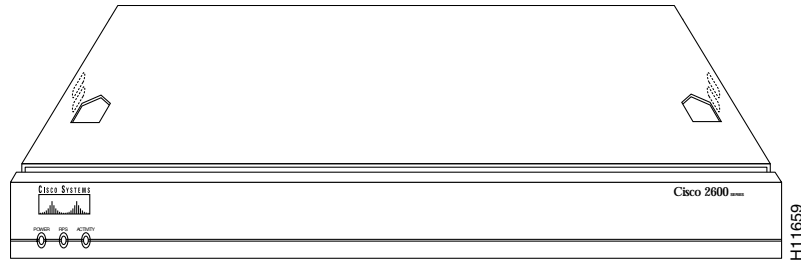
- Step 1** Power off the Cisco ITP-L.
- Step 2** Disconnect all cables from the rear panel of the Cisco ITP-L.
- Step 3** Remove the screws located on the top of the chassis. Note that the chassis is composed of two sections, top and bottom.
- Step 4** Holding the chassis with both hands, position it as shown in [Figure 6-18](#).
- Step 5** Slide the top section away from the bottom section as shown in [Figure 6-19](#).

**Figure 6-18** Holding Chassis for Cover Removal



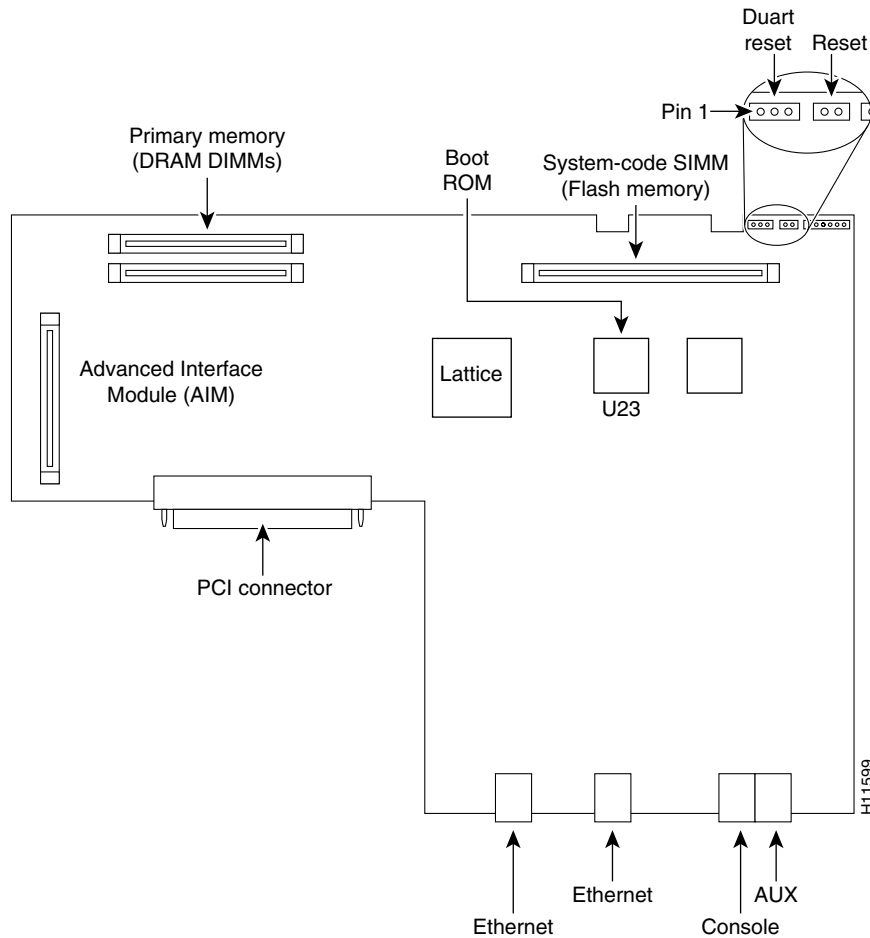
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**Figure 6-19** Removing Chassis Cover



**Step 6** When the top cover is off, set it aside. [Figure 6-20](#) shows the layout of the system cards.

**Figure 6-20** System Card Layout



## DRAM DIMM Installation

Take the following steps to install the DRAM DIMMs:

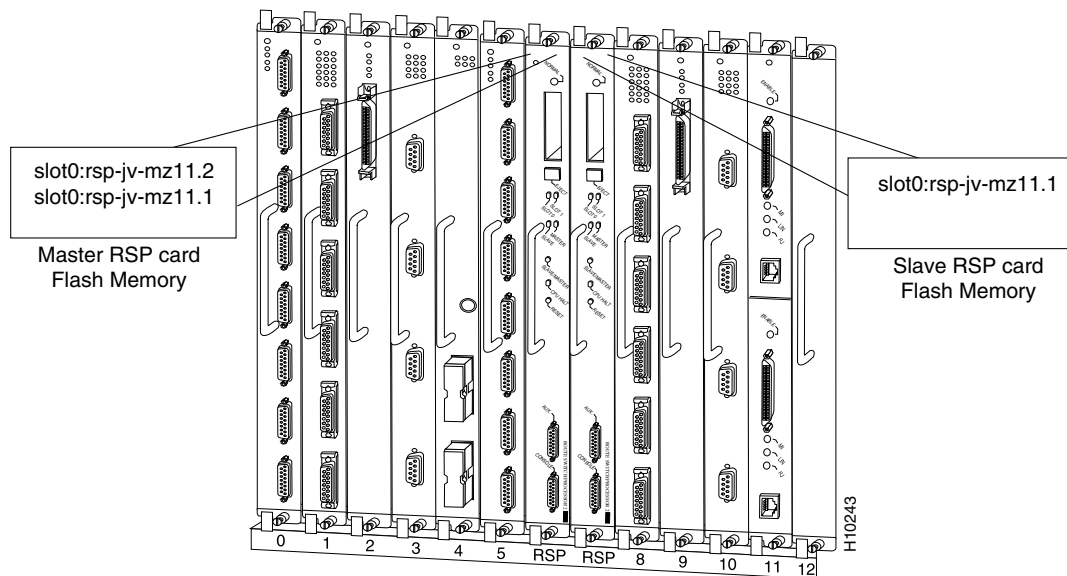
- Step 1** Power off the Cisco ITP-L.
- Step 2** Attach an ESD-preventive wrist strap.
- Step 3** Open the cover following the instructions in the [“Opening the Chassis”](#) section on page 6-18.
- Step 4** Remove the existing DRAM DIMM by pulling outward on the connectors to unlatch them, as shown in [Figure 6-21](#). Be careful not to break the holders on the DIMM connector.



**Caution** To prevent damage, do not press on the center of the DIMMs. Handle each DIMM carefully.

- Step 5** Position the new DIMM so that the polarization notch is located at the left end of the DIMM socket as shown in [Figure 6-21](#).

**Figure 6-21** Removing and Replacing the DRAM DIMM



- Step 6** Insert the new DRAM DIMM by sliding the end with the metal fingers into the DIMM connector socket at approximately a 90° angle to the system card. Gently rock the DIMM back into place until the latch on either side snaps into place. Do not use excessive force, because the connector might break.
- Step 7** Replace the Cisco ITP-L cover. Follow the instructions in the [“Closing the Chassis”](#) section on page 6-22.

## Replacing the System-Code SIMM

The system code (Cisco ITP-L operating system software) is stored in a Flash memory 80-pin single in-line memory module (SIMM).

For information about recommended SIMM part numbers for your Cisco ITP-L, see the *Cisco 2600 Series Hardware Installation Guide*.

## Tools Required

You will need the following tools to remove and replace the system-code SIMM on the Cisco ITP-L:

- Medium-size flat-blade screwdriver (1/4 inch [0.625 cm])
- Electrostatic discharge (ESD)-preventive wrist strap
- System-code SIMM

## Preparing to Install the System-Code SIMM

There is one system-code (Flash memory) SIMM socket on the system board. You can verify how much Flash memory is already installed in your Cisco ITP-L by entering the **show flash EXEC** command.



### Caution

The system code is stored on the Flash memory SIMM, but new system-code SIMMs are shipped without preinstalled software. Before continuing with this procedure, use the **copy flash tftp EXEC** command to back up the system code to a Trivial File Transfer Protocol (TFTP) server.



### Note

For more information about the **copy flash tftp** command and other related commands, see the Cisco IOS configuration and command reference publications. These publications are available on the Documentation CD-ROM that came with your Cisco ITP-L, and on Cisco.com.

## System-Code SIMM Replacement

Take the following steps to upgrade the system-code Flash memory SIMM:

- Step 1** If you have not already done so, enter the **copy flash tftp EXEC** command to back up the system code.
- Step 2** Power off the Cisco ITP-L.
- Step 3** Remove all cables from the rear panel of the Cisco ITP-L.
- Step 4** Attach an ESD-preventive wrist or ankle strap.
- Step 5** Open the chassis cover, following the procedure in the “Opening the Chassis” section on page 6-18.
- Step 6** Locate the system-code SIMM on the system card. (See [Figure 6-20](#).)
- Step 7** If necessary, remove the existing system-code SIMM by pulling outward on the connector holders to unlatch them. The connector holds the SIMM tightly, so be careful not to break the holders on the SIMM connector. (See [Figure 6-22](#).)
- Step 8** Position the new SIMM so that the polarization notch is located at the left end of the SIMM socket.



### Caution

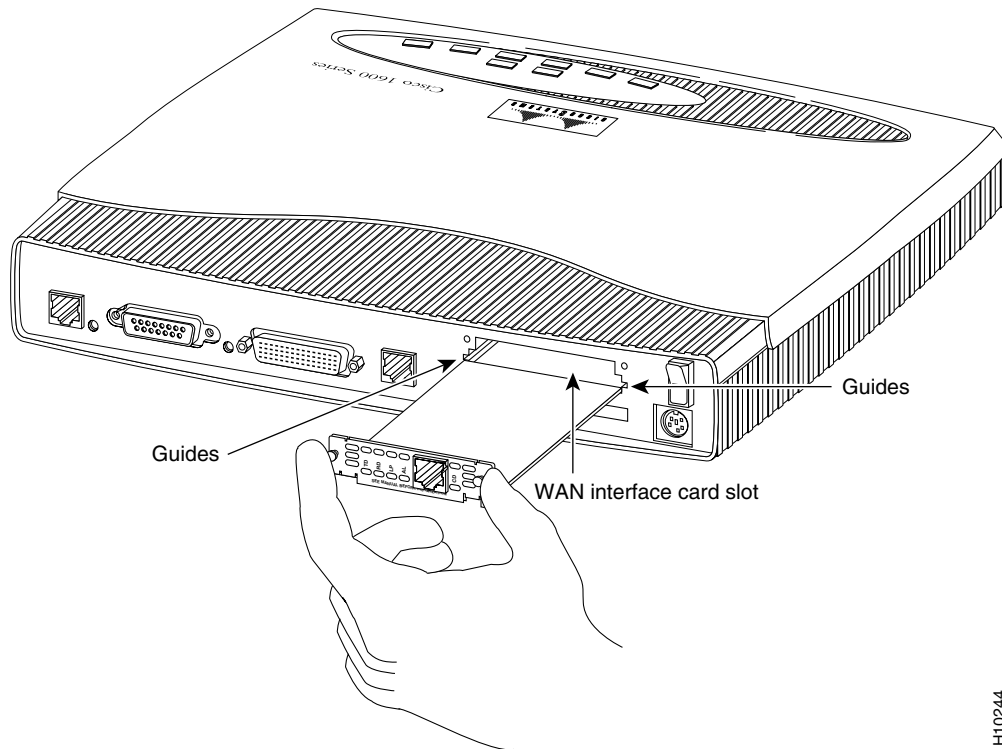
To prevent damage, do not press on the center of the SIMM. Handle each SIMM carefully. Note that some Flash memory SIMMs have the components mounted on the rear side; therefore, when inserting the SIMM, always use the polarization notch as a reference and *not* the position of the components on the SIMM.

- Step 9** Insert the new SIMM by sliding the end with the metal fingers into the SIMM connector socket at approximately a 90° angle to the system card. Gently rock the SIMM back into place until the latches on both sides snap into place. Do not use excessive force because the connector might break.

**Step 10** Replace the Cisco ITP-L cover following the procedure in the following section.

See the “[Procedures for Recovering Boot and System Images](#)” section on page 6-23 for instructions on how to place the Cisco IOS image on the new SIMM.

**Figure 6-22** Removing and Replacing the System-Code SIMM



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## Closing the Chassis

This section describes the procedure for closing the chassis by replacing the chassis cover.

### Replacing the Cover

To replace the cover, complete the following steps:

- Step 1** Position the two chassis sections, as shown in [Figure 6-19](#).
- Step 2** Referring to [Figure 6-18](#), press the two chassis sections together and ensure that the top section fits *into* the rear of the bottom section, the bottom section fits *into* the front of the top section, and that the sides of the top and bottom sections fit together.



**Caution**

To fit the two sections together, it might be necessary to work them together at one end and then the other; however, use care to prevent bending the chassis edges.

- Step 3** When the two sections fit together snugly, slide the chassis top until it fits into the front bezel.
  - Step 4** Replace the cover screws. Tighten the screws to no more than 8 or 9 inch/pound of torque.
  - Step 5** Reinstall the chassis on the wall, rack, desktop, or table.
  - Step 6** Reconnect all cables.
- 

## Procedures for Recovering Boot and System Images

If your Cisco ITP-L experiences difficulties and no longer contains a valid Cisco IOS software image in Flash memory, you can recover the Cisco IOS image using the procedures described in the Cisco IP Transfer Point - LinkExtender documentation.

