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Cisco 7513 and Cisco 7576 Chassis Replacement and Upgrade Instructions

**Product Numbers: CHAS-7513-DC=, CHAS-7513-AC=, MAS-7513= (Cisco 7513)
CHAS-7576-DC=, CHAS-7576-AC=, MAS-7576=, and UPG-7513/7576= (Cisco 7576)**

Customer Order Number: DOC-781897=

This publication provides instructions for replacing a Cisco 7513 or Cisco 7576 chassis, which is available as a spare part. It also includes instructions on upgrading a Cisco 7513 to a Cisco 7576.

Note In this document, the term *chassis* is used to refer to the Cisco 7513 or Cisco 7576 chassis. Also, the term *RSP* is used to refer to the RSP2 and RSP4 Route Switch Processors that are compatible with the Cisco 7513 and Cisco 7576.

The chassis is available as a spare part and as a kit to upgrade a Cisco 7513 to a Cisco 7576. The chassis includes all of the components required for operation except the processor modules and power supplies (MAS-7513=), (MAS-7576=), as a spare with power supplies (CHAS-7513-DC=, CHAS-7576-DC=, CHAS-7513-AC=, CHAS-7576-AC=), and as a kit to upgrade the Cisco 7513 to a Cisco 7576 (UPG-7513/7576=). After you replace the chassis, you must move the processor modules from your old chassis into your new chassis.

Note The Cisco 7576 Upgrade Kit does not contain RSPs, interface processors, or power supplies. Refer to the "Upgrading a Cisco 7513 to a Cisco 7576" section on page 5 for more information. In addition, the replacement chassis and the upgrade kit do not include the cable-management bracket or rack-mounting hardware kits. You can move the rack-mounting hardware and cable-management bracket from the existing chassis, or order either kit as a spare part.

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Document Contents

This publication contains the following sections:

- What is the Cisco 7513?, page 2
- What is the Cisco 7576?, page 3
- Upgrading a Cisco 7513 to a Cisco 7576, page 5
- Chassis Replacement or Upgrade Prerequisites, page 6
- Replacing or Upgrading the Chassis, page 12
- Port and Slot Configuration Worksheet, page 28
- Cisco Connection Online, page 29

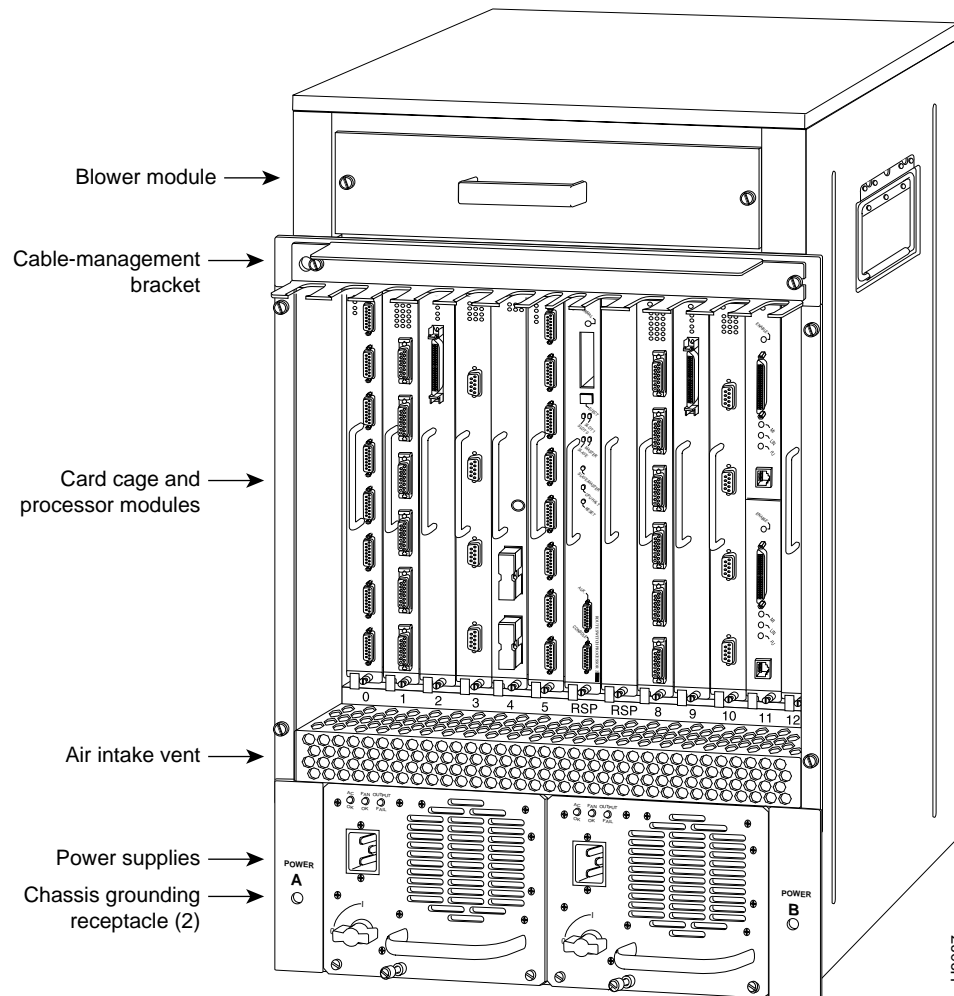
Note For detailed information and specifications on the Cisco 7513 and Cisco 7576, refer to the *Cisco 7500 Series Installation and Configuration Guide*, available in print or on the Document CD-ROM that came with your shipment.

What is the Cisco 7513?

The Cisco 7513 is a 13-slot router that supports multiprotocol, multimedia routing and bridging with a wide variety of protocols and any combination of available electrical interfaces and media. Network interfaces reside on interface processors that provide a direct connection between two CyBuses in the Cisco 7513 and your external networks. The Cisco 7513 has 13 slots: interface processor slots 0 through 5, Route Switch Processor (RSP) slots 6 and 7, and interface processor slots 8 through 12.

There are bays for up to two AC-input or DC-input power supplies. The chassis will operate with one power supply. While a second power supply is not required, it allows load sharing and increased system availability. The Cisco 7513 is shown in Figure 1. The three front-panel LEDs indicate system and power supply status, and LEDs on the RSP, interface processors, and power supplies indicate status.

Figure 1 Cisco 7513—Interface Processor End



What is the Cisco 7576?

The Cisco 7576 is an independent dual router system that supports multiprotocol, multimedia routing and bridging with a wide variety of protocols and any combination of available electrical interfaces and media. The Cisco 7576 consists of two independent routers on a single split backplane within the chassis footprint of a Cisco 7513 router.

Network interfaces reside on interface processors that provide a direct connection between two independent dual CyBuses in the Cisco 7576 and your external networks. The backplane of the Cisco 7576 has 13 slots and provides two routers on a single split backplane, designated router A and router B. Router A uses interface processor slots 0 through 5 and a Route Switch Processor (RSP4) in slot 6. Router B uses interface processor slots 8 through 12 and a Route Switch Processor (RSP4) in slot 7.

There are bays for up to two AC-input or DC-input power supplies. The chassis will operate with one power supply. While a second power supply is not required, it allows load sharing and increased system availability.

The Cisco 7576 (see Figure 2) is similar in most respects to the Cisco 7513. The differences between the two models are found in the backplane and the interface processor slot numbering scheme (see Figure 3) on the card cage.

Figure 2 Cisco 7576 Interface Processor End

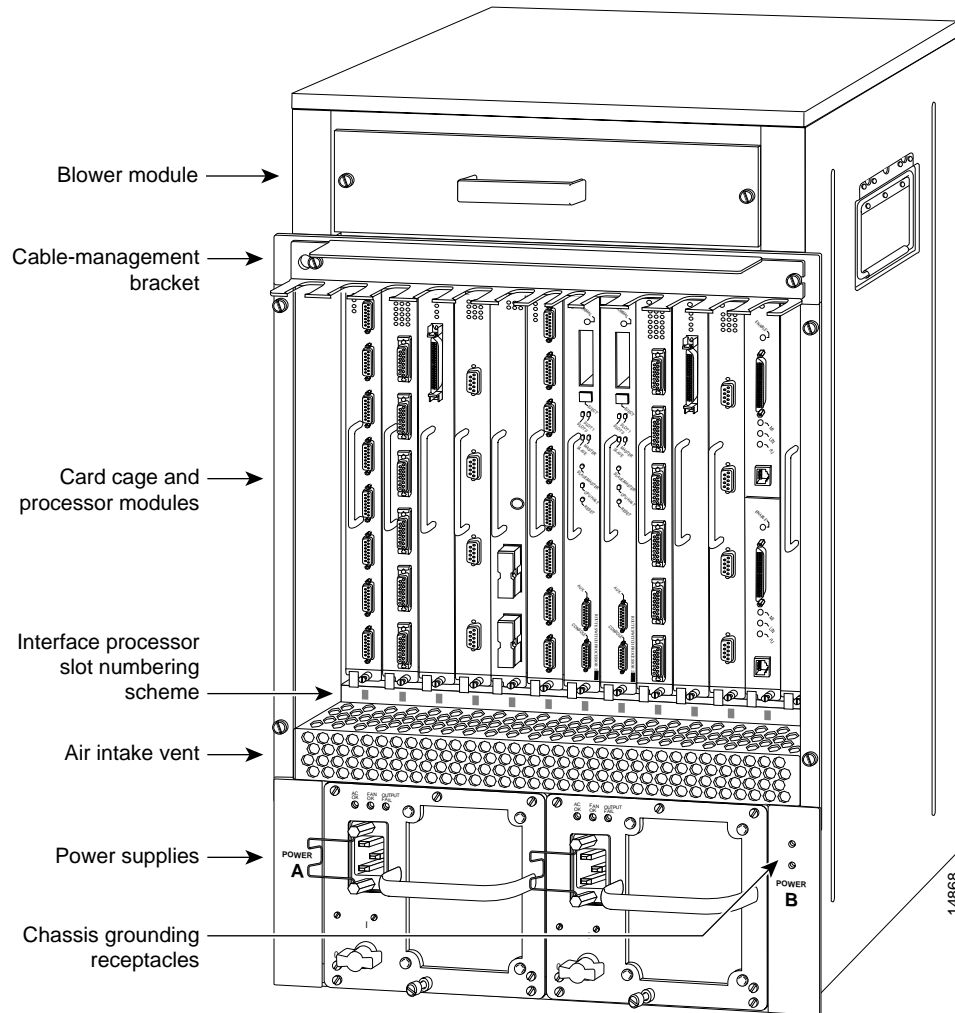


Figure 3 Enlarged View of the Cisco 7576 Interface Processor Slot Numbering Scheme



Note To provide a viewable image, slot numbers 0, 1, 2, 11, and 12 are not shown in Figure 3. The slot numbering scheme uses color coding to assist in identifying routers and CyBus assignments. Refer to “Identifying Cisco 7576 Independent Routers and CyBuses” in the *Cisco 7500 Series Installation and Configuration Guide* for detailed information on the slot numbering scheme.

Upgrading a Cisco 7513 to a Cisco 7576

You can upgrade a Cisco 7513 to a Cisco 7576 with the Cisco 7576 Upgrade Kit (UPG-7513/7576=). The Cisco 7576 is similar to the Cisco 7513 except for the backplane and the interface processor slot numbering scheme located on the card cage. The upgrade kit does not include power supplies, RSPs, or interface processors. These all need to be transferred from your existing Cisco 7513 to the Cisco 7576.

The Cisco 7576 Upgrade Kit includes:

- Cisco 7576 chassis including the card cage and backplane
- *Cisco 7513 and Cisco 7576 Unpacking Instructions*
- *Cisco 7513 and Cisco 7576 Chassis Replacement and Upgrade Instructions* (the publication you are reading now)
- *1200-Watt AC-Input Power Supply Replacement Instructions*
- *1200-Watt DC-Input Power Supply Replacement Instructions*
- *Cisco 7500 Series Installation and Configuration Guide*
- *Regulatory Compliance and Safety Information for the Cisco 7500 Series Routers*

Note The Cisco 7576 requires Cisco IOS software release 11.1(22)CC or later versions of the CC release train.

To upgrade your Cisco 7513 to a Cisco 7576, follow these steps:

- Step 1** Refer to the *Cisco 7513 and Cisco 7576 Unpacking Instructions* to unpack the unit.
- Step 2** Refer to the *Cisco 7513 and Cisco 7576 Chassis Replacement and Upgrade Instructions* to upgrade the chassis.
- Step 3** Determine whether your existing Cisco 7513 uses an AC-input or DC-input power supply.
- Step 4** Refer to the *1200-Watt AC-Input Power Supply Replacement Instructions* or the *1200-Watt DC-Input Power Supply Replacement Instructions* (depending on what type of power supply is installed in your existing Cisco 7513), to transfer the power supplies from the Cisco 7513 to the Cisco 7576.
- Step 5** Reinstall RSPs and interface processors.



Caution If you are only configuring one of the two routers that make up the Cisco 7576, make sure to configure router A instead of router B. To configure router A, install an RSP in slot 6 and install interface processors only in slots 0 through 5.

- Step 6** Refer to the *Cisco 7500 Series Installation and Configuration Guide* to perform installation, configuration, and troubleshooting on your new Cisco 7576 router.

Note The Cisco 7576 supports the use of both the RSP2 and RSP4. However, Cisco recommends that you operate the Cisco 7576 with RSP4s to increase the system's memory capacity. This allows for larger router tables and improved functionality.

Chassis Replacement or Upgrade Prerequisites

Before you begin this installation, review the safety guidelines in this section to avoid injuring yourself or damaging the equipment. This section also provides a list of the tools that you need to perform the chassis replacement or upgrade.

Safety Warnings

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



Warning This warning symbol means *danger*. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.

Waarschuwing Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het document *Regulatory Compliance and Safety Information* (Informatie over naleving van veiligheids- en andere voorschriften) raadplegen dat bij dit toestel is ingesloten.

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

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

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

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

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

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

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

Varning! Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. Se förklaringar av de varningar som förekommer i denna publikation i dokumentet *Regulatory Compliance and Safety Information* (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.

Safety Guidelines

The following guidelines will help to ensure your safety and protect the equipment. These guidelines are not inclusive of all potentially hazardous situations, so *be alert*.

General Safety Precautions

The following are general precautions for any workplace:

- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Do not work alone when potentially hazardous conditions exist.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the chassis. Fasten your tie or scarf and sleeves.
- Never install equipment that appears damaged.
- Keep tools and chassis components away from walk areas.
- Practice good housekeeping; keep tools and parts clean, accessible, and in good working order.

Safety with Electricity

Follow these 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.
- Never assume that power has been disconnected from a circuit; always check.
- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

In addition, use the guidelines that follow when working with any equipment that is connected to telephone wiring or 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.

Lifting Safely

A fully configured chassis weighs approximately 160 pounds (72.6 kilograms [kg]). Before installing the new (replacement) chassis, ensure that your site is properly prepared, so you can avoid having to move the chassis later to accommodate power sources and network connections.

- Never try to lift an object that is too heavy for you to lift safely by yourself.
- Ensure that your footing is solid, and balance the weight of the object between your feet.
- Lift the object slowly; never move suddenly or twist your body as you lift.

- Keep your back straight and lift with your legs, not your back. If you must bend down to lift the chassis, bend at the knees, not at the waist, to reduce the strain on your lower back muscles.
- When lifting the chassis, grasp the underside of the chassis exterior with both hands. Do not attempt to lift the end of the chassis with the handles on the interface processor carriers; these handles are not designed to support the weight of the chassis.
- Always disconnect all external cables before lifting or moving the chassis.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic boards or components are handled improperly, can result in complete or intermittent failures. Each processor module consists of a printed circuit board that is fixed in a metal carrier. EMI shielding, connectors, and a handle are integral components of the carrier. Handle processor modules by the metal frame or carrier only; avoid touching the board (particularly avoid touching any components, connector pins, or the metal *fingers* on the edge connector).

Following are guidelines for preventing ESD damage:

- Always use an ESD wrist strap or ankle strap and ensure that it makes good skin contact.
- When removing or installing interface processors, connect the equipment end of the ground strap to the chassis ground screw on the interface processor end of the chassis.
- Place removed processor modules board-side-up on an antistatic mat or in a static shielding bag.
- If you are returning a replaced part to the factory, immediately place it in a static shielding bag to avoid ESD damage to the board.
- Avoid contact between the board and clothing. The ESD strap only protects the board from ESD voltages on the body; ESD voltages on clothing can still cause damage.



Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms.

Cable Strain Relief

If possible, position the new replacement chassis close enough to the existing system so that you can avoid having to disconnect power and interface cables. Be sure to disengage any strain relief devices before attempting to pull the cables from the port. Following are descriptions of the different methods of strain relief that are used on the AC-input and DC-input power cables and the various types of network interface cables:

- On the AC power input receptacle (on the interface processor end of the AC-input powered chassis), a cable retention band snaps up around the plug on the power cable to prevent it from being inadvertently pulled out of the receptacle.
- On the DC-input power supply, use nylon cable ties to fasten the power cable to a bracket located just to the right of the input terminal block. Carefully cut these cable ties before you disconnect the power cable leads from the terminal block; replace the cable ties after you install the new chassis, and wire the power cable leads to the terminal block.
- Serial interface cables (all types) use thumbscrews on the cable connectors that secure the cable to the Fast-Serial Interface Processor (FSIP) port.

- Ethernet interface cables use either slide-type locks or thumbscrews. Although all Ethernet Interface Processors (EIPs) ship from the factory with slide-type locks on each port, all EIPs also include conversion kits for replacing the slide-type locks with jackscrews to accommodate Ethernet interface cables with thumbscrews.
- Multimode, FDDI connectors use small plastic arms on two sides of the connector that act like springs and are constrained by the inside of the connector port. To remove a multimode cable from an FDDI Interface Processor (FIP) port, pinch the two plastic arms inward while pulling the connector out of the port.

When removing any cable, pull the cable out at the connector; never pull or tug on the cable itself. For detailed descriptions of the system components, refer to the *Cisco 7500 Series Installation and Configuration Guide*.

Preparing the Work Area

Although some network downtime is unavoidable while you remove the RSPs from the old chassis, and replace them in the new chassis, you can minimize the downtime by placing the old and new chassis close together. If your existing chassis is mounted in a rack and there is space in the same rack or another rack close by, we recommend that you install the new, empty chassis in the rack before moving the components. (A fully configured chassis weighs approximately 160 pounds.)

Before installing the chassis in a new rack location, ensure that routing the interface cables to the new positions will not strain or tangle them.

You can further minimize downtime by leaving interface cables attached when you move interface processors to the new chassis, provided that doing so will not strain the cables.

Leave network interface cables connected to the interface ports *only* if the following conditions are true:

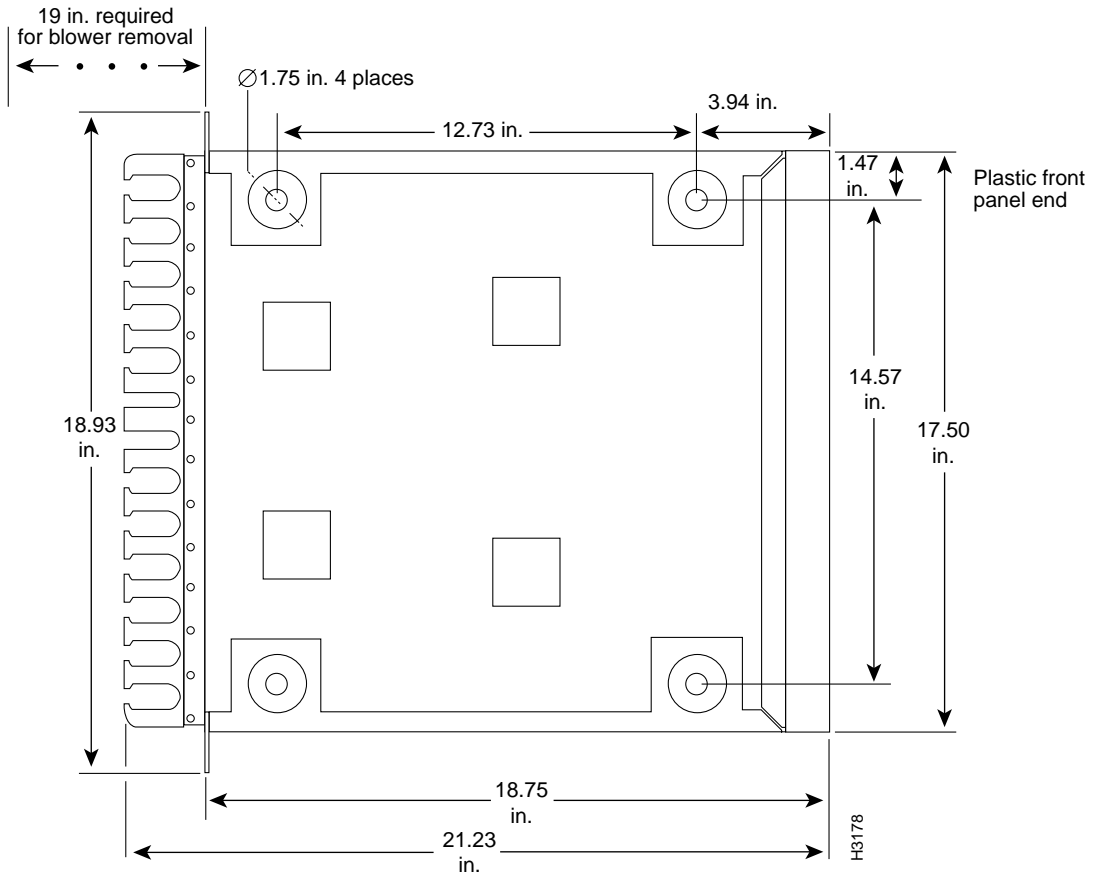
- You are able to place the new chassis close to the existing chassis, *and* moving the processor modules to the new chassis will not strain the interface cables.
- The new chassis is already located in its permanent location, *or* you will need to move it only a few feet into the space vacated by the old chassis when it is removed.

Note If these conditions are not true, for instance, if you must remove a rack-mounted chassis before you can install the new chassis, you *must* disconnect all power and network interface cables.

Ensure that your new chassis allows sufficient clearance for maintenance—to remove and replace processor modules, the blower module, and interface cables at the interface processor end, and to access the internal components at the noninterface processor end.

Figure 4 shows the chassis footprint and the clearance required.

Figure 4 Chassis Footprint and Clearance Requirements for Maintenance



Tools and Parts Required

This section lists the tools and parts you will need to complete these replacement procedures. Have the necessary tools on hand so that you can complete the replacement without interruption:

- To replace the chassis cover, you need a 3/16-inch, flat-blade screwdriver to loosen the captive screws on the chassis cover panel
- To install a replacement chassis, you need a number 1 phillips and a 3/16-inch, flat-blade screwdriver for the captive installation screws on the processor modules (most of the carriers use slotted screws, but some use phillips screws)
- To install a new cable-management bracket or to move the bracket from the existing chassis, you need the following tools and parts (pan head screws are included with the brackets):
 - Number 1 phillips screwdriver
 - Cable-management bracket
 - Two M3 x 8-mm, phillips pan head screws

- If you plan to mount or replace the chassis in an equipment rack, you also need the following tools:
 - Number 2 phillips screwdriver
 - 1/4-inch and 3/16-inch, flat-blade screwdrivers
 - ACS-7000RMK(=) rack-mount kit (with hardware) for the chassis (this kit also works for the Cisco 7000 chassis)
- Whenever you remove or install processor modules, have the following equipment on hand to help prevent ESD damage:
 - Antistatic mat or antistatic foam pad in case you need to put one of the processor modules down
 - Your own ESD-preventive strap or the disposable ESD strap that is included with all spares

Replacing or Upgrading the Chassis

The RSP is a required system component and should only be removed when the system is not operating, although power can be on to the chassis. All interface processors support online insertion and removal (OIR); however, after installing an interface processor, you must wait at least 15 seconds for the system to reinitialize the interfaces before installing the next interface processor. Therefore, it is more efficient to leave the power off until all components are moved into the new chassis, then start up the system and check the entire installation.

If you are installing the new chassis in an equipment rack, proceed to the next section. Otherwise, proceed to the “Moving Processor Modules from the Old Chassis to the New Chassis” section on page 18.

Replacing a Rack-Mounted Chassis

This section describes how to replace a chassis that is installed in an equipment rack. The order in which you remove the existing system, install the new chassis, and replace the components will vary depending upon the space available in the rack and in the work area.

Some rack configurations, such as an enclosed rack or a rack with a power strip that limits access, prohibit the normal installation sequence of first installing the chassis in the rack and then installing the cable-management brackets before installing the processor modules. In these situations, you can move all the components into the new chassis before installing it in the rack, but ensure that you follow the safety guidelines for lifting and working with electrical equipment that are provided in the section “Safety Guidelines” beginning on page 8.

If there is sufficient space available in the same rack (or an adjacent rack) and you have a rack-mount kit available, you can install the new (replacement) chassis before you remove the existing system. You can minimize downtime and avoid having to disconnect network interface cables by leaving the existing system operating while you install the empty replacement chassis in the rack. Also, an empty chassis is significantly lighter and easier to handle than one that is fully configured. Just ensure that both chassis, when installed, will be close enough to avoid straining the interface cables connected to the interface processors.

If you must remove the existing system to make room for the replacement chassis, or if you need the existing rack-mounting hardware to mount the new chassis, you will have to disconnect all network interface cables before removing the existing system from the rack. You can leave the system components in the old chassis until after you install the new, empty chassis in the rack.

Assess your rack and lab configuration and the equipment you have available, and then choose the appropriate replacement procedure from the following:

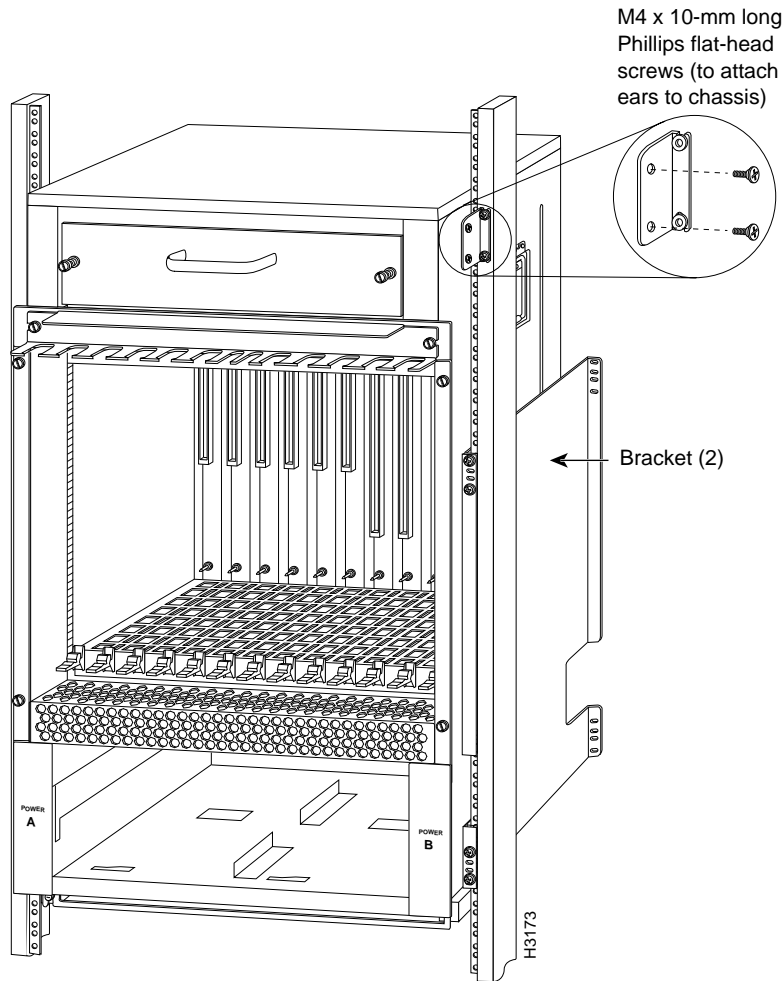
- If you have a spare rack-mount kit available and are able to install the new, empty chassis before you shut down and remove the existing one, follow the installation instructions provided with the rack-mount kit, *Cisco 7513 and Cisco 7576 Rack-Mount Kit Installation Instructions* (Publication Number 78-2023-xx). After you install the new chassis in the rack and install the cable-management brackets, proceed to the “Moving Processor Modules from the Old Chassis to the New Chassis” section on page 18,” to move the components. (After you complete the replacement and check the installation, you will be directed to the following section, “Removing the Existing Chassis from the Rack,” to remove the empty chassis.)
- If you must remove the existing chassis before you can install the new one, proceed to the following section, “Removing the Existing Chassis from the Rack.”

Removing the Existing Chassis from the Rack

Before removing the existing chassis from the rack, you must shut down the system power and disconnect the power cable and all interface cables. To help avoid problems when you install the new chassis, label all interface cables with their slot/port address and mark the positions of the chassis ears (with tape, chalk, or a marker) so that you can install the new chassis in the same position.

Two chassis ears hold the chassis in the rack (see Figure 5), but do not bear the weight of the chassis. The ears are secured to the chassis sides and to the rack posts. The chassis is supported by the two rack brackets.

Figure 5 Chassis, Rack Brackets, and Ears



We recommend that two people perform this procedure: one person should support the chassis while the other person removes the screws that secure the ears to the rack.

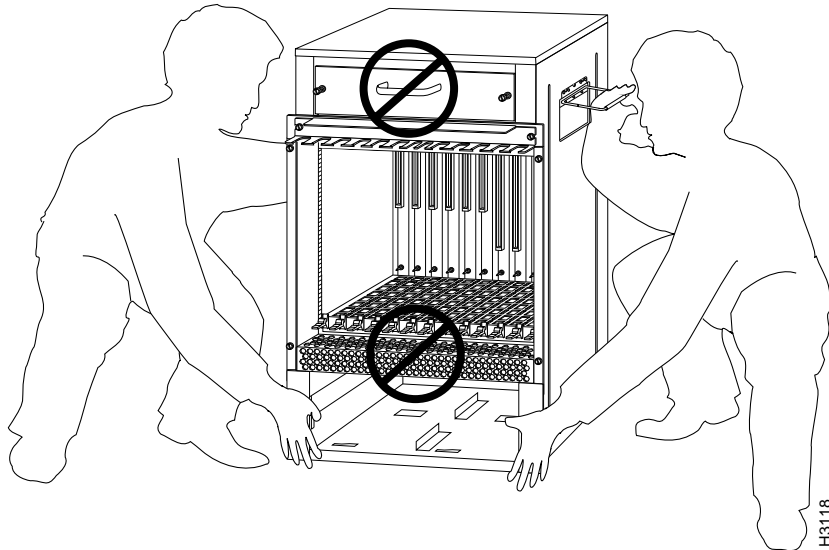


Warning The chassis weighs approximately 75 pounds with just the blower module and card cage installed. To prevent injury, have someone help you lift the chassis, as shown in Figure 6. To prevent damage to the air intake vent below the card cage, *do not* lift the chassis by grasping the handle with one hand and the bottom of the card cage with the other. Grasp the chassis as shown in Figure 6.

To remove the existing chassis from the rack, follow these steps:

- Step 1** Turn off the system power and disconnect the power cable and all interface cables from the chassis.
- Step 2** Use a screwdriver to loosen and remove each of the four screws (two on each side) that secure the chassis ears to the rack rails.
- Step 3** Pull the chassis out of the rack and place it on the floor or a table.

Figure 6 Lifting the Chassis



This completes the chassis removal procedure.

If you have not yet installed the new chassis in the rack, proceed to the next section.

Installing the New Chassis in the Rack

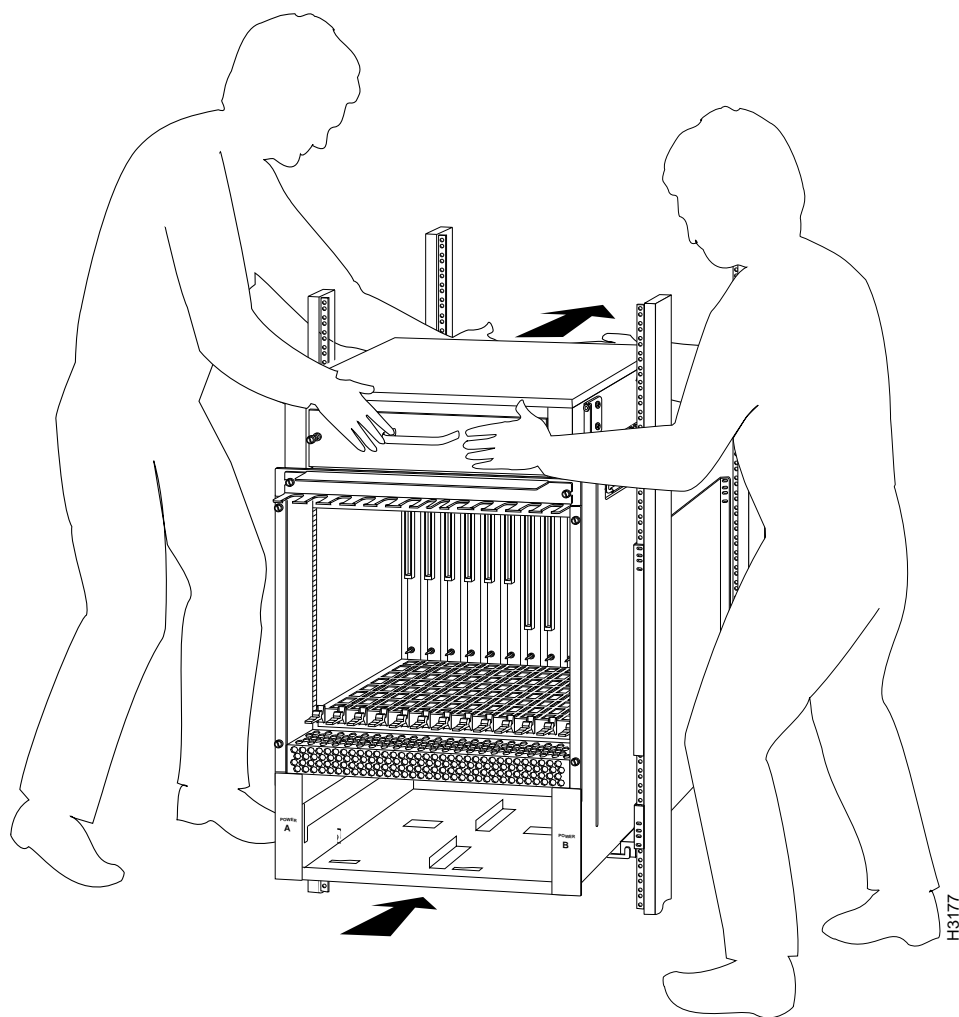
Mount the chassis in the rack before connecting any interface or power cables. If possible, install the new, empty chassis in the rack first, and then install the system components from the old chassis. To mount the chassis, install the ears on the chassis first, place the chassis in the rack, and then secure the ears to the rack rails.

We recommend that two people perform this procedure. Before lifting the chassis, ensure that your path to the rack is unobstructed.

To install the chassis in the rack, follow these steps:

- Step 1** Two people are *required* to perform this step. With a person positioned at either side of the chassis, grasp the bottom edge of the chassis with one hand near the front and the handle on the side of the chassis with the other, as shown in Figure 6.
- Step 2** Grasping the chassis as shown in Figure 6, slowly lift the chassis in unison. To prevent injury, avoid sudden twists or moves.
- Step 3** With the chassis positioned so the front is closest to the rack, insert the front of the chassis into the rack between the brackets, and then slowly lower the chassis until it rests on the two bracket ledges. (See Figure 7.)

Figure 7 Sliding the Chassis into the Rack (Shown with Card Cage Assembly and Blower Installed)



- Step 4** Slide the chassis back into the rack along the ledges until the ears meet the front mounting posts on both sides of the rack. (See Figure 7.)
- Step 5** Secure each ear to the rack-mounting post with two 10-32 x 5/8-inch, phillips pan-head screws.

This completes the procedure for moving the chassis into the rack.

Installing the Cable-Management Bracket

The cable-management bracket attaches to the interface processor end of the chassis just above the card cage and below the blower module. (See Figure 8.) Use the bracket to keep network interface cables untangled and orderly, and to prevent cables from hindering access to interface processors in the interface processor slots.

Install the bracket before connecting network interface cables to the interface processor ports; otherwise, you will probably need to disconnect the cables to install the screws that secure the brackets. Route interface cables through the bracket as you connect them to the interface processor ports.

Tools and Equipment Required

You will need the following tools and parts to install the cable-management brackets; brackets and pan head screws are included with the chassis:

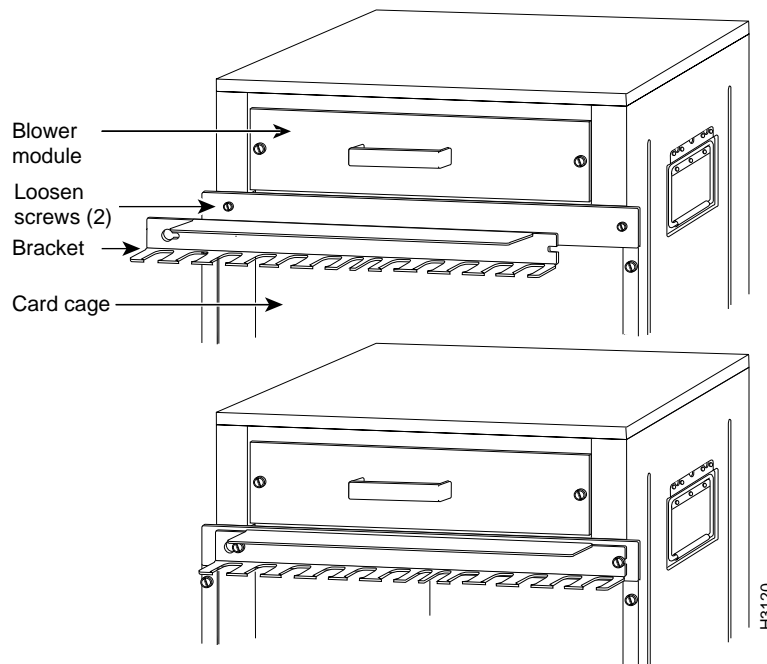
- Large flat-blade screwdriver
- One cable-management bracket and two slotted pan head screws (already attached to the chassis)

Installation Procedure

To install the cable-management bracket on the router, follow these steps:

- Step 1** On the interface processor end of the chassis, locate the two slotted screws positioned below the blower module and above the card cage. (See Figure 8.)

Figure 8 Cable-Management Bracket



Step 2 Use a flat-blade screwdriver to loosen the two slotted screws approximately 1/8-inch.

Step 3 Place the bracket over the screws (see Figure 8), and slide the bracket to the right.

Step 4 Use a flat-blade screwdriver to tighten the screws.

Step 5 When installing the network interface cables, route the cables up to and through the cable-management bracket.

Route the excess cable out through either end of the bracket, coil it, and secure it to the rack using nylon cable ties, or some other mode of attachment.

It might be necessary to bundle longer cables to avoid tangling them. Do this at the cable-management bracket or at the rack, but leave enough slack in the cables to remove processor modules. Change cables as required. Also, do not block the power supply air vents with cables.

This completes the procedure for installing the cable-management bracket.

Moving Processor Modules from the Old Chassis to the New Chassis

At the interface processor end of the chassis, slots contain the processor modules. (See Figure 1.) In the Cisco 7513, the RSP occupies RSP slot 6 or 7. In the Cisco 7576, the RSP placed in slot 6 controls router A and the RSP in slot 7 controls router B. The remaining 11 slots support any combination of interface processors.

Note If you are upgrading a Cisco 7513 to a Cisco 7576, you need to carefully consider how you will transfer the existing RSP(s) and interface processors from the Cisco 7513 to the Cisco 7576. For example, if the existing Cisco 7513 includes two RSPs utilizing the “High System Availability” (HSA) feature, keep in mind that this configuration is not supported in the Cisco 7576. Refer to the “Port and Slot Configuration Worksheet” on page 28 for port and slot planning assistance. In addition, the *Cisco 7500 Series Installation and Configuration Guide* includes detailed information on Cisco 7576 RSP and interface processor port assignments and usage.

Processor modules are keyed with guides on the backplane to prevent them from being fully inserted in the wrong slot. Empty interface processor slots contain an interface processor filler (an empty carrier) to help keep dust out of the chassis, provide electromagnetic interference (EMI) shielding, and maintain proper air flow through the chassis interior.

Processor modules slide into the processor slots and connect directly to the backplane. The spring-loaded ejector levers (see Figure 9) help to ensure that the bus connector on the back of the processor module is fully seated in the backplane or fully dislodged from it. Captive installation screws at both ends of each processor module faceplate prevent the processor from pulling away from the backplane and support the EMI integrity of the system. Failure to use the ejector levers and captive installation screws could result in a partial backplane connection, which can hang the system.

If you are replacing a Cisco 7513 chassis, move the interface processors to the same slot positions in the new chassis to retain your existing configuration. When upgrading a Cisco 7513 to a Cisco 7576, it is not possible to retain the existing configuration. The lithium battery backup on the RSP retains the system configuration in nonvolatile random-access memory (NVRAM). Therefore, if you install interface processors in the same slot positions in the new chassis that they occupied in the old chassis, the system and the individual interfaces should come up in their previous configuration. If you install interface processors in different slots in the new chassis, the system will recognize the interfaces, but will leave them in a shutdown state until you reconfigure and enable them.

Note We recommend that you refer to the “Port and Slot Configuration Worksheet” section on page 28 before you remove interface processors from the old chassis. This will ensure that you install them in the correct slots in the new chassis based on the configuration stored in NVRAM on the RSP.

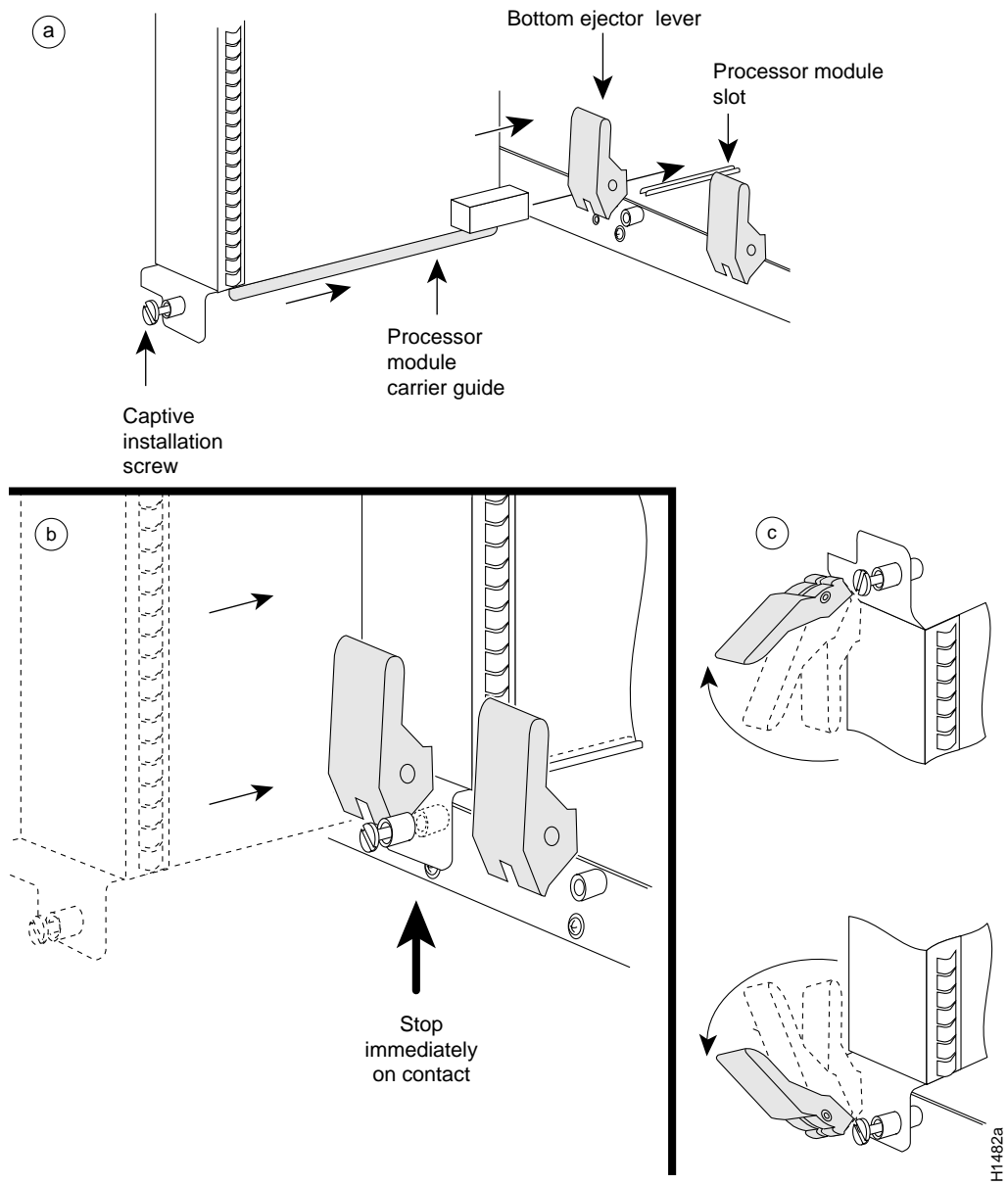
Although interface processors support OIR, you must wait at least 15 seconds after inserting an interface processor before inserting the next one. To help avoid errors with the installation, leave the power off until you have moved all components into the new chassis and have verified that all of them are installed properly.

Move the interface processors first, one at a time, then move the RSPs last. Before you remove an interface processor from the existing chassis, remove the interface processor filler from the corresponding slot in the new chassis. Then immediately install the interface processor in the new chassis and secure it in the slot before removing the next interface processor filler or module. If you leave the interface cables attached to the interface processors, route the cables through the cable-management brackets immediately after you secure the interface processor in the slot to help keep the other slots clear during the installation.

If there is sufficient slack in the interface cables, *and* if you can easily move the processor modules between the chassis without straining the cables, leave the interface cables connected. If you must disconnect the cables, label each cable with its slot and port number before you disconnect it. *Do not* reconnect the interface cables until you have installed all of the components in the new chassis (it is easier to install interface processors when the slots are not impeded by cables that drop from other slots). Use the optional cable-management brackets to keep the interface cables untangled and away from other interface processor slots and ports.

Note The Cisco 7513 and Cisco 7576 allow you to remove and replace interface processors and RSPs while the system is powered on; however, you must shut down the system power before accessing the chassis interior for any other reason. If you intend to remove and replace an interface processor or RSP while the system is powered on, do so only when no operations are taking place that involve the RSPs NVRAM or flash memory. This includes operations involving system configuration changes, and downloading microcode images.

Figure 9 Ejector Levers and Captive Installation Screws



To move the processor modules to the new chassis, follow these steps:

- Step 1** Before moving any processor modules, ensure that you have met the following prerequisites (refer to the “What is the Cisco 7513?” section on page 2” or the “What is the Cisco 7576?” section on page 3 for details):
- On both chassis, ensure that the power is turned off and the power cable is disconnected from the AC power receptacle or the DC terminal block.
 - To prevent ESD damage, wear a grounding strap or other ESD-prevention device and attach the equipment end to the chassis ground screw on the interface processor end of the chassis. (See Figure 1.)
 - If you will leave the interface cables connected to the processor modules, ensure that there is sufficient slack to avoid straining the cables when moving the processor module between chassis. Otherwise, label each cable with its slot and port number position. (This will help avoid mixing up cables when you reconnect them.)
 - Optional: Install the cable-management brackets on the new chassis before moving the components. Either move the brackets from the old chassis or install a new set.
- Step 2** Note the slot location of the interface processor you are going to move. Before removing the interface processor, remove the interface processor filler from the corresponding slot in the new chassis. When installing interface processors in the new chassis, place them in the same slot position that they occupied in the old chassis; this will retain your existing configuration and will help avoid confusion when reconnecting cables and checking the installation.
- Step 3** If necessary, disconnect any interface cables that are connected to the processor module.
- Step 4** Use a screwdriver to loosen both captive installation screws on the processor module. (See Figure 9a.)
- Step 5** Place your thumbs on the end of each ejector and simultaneously pull both ejectors outward, away from the carrier handle (in the opposite direction from that shown in Figure 9c) to release the processor module from the backplane.



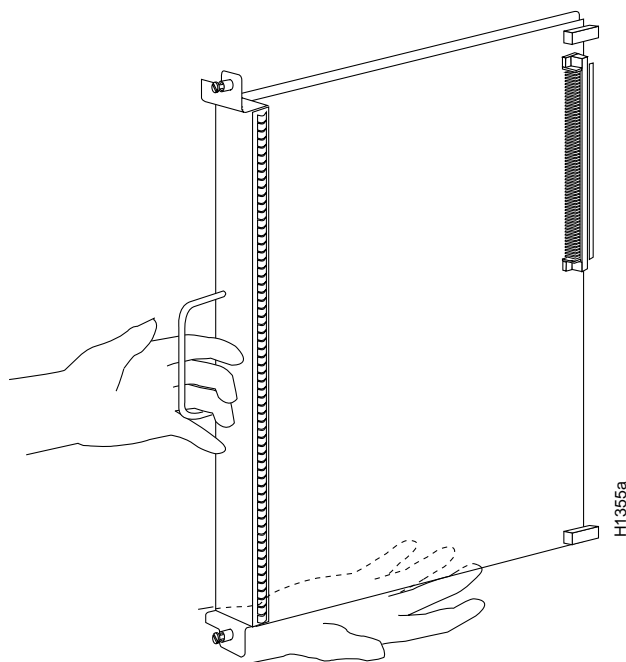
Caution You must install the RSP in one of the slots labeled *RSP* (slot 6 or 7). We recommend that you place the RSP in the same slot in the new chassis that it occupied in the old one. You can install interface processors in any of the interface processor slots (the lowest slots), but we recommend that you install them in the same slot positions that they occupied in the old chassis. The slots are keyed for correct installation. Forcing a processor module into the wrong slot can damage the backplane and board connectors.

Note If you are upgrading a Cisco 7513 to a Cisco 7576, you need to carefully consider how you will transfer the existing RSP(s) and interface processors from the Cisco 7513 to the Cisco 7576. For example, if the existing Cisco 7513 includes two RSPs utilizing the HSA feature, keep in mind that this configuration is not supported in the Cisco 7576. Refer to the “Port and Slot Configuration Worksheet” section on page 28 for port and slot planning assistance. In addition, the *Cisco 7500 Series Installation and Configuration Guide* includes detailed information on Cisco 7576 RSP and interface processor port assignments and usage.

- Step 6** Grasp the processor module handle with one hand and pull the processor module straight out of the slot, keeping your other hand under the carrier to guide it. (See Figure 10.) Keep the carrier at a 90-degree orientation to the backplane. Avoid touching the board or any connector pins.

- Step 7** Place the processor module in the same slot position in the new chassis and align the notches along the edge of the carrier with the grooves in the slot. (See Figure 9a.)
- Step 8** While keeping the carrier at a 90-degree orientation to the backplane, carefully slide the carrier into the slot until the back of the faceplate makes contact with the ejector levers, and then *stop*. (See Figure 9b.)
- Do not use unnecessary force when installing processor modules. Always guide the carrier into the slot only until the carrier faceplate makes contact with the ejector levers; then use the ejector levers to complete the insertion.
- Step 9** Using the thumb and forefinger of each hand to pinch each ejector, simultaneously push both ejectors inward (toward the carrier handle) until they snap into place and are at a full 90-degree orientation to the faceplate. (See Figure 9c.) The carrier ears (the ends of the faceplate) should be flush against the chassis.
- Step 10** Use a screwdriver to tighten the two captive screws to prevent the processor module from becoming partially dislodged from the backplane and to ensure proper EMI shielding.
- Step 11** Repeat Steps 2 through 10 for the remaining interface processors.

Figure 10 Handling a Processor Module



Note Leave the interface processor filler installed in any unfilled interface processor slots.

This completes the processor module removal and replacement procedure. If you need to install the new chassis in an equipment rack, proceed to the “Installing the New Chassis in the Rack” section on page 15. Otherwise, proceed to the next section to check the installation.

Checking the Installation

To complete the replacement procedure, perform the following steps to verify that the system is functioning properly. These steps will also help you verify that all the processor modules you moved are returned to their previous state. For additional first-time startup troubleshooting procedures, refer to the *Cisco 7500 Series Installation and Configuration Guide*.

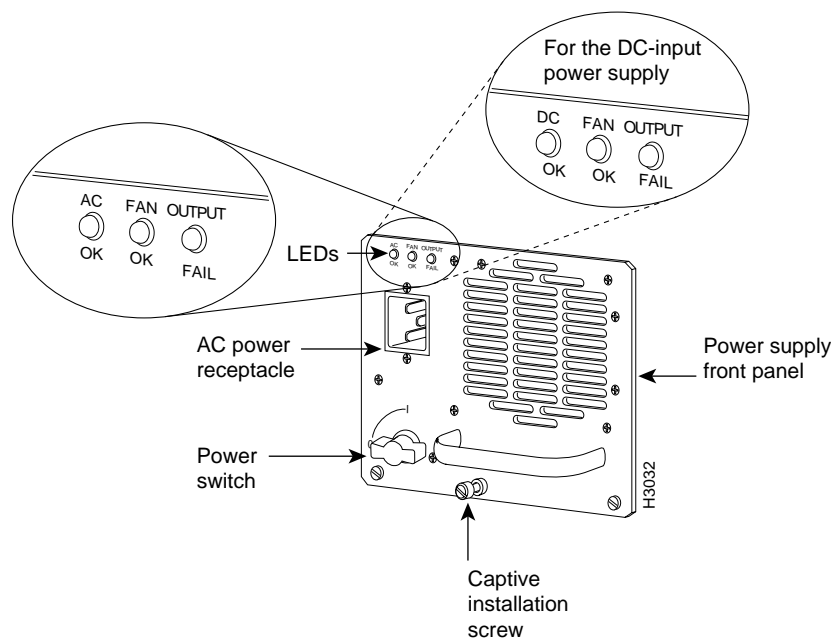
Because the lithium battery backup on the RSP retains the system configuration in NVRAM, the system and the individual interfaces should come up in their previous configuration, provided that you installed the interface processors in the same slots they occupied in the old chassis.

If, however, you installed interface processors in different slot positions in the new chassis, the system will recognize the interfaces, but will leave them in a down state until you reconfigure and enable them.

If you need technical assistance, refer to the “Cisco Connection Online” section on page 29.

- Step 1** Ensure that the system power switch is off, and then reconnect the power cable to the AC receptacle or DC terminal block, as required. For the AC-input power supply, snap the cable retention clip up around the plug to secure the cable. For the DC-input power supply, reattach a new nylon cable tie to support the weight of the cable.
- Step 2** Connect all interface cables to the appropriate interface processor ports. Ensure that all cables are fully seated in the ports and that all strain relief systems are engaged.
- Step 3** Ensure that you have either a console terminal connected to the system console port or a port available for a Telnet session to the router.
- Step 4** Turn on the system power. On the power supplies, the (AC or DC) OK LED should go on and stay on. (See Figure 11.)

Figure 11 Power Supply LEDs (AC-Input Power Supply Faceplate Shown)



If the system does not go on, check the following: If the system goes on, go to step 5.

- Check the source power. Ensure that the power switch is completely in the On (I) position and that the power (input) cord is properly connected at both ends.
- Check the fan OK LED. When on, this LED indicates the blower is operating. If the (AC or DC) OK LED is off and the blower is not operating, there is most likely a problem with the (AC or DC) input power or with one of the internal DC lines. If so, there are no installation adjustments that you should make; contact a service representative for further instructions.

Step 5 Verify that the normal LED on the RSP goes on and stays on. This indicates if the system software booted successfully. If the LED goes on, proceed to step 6. If it does *not* go on, do the following:

- Check the ejector levers and captive installation screws on the processor modules. If any appear loose, use the ejector levers to reseat the module, and then tighten the captive installation screws to secure it. Toggle the power off and back on again.
- If the RSP normal LED still remains off, note whether the CPU halt LED goes on, and contact a service representative.

Step 6 When the system boot is complete, the RSP begins to initialize the interface processors. During initialization, the LEDs on each interface processor behave differently (most flash on and off). The enabled LED on each interface processor goes on when initialization is completed.

- If the enabled LED on all interface processors goes on, the system has booted successfully and is now functional.
- If the RSP LEDs previously indicated a successful system boot, but none of the enabled LEDs on interface processors go on, suspect that one of the interface processors has shifted out of its backplane connector and hung the bus. Turn off the power, and then use the ejector levers to release each interface processor and reseat them in their slots. (See the “Moving Processor Modules from the Old Chassis to the New Chassis” section on page 18 for removal and insertion steps.) Tighten all captive installation screws, and then return to Step 1.

Step 7 If the enabled LED on a single interface processor remains off, suspect that the interface processor has shifted out of its slot. Use the ejector levers to release the interface processor and reseat it in the backplane. (Refer to the “Moving Processor Modules from the Old Chassis to the New Chassis” section on page 18 for removal and insertion steps.) Tighten both captive installation screws, and then return to Step 1.

Step 8 If an enabled LED still fails to go on after performing these steps, suspect that the specific interface processor has failed. Contact a service representative.

Step 9 Verify that the console terminal displays a script and system banner similar to the following:

```
GS Software (RSP-K), Version 10.3(571), SOFTWARE
Copyright (c) 1986-1995 by cisco Systems, Inc.
Compiled Wed 10-May-95 14:46 by mpo
```

```
System Bootstrap, Version 4.6(1) [fc2], SOFTWARE
```

Step 10 After the system initializes, enter the various **show** commands to display the status of the system and individual interfaces, and ensure that they are operating according to their previous configuration. (For descriptions and examples of these commands, refer to the following section, “Verifying the Installation Using show Command Descriptions and Examples.”)

When the system starts up and operates successfully, the replacement procedure is complete, and you can resume normal operation.

If the system still fails to start up or operate properly, or if you isolate the cause of the problem to a failed component, contact a service representative for further assistance.

Note After you verify a successful installation, gather the old chassis and any remaining spares and parts. If the old chassis is still mounted in a rack, follow the steps in the “Removing the Existing Chassis from the Rack” section on page 13” to remove it. Place spare interface processors or interface processor fillers in the chassis slots, and move the chassis to the appropriate location for storage or shipment.

Verifying the Installation Using show Command Descriptions and Examples

This section describes the various **show** commands that you can use to display system status and configuration. If you installed the interface processors in the same slot locations that they occupied in the old chassis, the interfaces should retain the same configuration. If you installed the interface processors in different slot locations, the system will recognize the interfaces, but you will have to use the **configure** command to reconfigure and enable them.

You can check the version of the default ROM image either by removing the board and checking the ROM labels or by configuring the interface or system software to boot from ROM, restarting the system, and using these same commands to check the running version.

Note The following examples may differ based on the router model and version of Cisco IOS software that is being used.

Enter the **show version** command to display the current system software version, and enter the **show controllers cxbus** command to display the microcode version of the RSP and each interface processor. The following is an example of the **show version** command.

```
Router> show version

GS Software (RSP-K), Version 10.3(571), SOFTWARE
Copyright (c) 1986-1995 by cisco Systems, Inc.
Compiled Wed 10-May-95 14:46 by mpo

System Bootstrap, Version 4.6(1) [fc2], SOFTWARE

Current date and time is Sat 1-22-1994 21:38:35
Boot date and time is Tue 12-28-1993 15:32:28
Router uptime is 3 weeks, 4 days, 6 hours, 7 minutes
System restarted by reload
System image file is "gs7-k.103-1", booted via tftp from 1.1.1.12

(example text omitted)
X.25 software, Version 2.0, NET2 and BFE compliant.
Bridging software.
1 EIP controller (6 Ethernet).
1 TRIP controller (4 Token Ring).
6 Ethernet/IEEE 802.3 interfaces.
4 Token Ring/IEEE 802.5 interfaces.
(remainder of example text omitted)
```

Following is an example of the **show controller cbus** command display. (In this example, ROM Version 1.0 is assumed because you cannot determine the ROM version with screen displays unless it is the running version.)

```
Router# show controllers cbus

(text omitted from example)
FSIP 1, hardware version 1.0, microcode version 1.0
Interface 8 - Serial1/0, electrical interface is V.35 DTE
(text omitted from example)
Interface 9 - Serial1/1, electrical interface is V.35 DTE
(remainder of displayed text omitted from example)
```

The command **show interfaces serial slot/port** displays statistics for the specific serial interface you specify by its slot/port address. If you enter this command without the *type* and *slot/port* arguments, the system will display statistics for all interfaces in the system.

```
Router> show int hssi 1/0

Hssi 1/0 is up, line protocol is up
Hardware is cxBus HIP
Internet address is 1.1.1.9, subnet mask is 255.255.255.0
(display text omitted)
```

The command **show configuration** displays the contents of the system configuration file stored in NVRAM.

```
Router# show config

Using 1652 out of 130048 bytes
version 10.3(571)
!
hostname Router
!
enable-password guessagain
!
microcode TRIP flash tripl-0
microcode reload
!
interface hss1/0
ip address 1.1.1.67
ip route-cache cbus
no keepalive
!
interface serial2/1
ip address 1.1.1.12
(display text omitted)
```

The command **show protocols** displays the global (system-wide) and interface-specific status of any configured Level 3 protocol.

```
Router> show protocols

Global values:
  Internet Protocol routing is enabled
Hss1/0 is up, line protocol is up
(display text omitted)
```

Port and Slot Configuration Worksheet

The port and slot configuration worksheet (Table 1) is used in conjunction with Figure 12 to assist in planning and documenting your use of the slots in a Cisco 7513 or Cisco 7576 router. Figure 12 shows the dual CyBus backplane without the Time Division Multiplexing (TDM) connectors found on the Cisco 7576.

Cisco 7513 Slot Assignments

The dual CyBus backplane has 13 slots: interface processors are placed in slots 0 through 5 and slots 8 through 12. RSPs are placed in slots 6 and 7.

Cisco 7576 Slot Assignments

The Cisco 7576 consists of two independent routers on a single split backplane. These are designated router A and router B.

- Router A
 - Interface processors are placed in slots 0 through 5
 - An RSP is placed in slot 6
- Router B
 - Interface processors are placed in slots 8 through 12
 - An RSP is placed in slot 7

Figure 12 Slot Numbering (Use with Table 1)

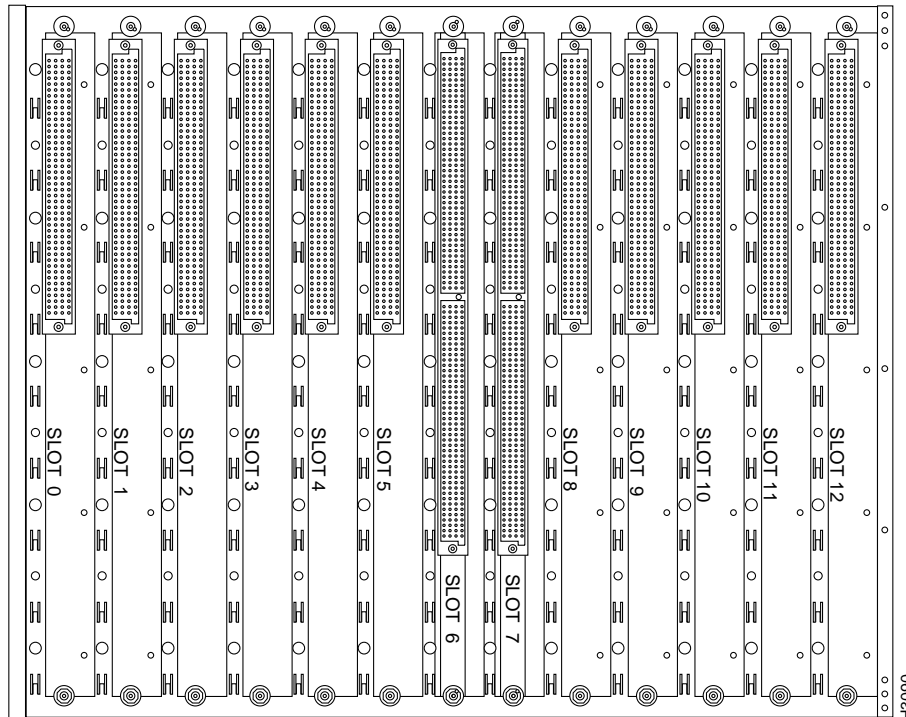


Table 1 Port and Slot Configuration Worksheet (Refer to Figure 12)

Port	Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5 ¹	Slot 8	Slot 9	Slot 10	Slot 11	Slot 12
1											
2											
3											
4											
5											
6											
7											
8											
Router Name(s)				Location				Serial Number			

¹ Slots 6 and 7 are reserved for the RSPs in the Cisco 7513 and Cisco 7576. However, in the Cisco 7576, slot 6 is used for router A, and slot 7 is used for router B.

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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 connection rates up to 28.8 kbps.

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