Cisco 6400 Installation and Replacement of Field-Replaceable Units

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Overview

This document provides information about replacing and verifying field-replaceable units (FRUs), including cards and other components, in the Cisco 6400 carrier-class broadband aggregator. All cards, modules, and components support online insertion and removal (often referred to as hot-swapping). Hot-swapping allows you to remove, replace, and rearrange cards without turning off the system power. When the system detects that a card or module is added or removed, it automatically runs diagnostic and discovery routines, acknowledges the presence or absence of the card or module, and resumes system operation without any operator intervention.

> **Note** If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, refer to the "Obtaining Technical Assistance" section on page 53.

> **Note** The illustrations in this guide depict the original Cisco 6400 chassis. Your chassis may appear or look slightly different.

CISCO SYSTEMS

Contents

This document includes the following sections:

Document Conventions

This publication uses the following conventions:

Note Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

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 vare 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 förkommer i denna publikation i dokumentet *Regulatory Compliance and Safety Information* (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.

Tools and Equipment Required

You need the following tools and equipment to remove and replace modules. If you need additional equipment, see the "Obtaining Technical Assistance" section on page 53.

- One number 2 Phillips screwdriver and one flat-blade screwdriver
- Electrostatic discharge (ESD) grounding strap (disposable ESD strap provided with system)

General Safety Precautions and Maintenance Guidelines

General Safety Precautions

ESD, EMI, and Safety Precautions

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Caution Static voltages as low as 30 volts can cause latent damage to circuitry. Be sure to observe all standard anti-static procedures (for example, wear a grounding strap) when handling electronic equipment and components.

Warning Blank faceplates (filler panels) serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards and faceplates are in place. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.

Laser Safety Precautions

Warning Class 1 laser product. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.

Warning Because invisible radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.

Warning Invisible laser radiation present. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.

Warning Statement for Sweden

Varning! Osynlig laserstrålning när denna del är öppen och förregleringen är urkopplad. Rikta inte blicken in mot strålen.

Warning Statement for Finland

Varoitus Alleviates ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Äjä katso säteeseen.

Lifting and Reaching Safety Precautions

Warning To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit. Lift the unit only by using handles that are an integral part of the chassis, or by grasping the chassis underneath its lower edge. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.

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Warning **Two people are required to lift the chassis. To prevent injury, keep your back straight and lift with your legs, not your back. Translations of this warning can be found in the** *Regulatory Compliance and Safety Information* **document that accompanied this device.**

Figure 1 shows the proper way to lift the Cisco 6400 chassis.

Figure 1   Lifting the Cisco 6400 Chassis
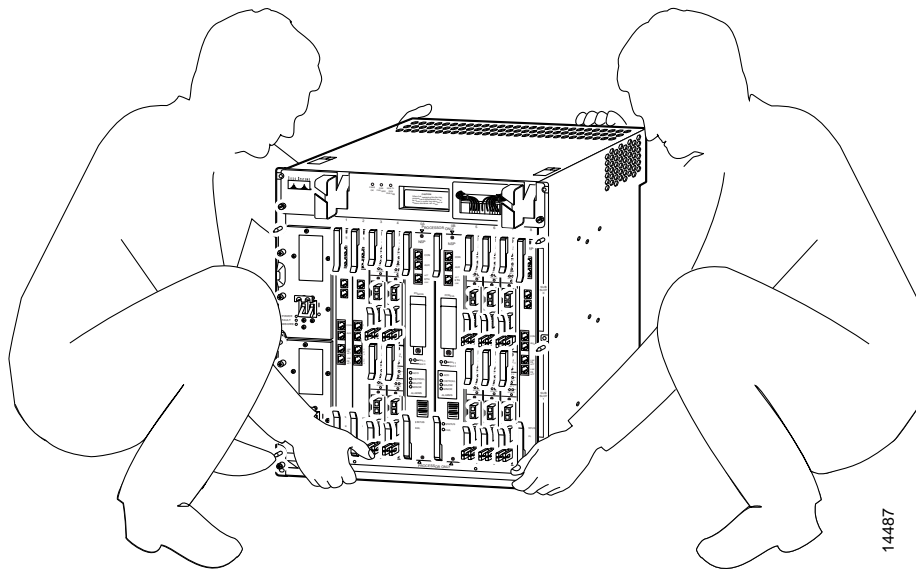
Hot-Swapping Modules and Line Cards

The Cisco 6400 system has a hot-swap feature that allows you to install and remove modules and line cards while the system is operating. With hot swapping, you do not need to power down the system.

When unconfigured node line cards (NLCs) are installed for the first time, the system identifies them as present but unconfigured. Read the instructions for initial interface configurations in the *Cisco 6400 Software Setup Guide.*

If a card or module similar to the one that was removed is reinserted into a slot, the Cisco 6400 automatically configures its ports and brings it online up to the port count of the original card.

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Note You must administratively shut down the card or module; otherwise alarms are activated.

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Caution To avoid erroneous failure messages, allow at least 15 seconds for the system to reinitialize. Note the current configuration of all interfaces before you remove or insert another card.

Plug-In Module or Card Replacement Suggestions

The following are examples of recommended module and card insertion practices:

- Do not force the faceplate into its slot. This action can damage the pins on the backplane if they are not aligned properly with the module or card.

- Fully depress the ejector levers to ensure that the card connector mates with the backplane correctly. Ensure that the card or module is firmly seated in the slot.

- Use the installation screws (top and bottom of carrier) to secure the module or card firmly in place in the chassis.

✎ **Note** Any module that is only partially connected to the backplane can disrupt system operation.

Cisco 6400 System Component Identification

Figure 2 identifies the major components of the Cisco 6400 system. Card slots 1 through 8 can contain a combination of node route processor (NRP) and node line card (NLC) modules; only node switch processor (NSP) modules can be inserted into card slots 0A and 0B.

Figure 2   Cisco 6400 System Components—Front View
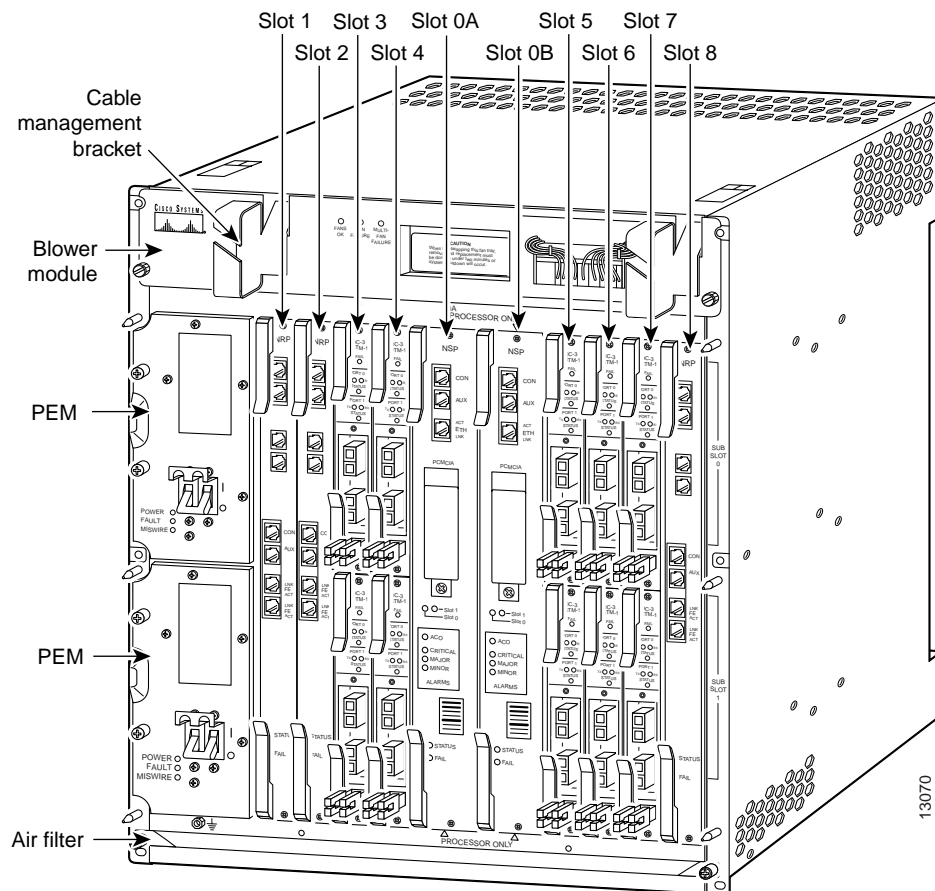
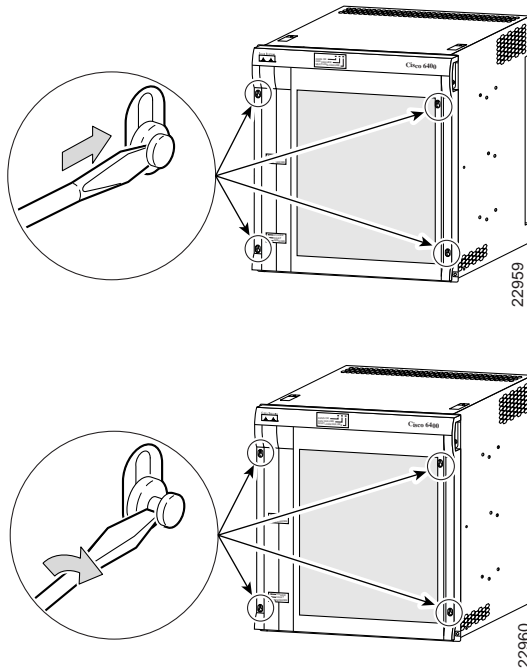# Replacing the Front Cover

> **Note** The Cisco 6400 no longer ships with the plastic front cover that was included in shipments made before June 2002. This section covering removal and replacement procedures is included only for reference purposes.

Removing the Front Cover

To remove the front cover, first remove the bezel plugs:

Step 1 Insert the tip of a flat-blade screwdriver into the indentation between the top and bottom of the plug.

Step 2 Rotate the screwdriver blade 90 degrees, pushing out the top of the plug (Figure 3).

Step 3 Remove the plug with your fingers.

Step 4 Firmly grasp the cover with both hands, lift upward as far as possible (about 1 inch), and pull forward.

Figure 3   Removing Bezel Plugs

> **Note** The cover is secured by four posts. Avoid bending or twisting cables and connectors.

Installing the Front Cover

To install the front cover:

Step 1   Line up the hole in each corner of the cover with the four posts on the chassis (Figure 4).

Step 2   Gently but firmly push the cover onto the posts and slide downward to secure.

Step 3   Insert one of the bezel plugs into a corner hole, below the post.

Step 4   When the plug is lined up in the hole (Figure 5), use your thumb to gently but firmly press on the top of the plug until the top collapses against the bottom.

Step 5   Repeat Steps 3 and 4 for the remaining three corners. Avoid bending or twisting cables and connectors.
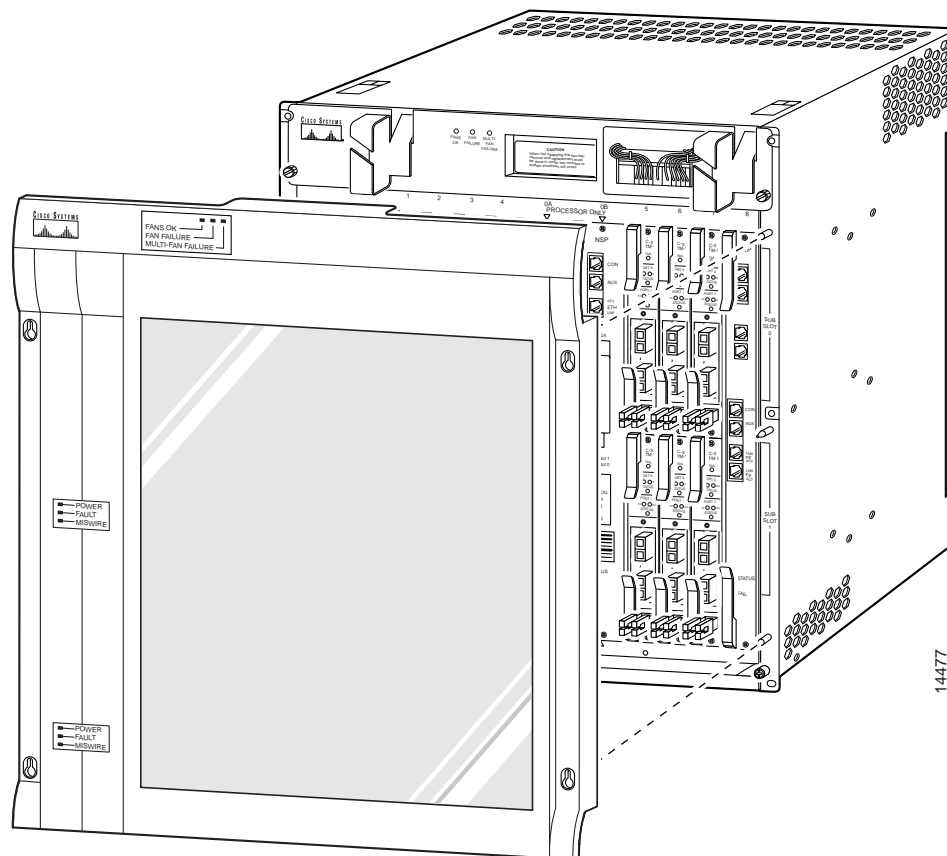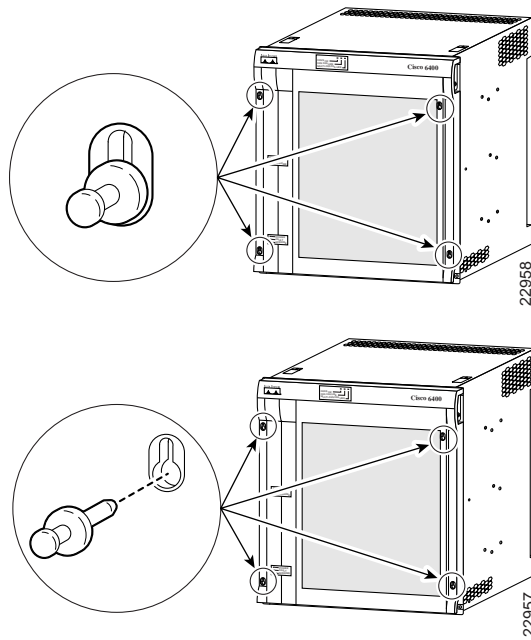
Figure 4   Installing the Front Cover

Figure 5 Installing Bezel Plugs

Powering Down the System

To power down the Cisco 6400 system:

Step 1 Notify appropriate personnel that you plan to shut down the Cisco 6400 system and that this will result in total loss of service. Appropriate personnel includes the regional alarm or network monitoring center, central office personnel, and key customers.

Step 2 Before shutting down the Cisco 6400, use the **copy** command to save any configuration changes to NVRAM, and also to a PCMCIA card. (Refer to the *Cisco 6400 Command Reference* for instructions on using the **copy** command.)

Step 3 Complete all copy or write operations involving Flash media (PCMCIA slots or boot Flash) before you power down the Cisco 6400.

Step 4 To power down the Cisco 6400, turn off the switch on all PEMs (your system can be configured with one or two PEMs).

Backing Up the PCMCIA Card

We recommend that you create a duplicate PCMCIA card that contains the current boot software image and the current software configuration. You can use the duplicate to recover from a major system failure with less disruption. If you have a backup PCMCIA card, you can use that card to load a new node switch processor (NSP) module and avoid a time-consuming reconfiguration process. For instructions on creating a backup PCMCIA card, refer to the *Cisco 6400 Software Setup Guide.*

Maintaining the Air Filter

The Cisco 6400 automatically powers down if the system overheats. If the blower module's air filters are too dirty or clogged, the system might have insufficient air flow and might overheat.

You should replace the Cisco 6400 air filters every six months. In certain environments, you might have to replace the air filter more frequently.

Removing the Air Filter

The Cisco 6400 ships with either a screw-type or tab-type air filter.

To remove a tab-type air filter, press the release tabs on each side of the chassis to release the air filter and slide it out of the chassis. (See Figure 6.)
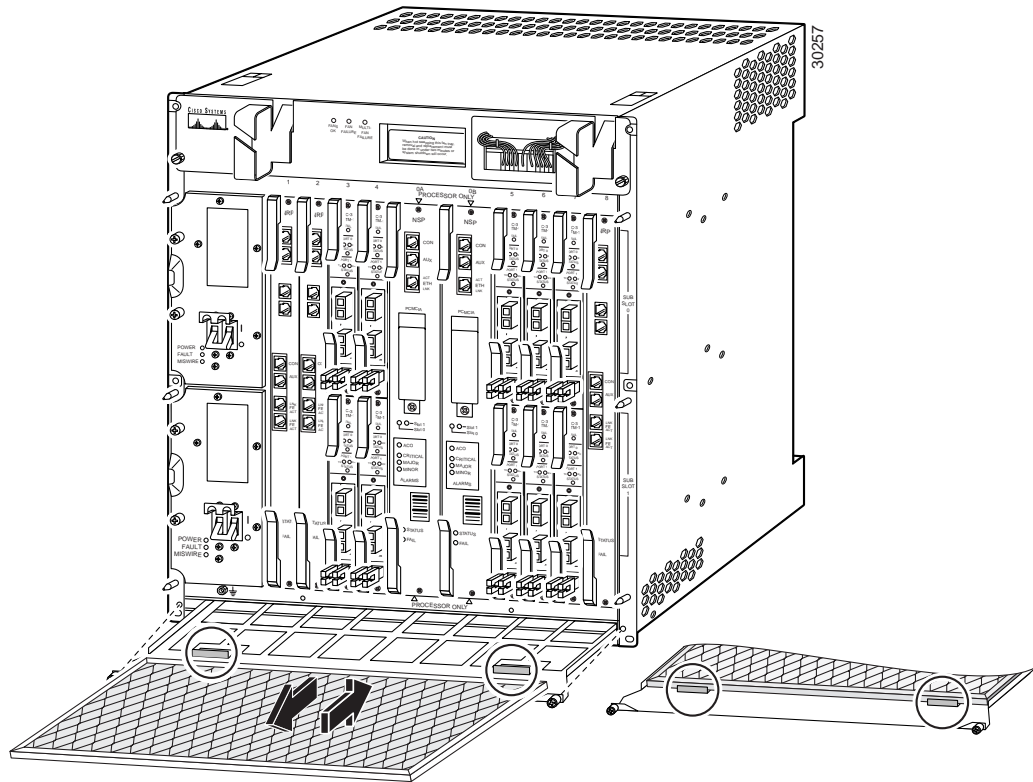
Figure 6   Tab-type Air Filter Release Tabs

Air filter
release tabs
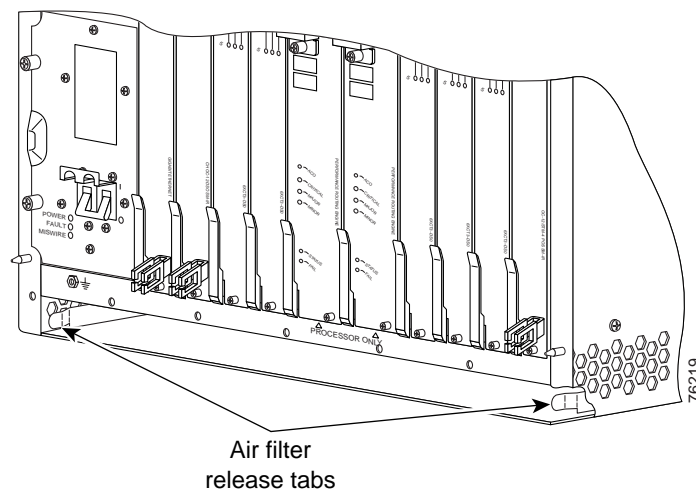
To remove a screw-type air filter, refer to Figure 7 and perform the following steps.

Step 1   Locate the filter tray at the bottom front of the chassis, below the plug-in modules. Use a number 2 Phillips screwdriver to unlock the filter tray.

Step 2   Gently pull the filter toward you to remove it from the chassis.

Step 3   If you are replacing the filter, discard the old filter and go to the section "Replacing the Air Filter."

*Figure 7   Removing a Screw-type Air Filter from the Chassis*

Replacing the Air Filter

The Cisco 6400 ships with either a screw-type or tab-type air filter.

To install a new tab-type air filter, slide the new filter all the way into the chassis and lift it up until it snaps into place. The directional arrows located on the metal frame of the filter should be pointing up. (See Figure 8.)

Figure 8   Inserting a Tab-Type Air Filter
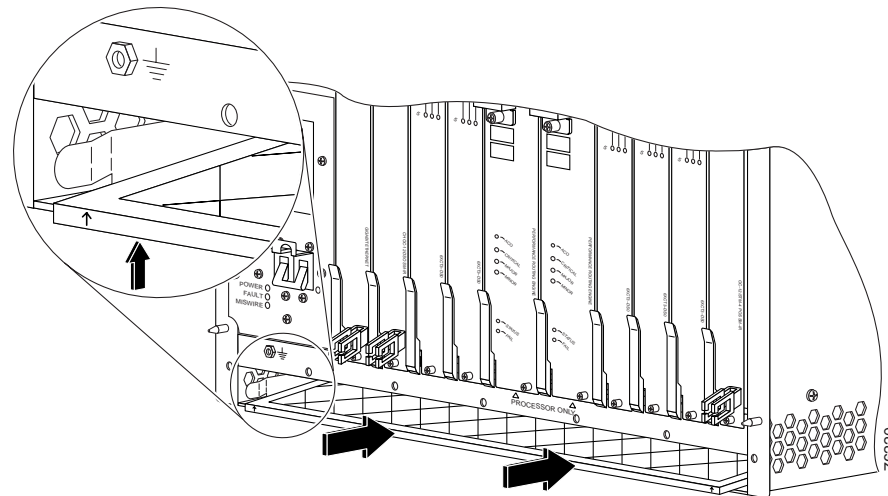
To install a new screw-type air filter, refer to Figure 7 and perform the following steps:

Step 1   Hold the air filter with the arrows (located on the metal frame) facing up.

Step 2   Slide the air filter into the bottom tray of the chassis.

Step 3   Secure the tray by tightening the retaining screws.

Replacing an NSP Module

The Cisco 6400 can contain one or two NSP modules, which are located in slots 0A and 0B (in the middle of the chassis). Figure 9 shows the NSP faceplate.

Figure 9   NSP Faceplate
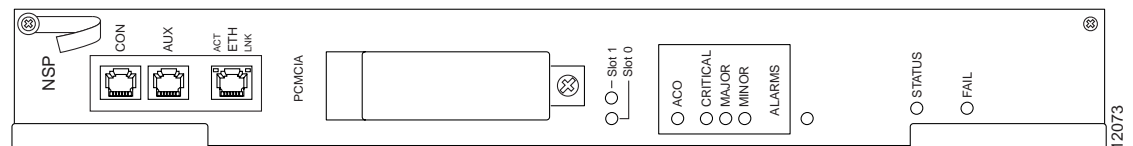
Caution   Removing an active NSP in a redundant configuration causes a switchover. Removing an active NSP in a nonredundant configuration causes a system shutdown.

Removing the NSP Module

To remove an NSP module:

Step 1   Attach a ground strap to your wrist.

Step 2   Unscrew the upper and lower retaining screws.

Step 3   Disconnect any cables connected to the NSP module that you are about to remove.

Step 4   Grasp the upper and lower extraction levers. Pull up on the upper lever while pushing down on the lower lever. This action disengages the module from the connectors on the backplane.

Step 5   Slide the NSP module out of the slot.

Step 6   Place the NSP module on an antistatic surface. If the module will be out of the chassis for several minutes or longer, put it in a static-shielding bag or in a box lined with antistatic material.

Step 7   Install another NSP module or a blank faceplate in the empty slot.


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Warning   **Blank faceplates (filler panels) serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they reduce electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards and faceplates are in place. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Installing the NSP Module

The NSP module can be inserted only in slot 0A or 0B. To install an NSP module in the Cisco 6400 chassis:

Step 1   Remove the blank filler panel from the selected slot, if a blank panel is present.

Step 2   Hold the NSP module vertically, with the NSP faceplate toward you and the backplane connectors away from you. Ensure that the module is right side up by noting the lettering on the faceplate.

Step 3   Carefully align the upper and lower edges of the NSP carrier with the upper and lower guides in the chassis (Figure 10).

Figure 10   Inserting an NSP into the Chassis

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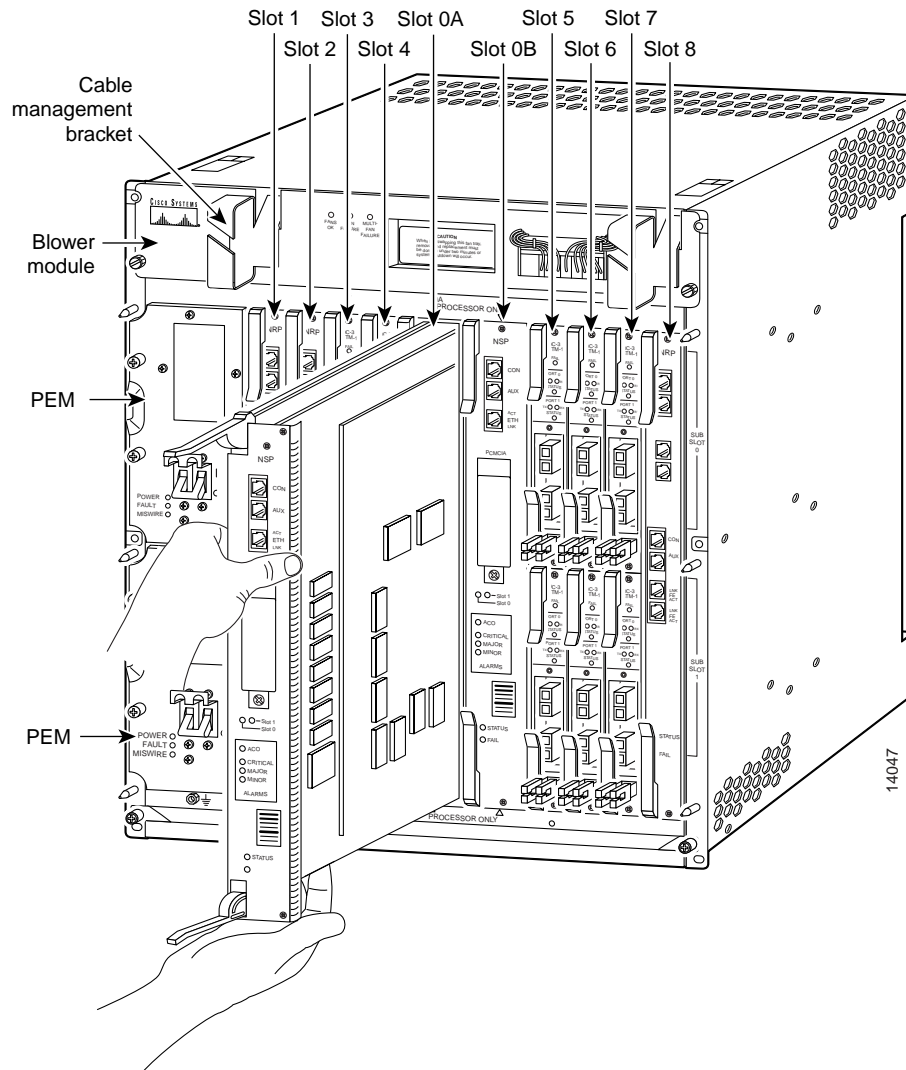
Caution   To ensure that the NSP module mates properly with all backplane connector pins, the card length and card slots have been designed with very close tolerances. To slide the module into the slot requires gentle pressure with each hand, at the top and bottom of the faceplate.

Step 4   Gently slide the module into the slot until it makes contact with the backplane.

Step 5   Press the upper lever down and the lower lever up at the same time.

Step 6   Secure the card by tightening the upper and lower retaining screws.

Step 7   Connect the cables.

Step 8   Pull the cables across the wire restraint and bend the restraint upward to trap the cables (Figure 11).
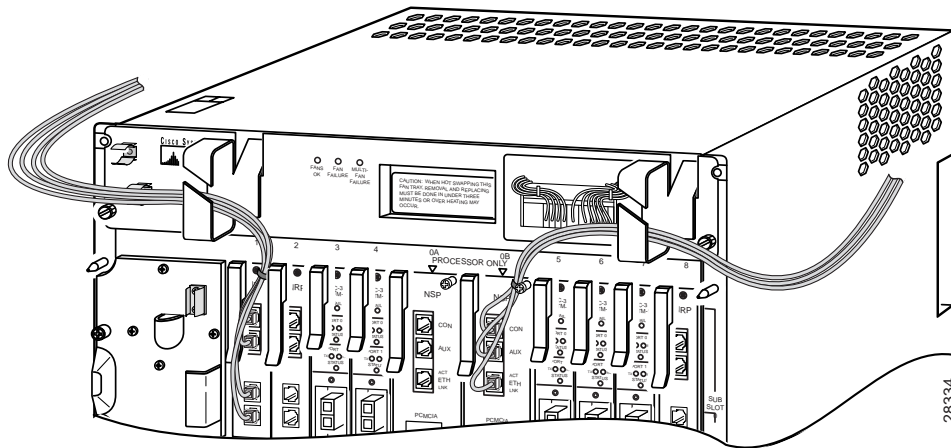
Figure 11   Wire Restraint on the NSP

Wire restraint

30256
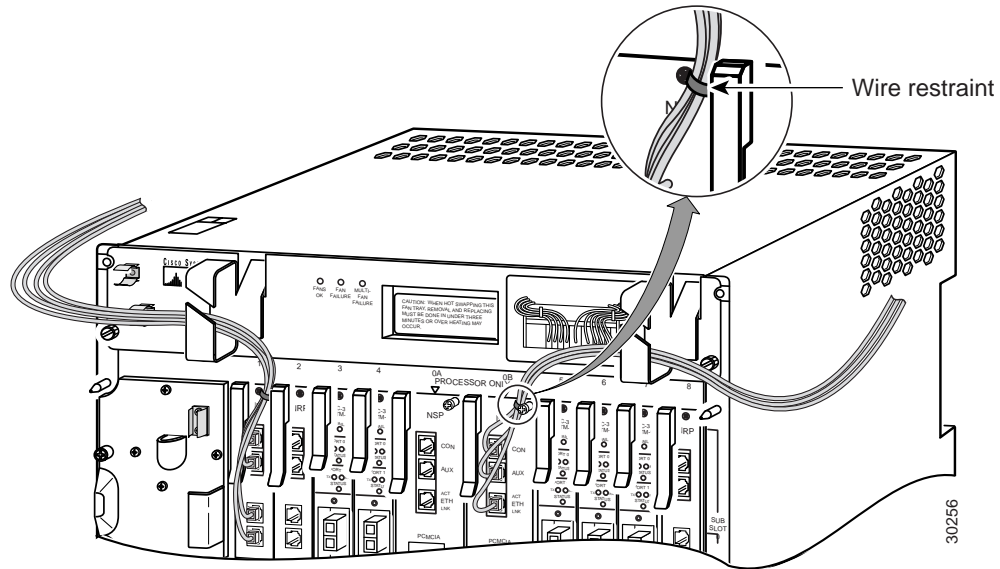
Step 9   Route the cables through the cable management bracket, creating a 20-inch (or larger) service loop (Figure 12).

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Note   A minimum 20-inch loop is critical to hot swapping the blower.

Figure 12   Routing the NSP Cables Through the Cable Management Bracket

28334

Step 10   Install blank filler panels to cover any unused slots. Like cards and modules, each filler panel is held in place by two retaining screws.

Replacing an NSP Module PCMCIA Card

There are two PCMCIA slots in the NSP module. To replace a PCMCIA card:

Step 1   Unscrew the locking fastener on the bottom of the PCMCIA slot cover.

Step 2   Lift the cover and press the eject button on the PCMCIA slot for the card you are removing. The card ejects.

Step 3   Remove the PCMCIA card and insert the new card. Push firmly to seat the new PCMCIA card.

Step 4   Close the cover and tighten the locking fastener.

Note   If you seat a PCMCIA Type II card in Slot 0, you cannot use Slot 1. However, if you seat a Type I card in Slot 0, you can insert either a Type I or Type II card in Slot 1.

Replacing an NSP Module SIMM

General SIMM Information

SIMMs are sensitive components that are susceptible to ESD damage. Handle SIMMs by the edges only; avoid touching the memory modules, pins, or traces (the metal *fingers* along the connector edge of the SIMM).

Caution   To upgrade DRAM, you must install identical SIMMs in both DRAM SIMM connectors.

The default DRAM configuration is 64 MB, contained in two 32-MB SIMMs. The DRAM can be increased to 128 MB by adding two more 32-MB SIMMs. The amount of DRAM required on the NSP module is determined by the number of active physical and logical ports (virtual path tunnels) and the expected number of active switched virtual channels (SVCs) through the switch.

In a 64-MB DRAM configuration, the two accessible SIMM sockets (U51 and U63) are empty. To upgrade to 128-MB DRAM, you must purchase an upgrade kit from Cisco and insert the SIMMs into the two empty sockets.

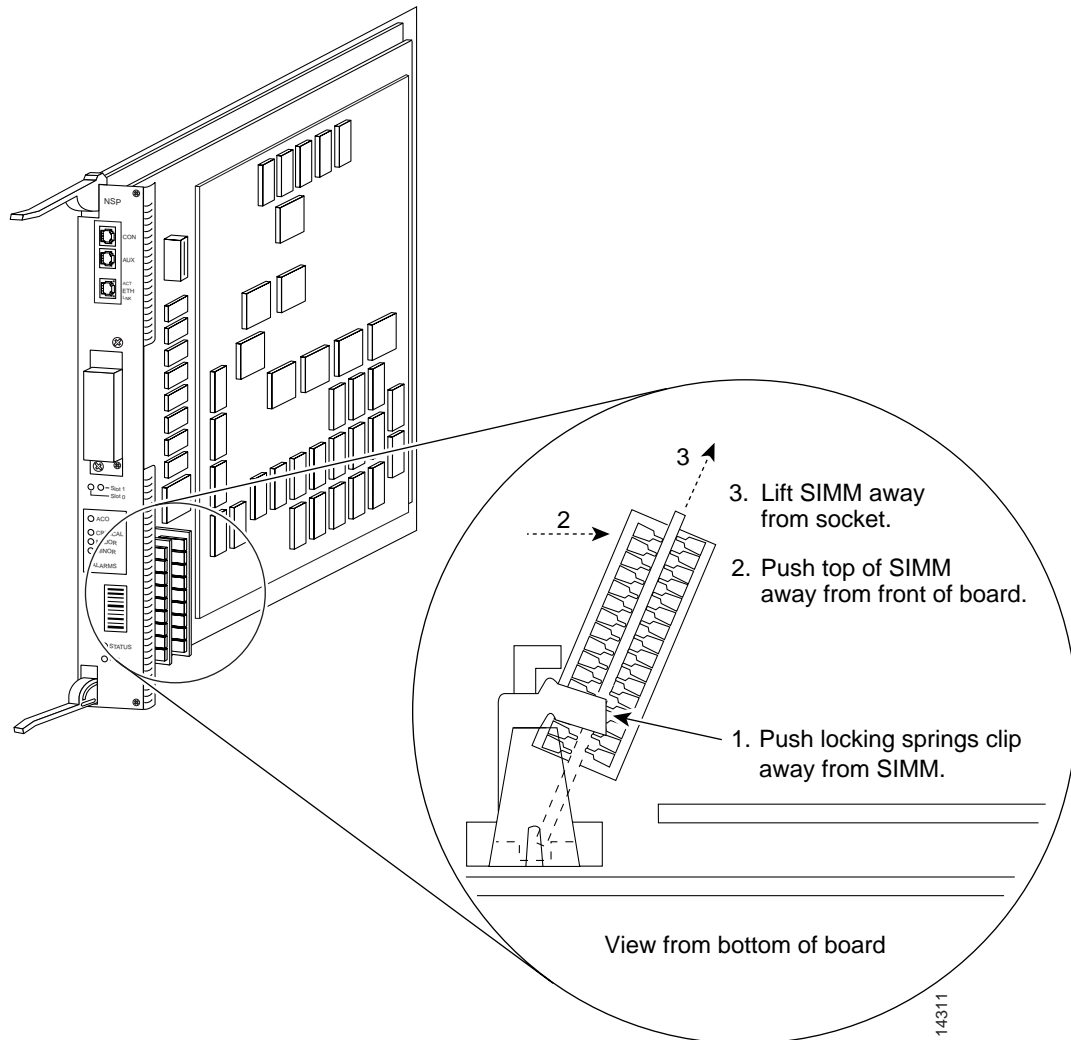**Note**   You must use SIMMs obtained from Cisco Systems.

Removing NSP Module SIMMs

To remove the existing SIMMs:

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

Step 2   Disconnect the console and auxiliary cables from the NSP module.

Step 3   Loosen the captive installation screws on the NSP module.

Step 4 Place the NSP on an antistatic mat or pad. Position the NSP so that the faceplate is away from you and the edge connector is toward you.

Step 5 Locate the SIMMs. The DRAM SIMMs occupy sockets U51 and U63 (Figure 13).

Figure 13 Removing an NSP SIMM Module

3. Lift SIMM away from socket.

2. Push top of SIMM away from front of board.

1. Push locking springs clip away from SIMM.

View from bottom of board

Step 6 Release the spring clips from the SIMM that you wish to remove and lift the SIMM from the socket (Figure 13).

Step 7 When both ends of the SIMM are released from the socket, use your thumb and forefinger to grasp the ends of the SIMM and pull the SIMM completely out of the socket. Handle the edges of the SIMM only; avoid touching the memory module, pins, or metal traces (fingers) along the socket edge.

Step 8 Place the SIMM in an antistatic bag to protect it from ESD damage.

Step 9 Repeat steps 5 through 8 for the remaining SIMMs, as required for your upgrade.

Installing an NSP SIMM Module

To replace a SIMM module:

Step 1 Keep the NSP in the same orientation as in the previous procedure (with the handle facing away and the edge connector toward you).

Step 2 Remove a new SIMM from the antistatic bag.

⚠ **Caution** Handle SIMMs by the card edges only. SIMMs are sensitive components that can short out if mishandled.

Step 3 Hold the SIMM component side up with the connector edge (the metal fingers) closest to you.

Step 4 Hold the sides of the SIMM between your thumb and middle finger, with your forefinger against the far edge, opposite the connector edge (Figure 13).

Step 5 Tilt the SIMM to approximately the same angle as the socket, and insert the entire connector edge into the socket. Insert the first SIMM in the socket farther from you.

⚠ **Caution** When inserting SIMMs, use firm but not excessive pressure. If you damage a socket, you must return the NSP to the factory for repair.

Step 6 Gently push the SIMM into the socket until the spring clips snap over the ends of the SIMM. If necessary, rock the SIMM gently back and forth to seat it properly.

Step 7 Repeat Steps 2 through 6 for the remaining SIMM. Insert the second SIMM in the socket closer to you.

Step 8 When both SIMMs are replaced, check all four alignment holes (two on each SIMM) and ensure that each spring retainer is visible. If it is not, the SIMM is not seated properly. If a SIMM appears misaligned, carefully remove it and reseat it in the socket. Push the SIMM firmly back into the socket until the retainer springs snap into place.

Verifying SIMM Operation

If the system fails to boot properly, or if the console terminal displays a checksum or memory error, check the following:

- Ensure that all SIMMs are installed correctly. Check the SIMMs by looking straight down on them and then observe them at eye level. The SIMMs should both be aligned at the same angle and should be at the same height. If one SIMM appears to stick out or rests in the socket at an angle different from the other, remove the SIMM and reinsert it. Replace the NSP and reboot the system for another installation check.

- Each DRAM SIMM bank must contain SIMMs of the same size and speed, or the system does not operate. Contact Cisco Systems to order the NSP DRAM upgrade package. Other vendors' parts might not work properly. (To contact Cisco Systems, see the "Obtaining Technical Assistance" section on page 53.)

If the system fails to restart properly after several attempts, contact a service representative for assistance. Before you contact Cisco Systems, make note of any error messages, unusual LED states, or any other indications that might help identify the problem.

Replacing an NRP Module

NRP modules can be installed in slots 1 through 8 in the Cisco 6400 chassis. The procedure for replacing an NRP module is basically the same for the NRP-1 and NRP-2 modules. The only difference is that for the NRP-1, the attached cables are directed up to wire restraints; and for the NRP-2SV, the cable is directed down to cable management brackets. This is clarified in Step 8 on page 21.

Removing an NRP Module

To remove an NRP module from the Cisco 6400 chassis:

Step 1   Attach an ESD-preventive wrist strap.

Step 2   Disconnect any cables connected to the NRP module that you are about to remove.

Step 3   Unfasten the upper and lower retaining screws.

Step 4   Grasp the upper and lower extraction levers. Pull up on the upper lever while pushing down on the lower lever. This action disengages the NRP carrier from the connectors on the backplane.

Step 5   Slide the module out of the slot.

Step 6   Place the NRP module on an antistatic surface. If it will be out of the chassis for several minutes or longer, put it in a static-shielding bag or in a box lined with antistatic material.

Step 7   Insert another NRP module or a blank faceplate in the empty slot.

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Warning   **Blank faceplates (filler panels) serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they reduce electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards and faceplates are in place. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Installing an NRP-2SV Module

To install an NRP-2SV module in the Cisco 6400 chassis:

Step 1   If a blank panel is present, remove the blank filler panel from the selected slot.

Step 2   Hold the NRP-2SV module vertically with the NRP-2SV faceplate toward you and the backplane connectors away from you. Ensure that the module is right side up by noting the lettering on the faceplate.

Step 3   Carefully align the upper and lower edges of the NRP-2SV carrier with the upper and lower guides in the chassis. See Figure 14 for an example of inserting an NRP-2SV module in the chassis.

Figure 14   Inserting an NRP-2SV into the Chassis
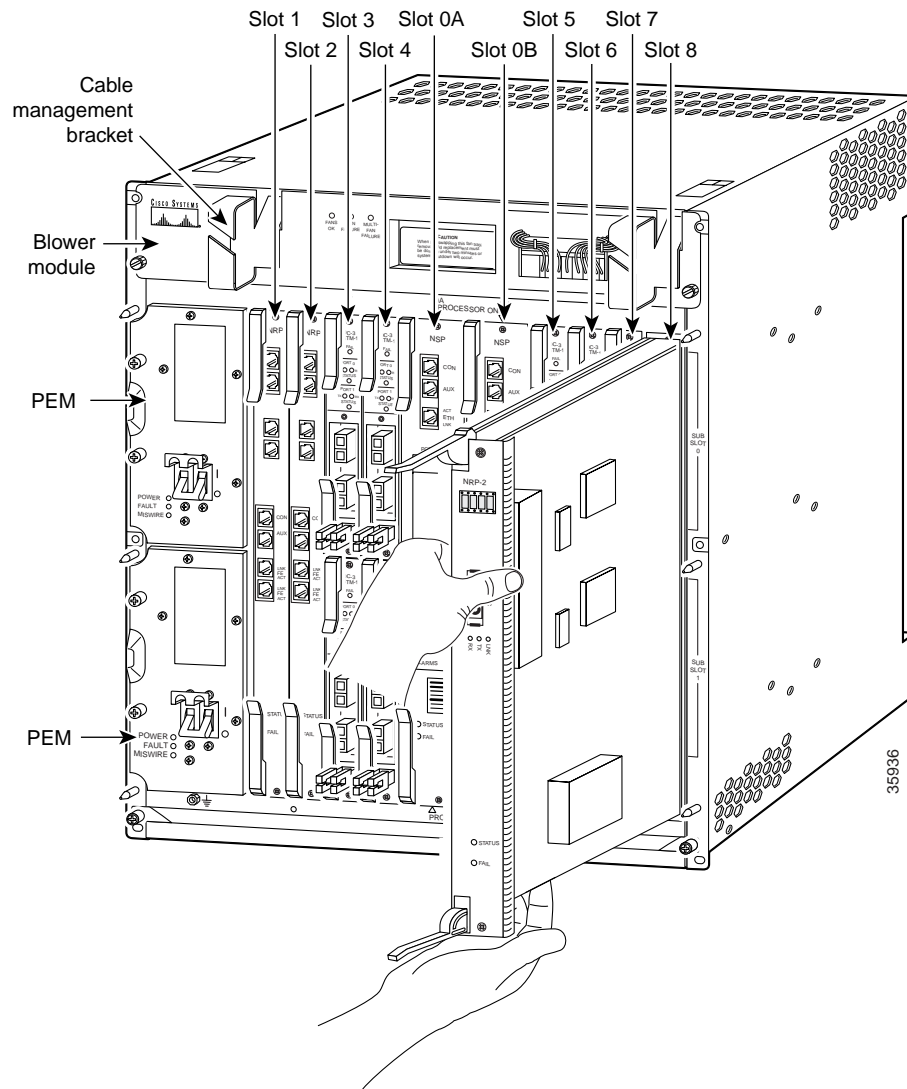
The following warnings apply to the NRP-2SV module.

⚠️

Warning   **Class 1 laser product. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

⚠️

Warning   **Because invisible radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

⚠️

Warning   **Invisible laser radiation present. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Cisco 6400 Installation and Replacement of Field-Replaceable Units ■

Warning Statement for Sweden

⚠

Varning! **Osynlig laserstrålning när denna del är öppen och förregleringen är urkopplad. Rikta inte blicken in mot strålen.**

Warning Statement for Finland

⚠

Varoitus **Alleviates ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Äjä katso säteeseen.**

⚠

Caution To ensure that the NRP-2SV module connects properly with all backplane connector pins, the card length and card slots have been designed with very close tolerances. To slide the module into the slot requires gentle pressure with each hand at the top and bottom of the faceplate.

Step 4 Gently slide the NRP module into the slot until it makes contact with the backplane.

Step 5 Press the upper lever down and the lower lever up at the same time.

Step 6 Secure the carrier by tightening the upper and lower retaining screws.

Step 7 Connect the cables.

Step 8 For an NRP-1 module, follow the first step; for an NRP-2SV module, go to the second step:

– For an NRP-1 module, pull the cables across the wire restraint and bend the restraint upward to trap the cables (Figure 15). Route the cables through the cable management bracket, creating a 20-inch (or larger) service loop (Figure 16).

✎

Note A minimum 20-inch loop is critical to hot swapping the blower.

– For an NRP-2SV module, direct the cable down (Figure 17).

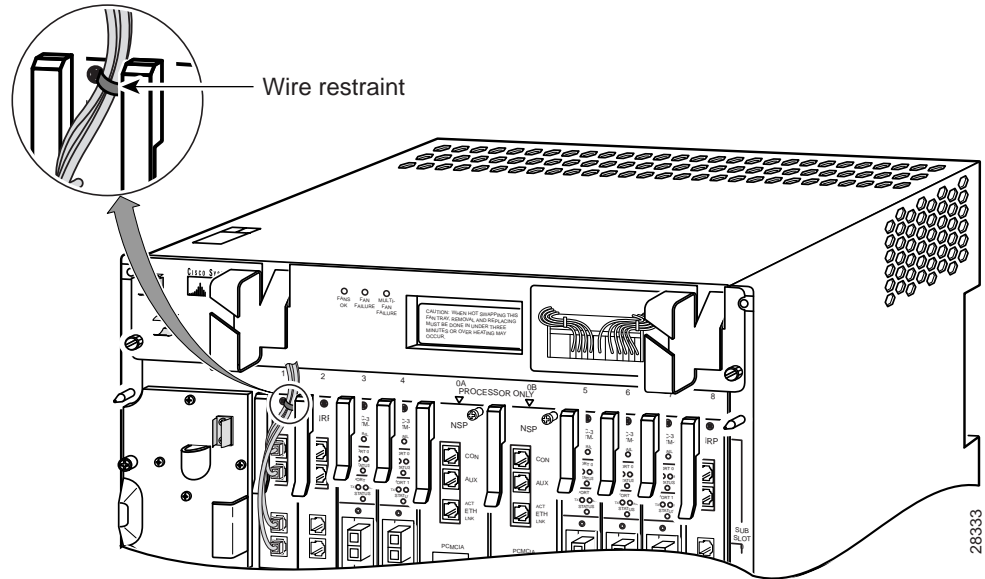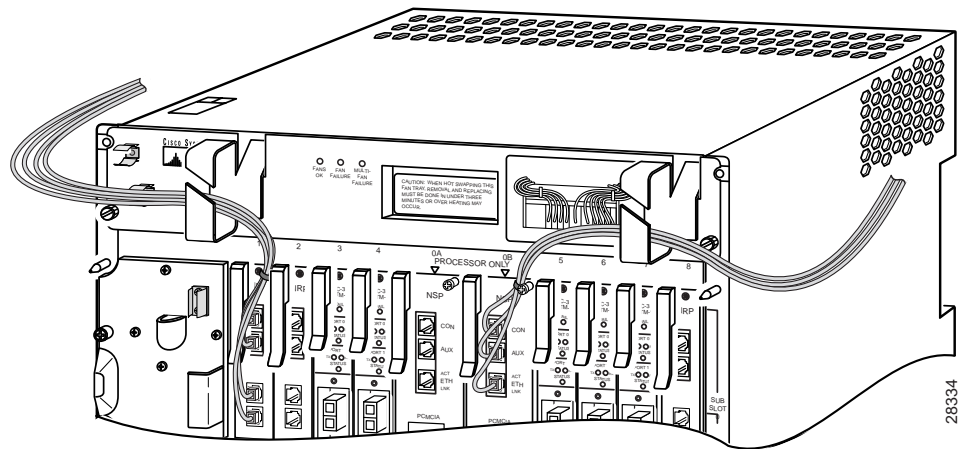*Figure 15   Pulling Wires Across the Wire Restraint on the NRP-1 Module*

Wire restraint

28333

Figure 16   Routing the NRP-1 Cables Through the Cable Management Bracket

28334

Figure 17   NRP-2SV Fiber-Optic Cable Management

Step 9   Install blank filler panels to cover any unused slots. Use two retaining screws to secure each filler panel.

Replacing an NRP-1 Module SIMM

This section describes how to remove and replace an NRP-1 SIMM module.

General SIMM Information

SIMMs are sensitive components that are susceptible to ESD damage. Handle SIMMs by the edges only; avoid touching the memory modules, pins, or traces (the metal "fingers" along the connector edge of the SIMM).

Figure 18 shows the locations of the DRAM and Flash SIMMs on the NRP-1 module. The procedures for removing, installing, and verifying the DRAM and Flash SIMMs are identical.

⚠️

Caution   To upgrade DRAM, you must install identical SIMMs in both DRAM SIMM connectors.

NRP-1 Memory Description

The default DRAM configuration is 64 MB, contained in two 32-MB SIMMs. The DRAM can be increased to 128 MB by replacing them with two 64-MB SIMMs. The amount of DRAM required on the NRP-1 module is determined by the number of routed and bridged sessions the NRP-1 is configured to handle.

The default Flash configuration is 8 MB, but you can upgrade to a 16-MB Flash SIMM. The amount of Flash memory required on the NRP-1 module is determined by the number and sizes of images and configuration files stored in Flash memory.

To upgrade either DRAM or Flash memory on the NRP-1 module, you must purchase an upgrade kit from Cisco Systems and replace the current SIMMs.

Note You must use SIMMs obtained from Cisco Systems.

Removing an NRP-1 Module SIMM

To remove the SIMM from the Cisco 6400 chassis:

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

Step 2 Disconnect the signal and control cables from the NRP.

Step 3 Loosen the captive installation screws on the NRP module and remove the module from the chassis.

Step 4 Place the NRP module on an antistatic mat or pad. Position the NRP module so that the faceplate is away from you, and the edge connector is toward you.

Step 5 Locate the SIMMs on the NRP module(Figure 18).

Step 6 Release the spring clips from the SIMM that you wish to remove and lift the SIMM from the socket (Figure 19).

Step 7 When both ends of the SIMM are released from the socket, use your thumb and forefinger to grasp the ends of the SIMM and pull the SIMM completely out of the socket. Handle the edges of the SIMM only; avoid touching the memory module, pins, or metal traces (fingers) along the socket edge.

Step 8 Place the SIMM in an antistatic bag to protect it from ESD damage.

Figure 18   NRP-1 Module SIMMs

Flash SIMM

DRAM SIMMS

29441

Figure 19   Removing the NRP-1 Module SIMM

1. Push locking spring clips away from SIMM.

2. Swing top edge of SIMM up.

3. Lift SIMM out of socket.

14490

Installing the NRP-1 Module SIMM

To replace the SIMM:

Step 1 Keep the NRP in the same orientation as in the previous procedure (with the handle facing away and the edge connector toward you).

Step 2 Remove a new SIMM from the antistatic bag.

⚠️
Caution Handle SIMMs by the card edges only. SIMMs are sensitive components that can short out if mishandled.

Step 3 Hold the SIMM component side up with the connector edge (the metal fingers) closest to you.

Step 4 Hold the sides of the SIMM between your thumb and middle finger, with your forefinger against the far edge, opposite the connector edge.

Step 5 Tilt the SIMM to approximately the same angle as the socket, and insert the entire connector edge into the socket. If you are installing the DRAM SIMMs, insert the first DRAM SIMM in the socket farther from you.

⚠️
Caution When inserting SIMMs, use firm but not excessive pressure. If you damage a socket, you must return the NRP to the factory for repair.

Step 6 Gently push the SIMM into the socket until the spring clips snap over the ends of the SIMM. If necessary, rock the SIMM gently back and forth to seat it properly.

Step 7 Repeat steps 2 through 6 for each remaining new SIMM.

Step 8 For each SIMM you installed, check both alignment holes and ensure that each spring retainer is visible. If it is not, the SIMM is not seated properly. If a SIMM appears misaligned, carefully remove it and reseat it in the socket. Push the SIMM firmly back into the socket until the retainer springs snap into place.

Verifying SIMM Operation

If the system fails to boot properly, or if the console terminal displays a checksum or memory error, check the following:

• Ensure that all SIMMs are installed correctly. Check the SIMMs by looking straight down on them and then observe them at eye level. The SIMMs should both be aligned at the same angle and should be at the same height. If a SIMM appears to stick out or rests in the socket at an angle different from the others, remove the SIMM and reinsert it. Reinstall the NRP module and reboot the system for another installation check.

• Ensure that the DRAM SIMMs are the same size and speed.

If the system fails to restart properly after several attempts, contact a service representative for assistance. Before you contact Cisco Systems, make note of any error messages, unusual LED states, or any other indications that might help identify the problem.

Replacing an NRP-2SV Dual Inline Memory Module

This section describes how to remove and replace an NRP-2SV dual inline memory module (DIMM). There are two DRAMs on the NRP-2SV module: The control path DIMM and the forwarding path DIMM.

General DIMM Information

DIMMs are sensitive components that are susceptible to ESD damage. Handle DIMMs by the edges only; avoid touching the memory modules, pins, or traces (the metal "fingers" along the connector edge of the DIMM).

Figure 20 shows the location of the DIMMs on the NRP-2SV module.

Figure 20   NRP-2SV Module DIMM
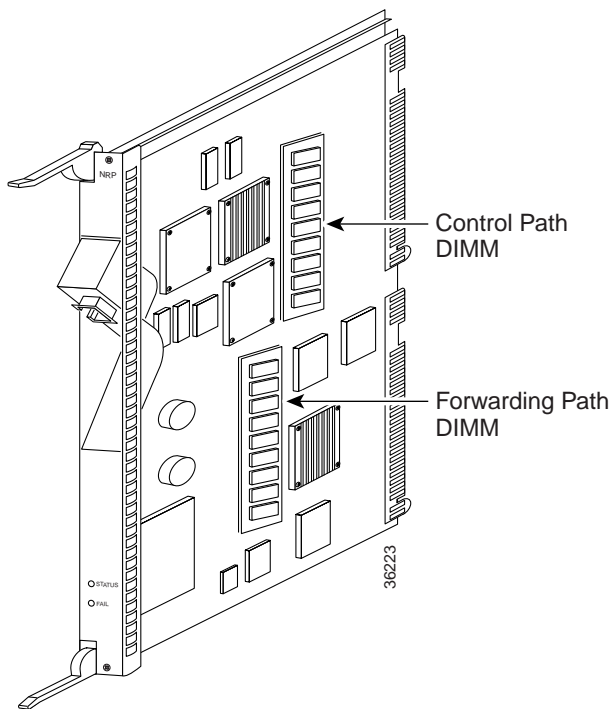
Each of these DIMMs is 512 MB. (Older cards may have 256 MB DIMMS. An upgrade kit is available from Cisco Systems, Inc.) The amount of DRAM required on the NRP-2 module is determined by the number of routed and bridged sessions the NRP-2 is configured to handle.

There is no Flash memory on the NRP-2SV module.

Note   You must use DIMMs obtained from Cisco Systems.

Removing an NRP-2SV Module DIMM

To remove a DIMM:

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

Step 2 Disconnect the cables from the NRP-2SV.

Step 3 Loosen the captive installation screws on the NRP-2SV module and remove it from the chassis.

Step 4 Place the NRP-2SV on an antistatic mat or pad. Position the NRP-2SV module so that the faceplate is away from you and the edge connector is toward you.

Step 5 Locate the DIMMs on the NRP-2SV module (Figure 20).

> ✎
>
> **Note** Be sure to note the orientation of the DIMM in the socket. The card is notched so that it can be inserted only one way to align the notches on the DIMM with the socket. When you insert the new NRP-2SV, align the new DIMM the same as the old DIMM to avoid damaging the unit and to ensure proper operation.

Step 6 Pull the levers on the socket to the "outside" to release the DIMM, and then lift the DIMM from the socket.

Step 7 When both ends of the DIMM are released from the socket, use your thumb and forefinger to grasp the ends of the DIMM and pull the DIMM completely out of the socket. Handle the edges of the DIMM only; avoid touching the memory module, pins, or metal traces (fingers) along the socket edge.

Step 8 Place the DIMM in an antistatic bag to protect it from ESD damage.

Installing the NRP-2SV Module DIMM

To replace the DIMM:

Step 1 Keep the NRP-2SV in the same orientation as in the previous procedure (with the handle facing away and the edge connector toward you).

Step 2 Remove a new DIMM from the antistatic bag.

> ⚠
>
> **Caution** Handle DIMMs by the card edges only. DIMMs are sensitive components that can be shorted by mishandling. When inserting DIMMs, use firm but not excessive pressure. If you damage a socket, you must return the NRP-2SV to the factory for repair.

Step 3 Align the new DIMM to the same orientation the old DIMM was in when you removed it from the socket.

Step 4 Hold the sides of the DIMM between your thumb and middle finger, with your forefinger against the far edge, opposite the connector edge.

Step 5 Align the two notches on the DIMM with the socket and insert the connector edge into the socket.

Step 6 Gently push the DIMM into the socket until the notches on the DIMM align with the levers on the socket. The DIMM will "click" into place. The DIMM is "self-locking" when properly seated.

Verifying DIMM Operation

If the system fails to boot properly, or if the console terminal displays a checksum or memory error, ensure that the DIMM is installed correctly. Check by looking straight down on the DIMM and then observe it at eye level. Reinstall the NRP-2SV module and reboot the system for another installation check.

If the system fails to restart properly after several attempts, contact a service representative for assistance. Before you contact Cisco Systems, make note of any error messages, unusual LED states, or any other indications that might help identify the problem.

Installing or Replacing a Half-Height Node Line Card

The Cisco 6400 supports three half-height node line card (NLC) modules:

- OC-3/STM-1 SM NLC (see Figure 21)
- OC-3/STM-1 MM NLC (see Figure 22)
- DS3 45-Mbps bidirectional NLC (see Figure 23)

To install a half-height NLC module in the Cisco 6400 chassis, you must do the following:

a. Install a full-height carrier module in the chassis.

b. Mount the NLC module on a full-height carrier module.

The carrier module can accommodate two half-height NLCs.

Because the NLCs support different media and interface types, configuration commands used with the cards can vary according to type. For complete NLC configuration information, refer to these documents:

- *Cisco 6400 Software Setup Guide*
- *Cisco 6400 Command Reference*
- *Release Notes for Cisco 6400* (available on CCO)

Figure 21   OC-3/STM-1 SM NLC Faceplate
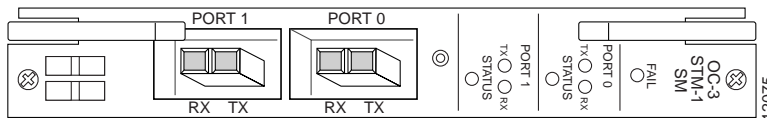
Figure 22   OC-3/STM-1 MM NLC Faceplate

⚠ **Warning**   **Class 1 laser product. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

⚠

Warning **Because invisible radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

⚠

Warning **Invisible laser radiation present. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning Statement for Sweden

⚠

Varning! **Osynlig laserstrålning när denna del är öppen och förregleringen är urkopplad. Rikta inte blicken in mot strålen.**

Warning Statement for Finland

⚠

Varoitus **Alleviates ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Äjä katso säteeseen.**

Figure 23   DS3 NLC Faceplate

Installing a Full-Height NLC Carrier in the Chassis

The full-height carrier module is used to accommodate one or two half-height NLCs. To install a carrier into the Cisco 6400 chassis:

Step 1 Attach an ESD-preventive wrist strap.

Step 2 Remove the filler panel, if one is present.

Step 3 While holding the carrier module vertically, align the upper and lower edges with the slot and gently slide the carrier module into the slot until it makes contact with the backplane (Figure 24).

Step 4 Tighten the upper and lower retaining screws to secure the carrier module.

Figure 24   Installing a Full-Height Carrier Module for Half-Height NLCs
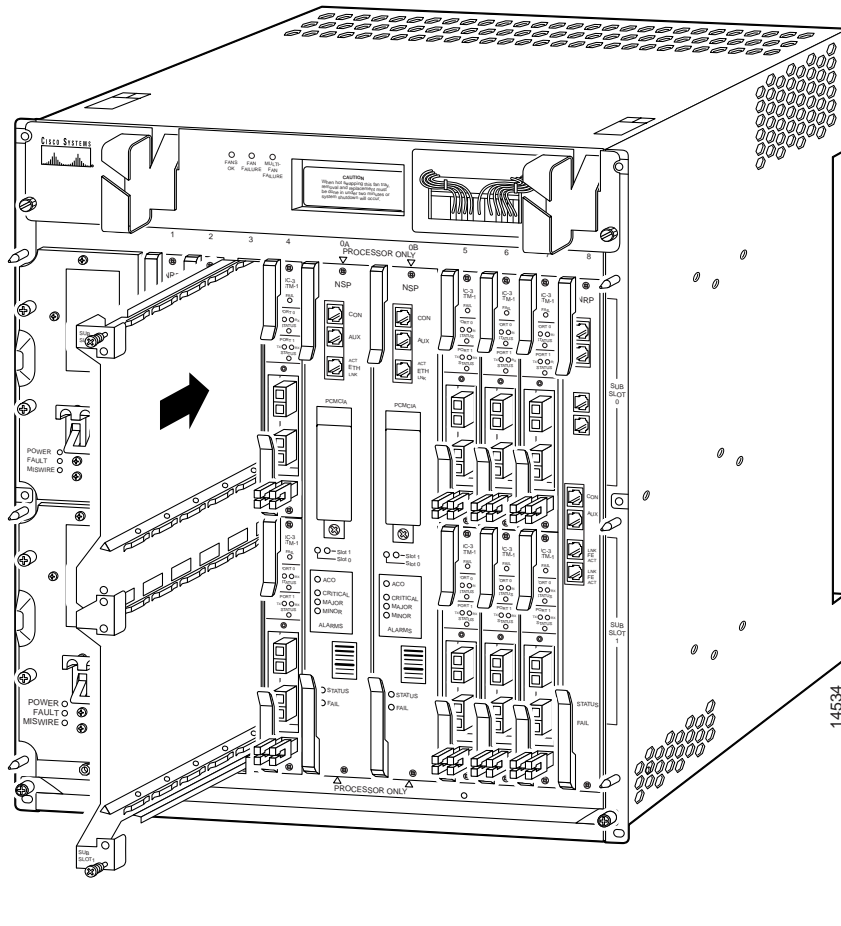
Installing a Half-Height Node Line Card

To install a half-height NLC in the Cisco 6400 chassis:

Step 1 Install a full-height NLC carrier in the Cisco 6400 chassis as described in the "Installing a Full-Height NLC Carrier in the Chassis" section on page 31.

Step 2 Hold the NLC vertically, with the module faceplate toward you and backplane connectors away from you. Ensure that the card is right side up by noting the lettering of the faceplate.

Step 3 Carefully align the upper and lower edges of the NLC with the upper and lower guides in the full-height carrier (Figure 25).

Figure 25   Installing a Half-Height NLC

Port Ø
Tx and Rx →

Port 1 →
Tx and Rx
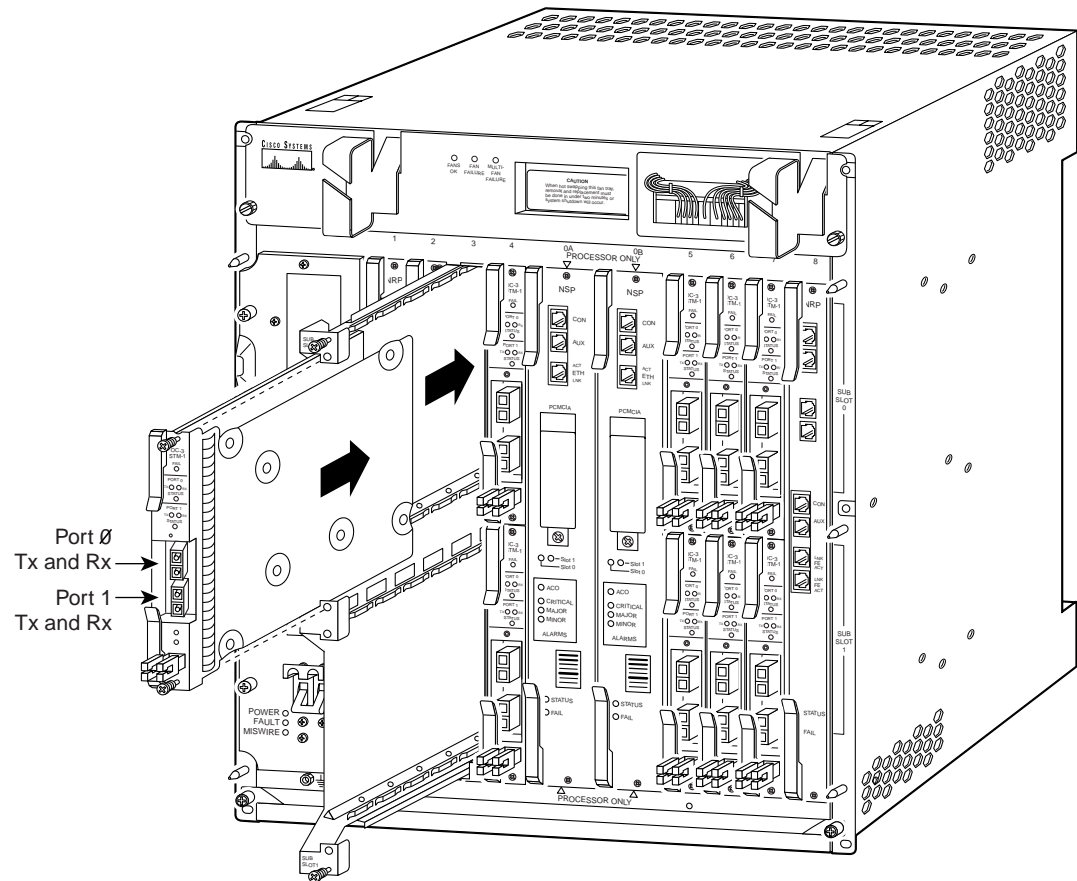
⚠
Caution   To ensure that the card mates properly with all backplane connector pins, the card length and card slots have been designed with very close tolerances. To slide the card into the slot requires gentle pressure with each hand, at the top and bottom of the faceplate.

Step 4   Gently slide the NLC into the carrier module until it makes contact with the backplane.

Step 5   Press the upper lever down and the lower lever up at the same time. (This action electrically connects the card to the backplane.)

Step 6   Secure the carrier module by tightening the upper and lower retaining screws.

Step 7   Install blank filler panels to cover any unused slots. Like cards, each filler panel is held in place by two retaining screws.

Connecting Cables to the Half-Height NLC

After you install the half-height NLC, you must connect the cables as described in this section.

OC-3/STM-1 NLC

Cable connections are the same for the OC-3/STM-1 SM NLC and OC-3/STM-1 MM NLC. However:

• The OC-3/STM-1 SM NLC has two ports for *single-mode intermediate reach* fiber connection on the front of each NLC.

• The OC-3/STM-1 MM NLC has two ports for *multimode* fiber connection on the front of each NLC.

Each port provides an interface to the ATM switching fabric for transmitting and receiving data at rates up to 155 Mbps bidirectionally. Install the fiber-optic cables as shown in Figure 26.

Figure 26   Connecting Cables to an OC-3/STM-1 NLC
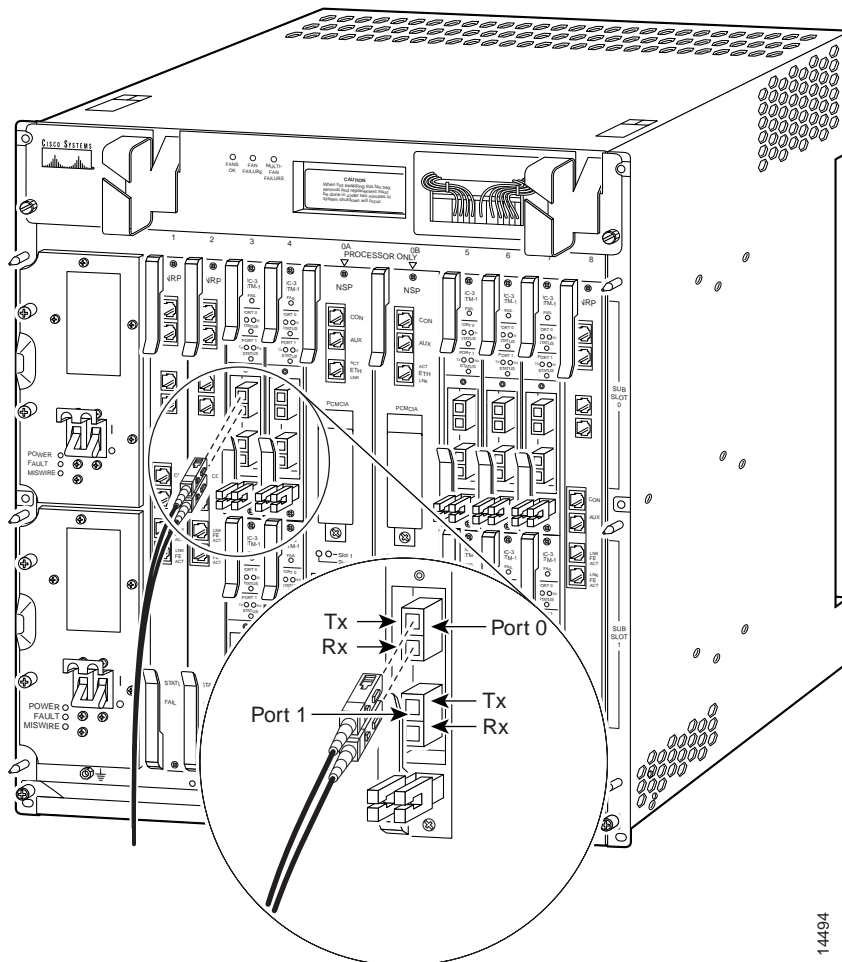
Figure 27 shows suggested cable management for the OC-3/STM-1 SM (single mode) and OC-3/STM-1 MM (multimode) fiber-optic cable.

Figure 27   *OC-3 Fiber-Optic Cable Management*
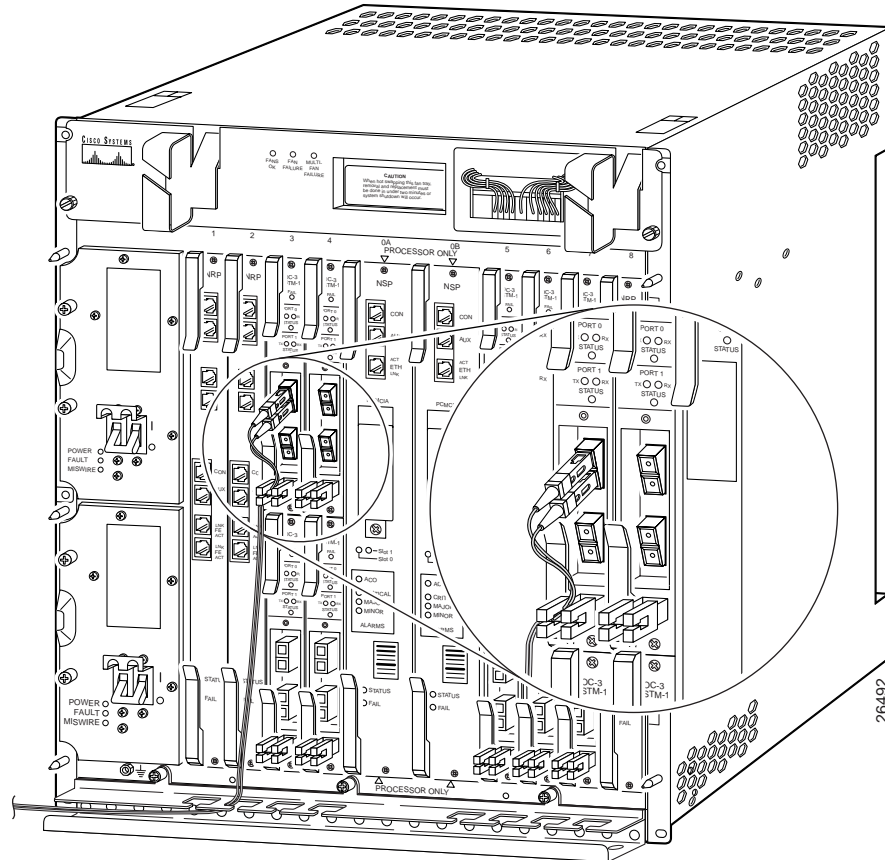
DS3 Node Line Card

The cable connections for the DS3 NLC are different from those for the OC-3 NLCs. The DS3 NLC has two ports that connect to the ATM switching fabric using 75-ohm single or bundled coaxial cables with bayonet-style twist-lock (BNC) connectors attached to the back of the chassis for each DS3 port (Figure 28).

⚠️
Warning **The DS3 ports are not intended to be connected to cables that run outside the building where it is installed. For any connections outside the building, the DS3 ports must be connected to a network termination unit (NTU). NTU devices should comply with appropriate national safety standards such as UL 1950, CSA 950, EN 60950, IEC 950, and AS 3260. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Figure 28   Connecting Cables to a DS3 Node Line Card
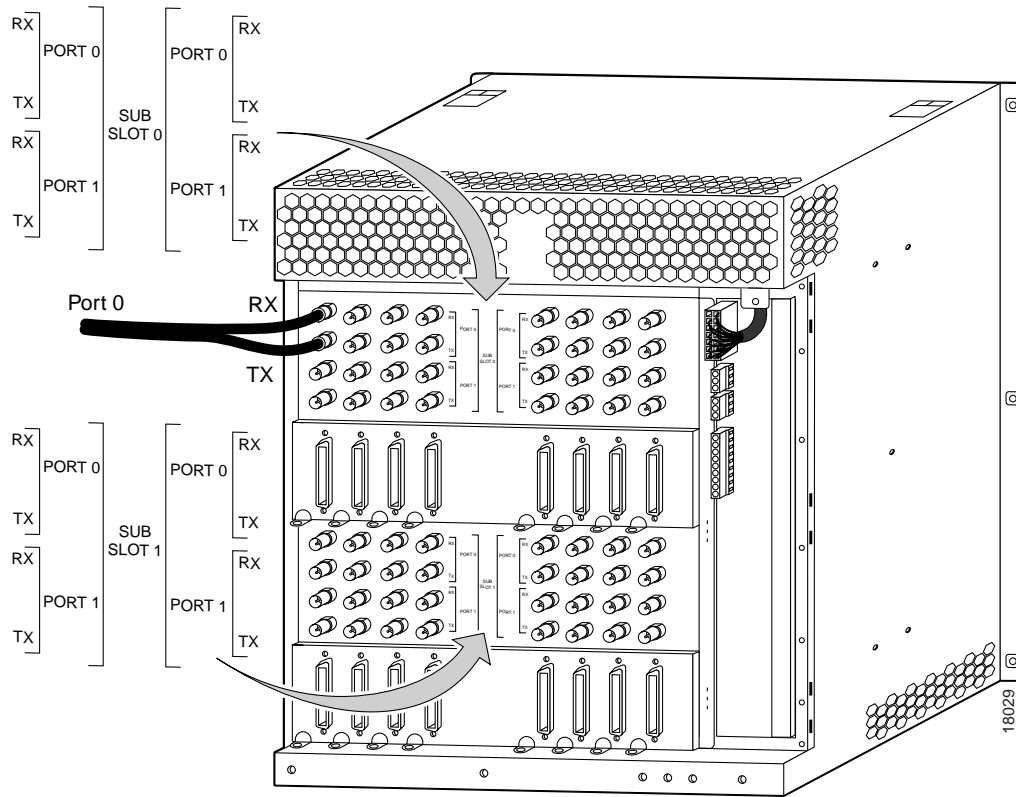
Removing a Half-Height NLC

To remove a half-height NLC from the Cisco 6400 chassis:

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

Step 2   Remove any connections to the modules. Be sure to cover any fiber-optic connections to prevent contamination from moisture or dirt.

Step 3   Loosen the two (top and bottom) cross-slotted screws securing the NLC metal carrier to the full-height carrier.

Step 4   Grasp the two lever handles on the NLC, and gently pull the handles away from the carrier unit to loosen the unit.

Step 5   Carefully slide the NLC out of the full-height carrier. Avoid damaging the connectors on the rear of the plug-in unit.

Step 6   Place the NLC on an antistatic surface.

Installing or Replacing a Full-Height Node Line Card

The Cisco 6400 supports one full-height NLC module: OC-12/STM-4 NLC (Figure 29). The full-height NLC is premounted on its carrier.

Figure 29   OC-12 NLC Faceplate

Warning   **Class 1 laser product. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning   **Because invisible radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning   **Invisible laser radiation present. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.Class 1 laser product. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning   **Because invisible radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning   **Invisible laser radiation present. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning Statement for Sweden

⚠

Varning!   **Osynlig laserstrålning när denna del är öppen och förregleringen är urkopplad. Rikta inte blicken in mot strålen.**

Warning Statement for Finland

⚠

Varoitus   **Alleviates ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Äjä katso säteeseen.**

Installing a Full-Height NLC

To install a full-height NLC in the Cisco 6400 chassis:

Step 1   Remove the blank filler panel from the selected slot, if a blank panel is present.

Step 2   Hold the NLC module vertically, with the NLC faceplate toward you and the backplane connectors away from you. Ensure that the module is right side up by noting the lettering on the faceplate.

Step 3   Carefully align the upper and lower edges of the NLC carrier with the upper and lower guides in the chassis. Refer to Figure 30 for an example of inserting a module in the chassis.

Figure 30   Installing a Full-Height NLC

⚠
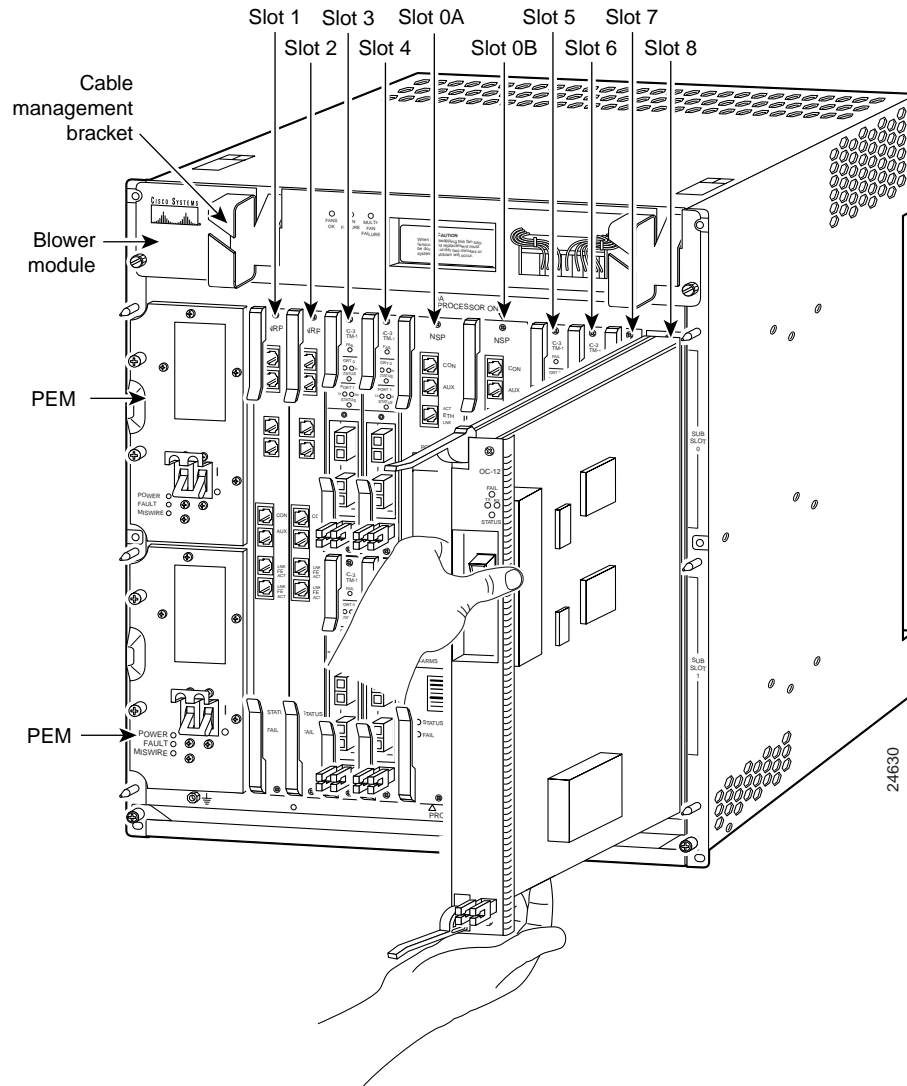
Caution   To ensure that the NLC module mates properly with all backplane connector pins, the module length and module slots have been designed with very close tolerances. To slide the module into the slot requires gentle pressure with each hand, at the top and bottom of the faceplate.

Step 4   Gently slide the NLC module into the slot until it makes contact with the backplane.

Step 5   Press the upper lever down and the lower lever up at the same time.

Step 6   Secure the carrier by tightening the upper and lower retaining screws.

Step 7   Connect the cables.

Step 8   Install blank filler panels to cover any unused slots. Use two retaining screws to secure each filler panel.

Connecting Cables to the Full-Height NLC

The OC-12/STM-4 NLC has one port for single-mode intermediate reach fiber connection on the front of each NLC. This port provides an interface to the ATM switching fabric for transmitting and receiving data at rates up to 622 Mbps bidirectionally. Install the fiber-optic cables (Figure 31).

Figure 31   Connecting Cables to an OC-12 Node Line Card
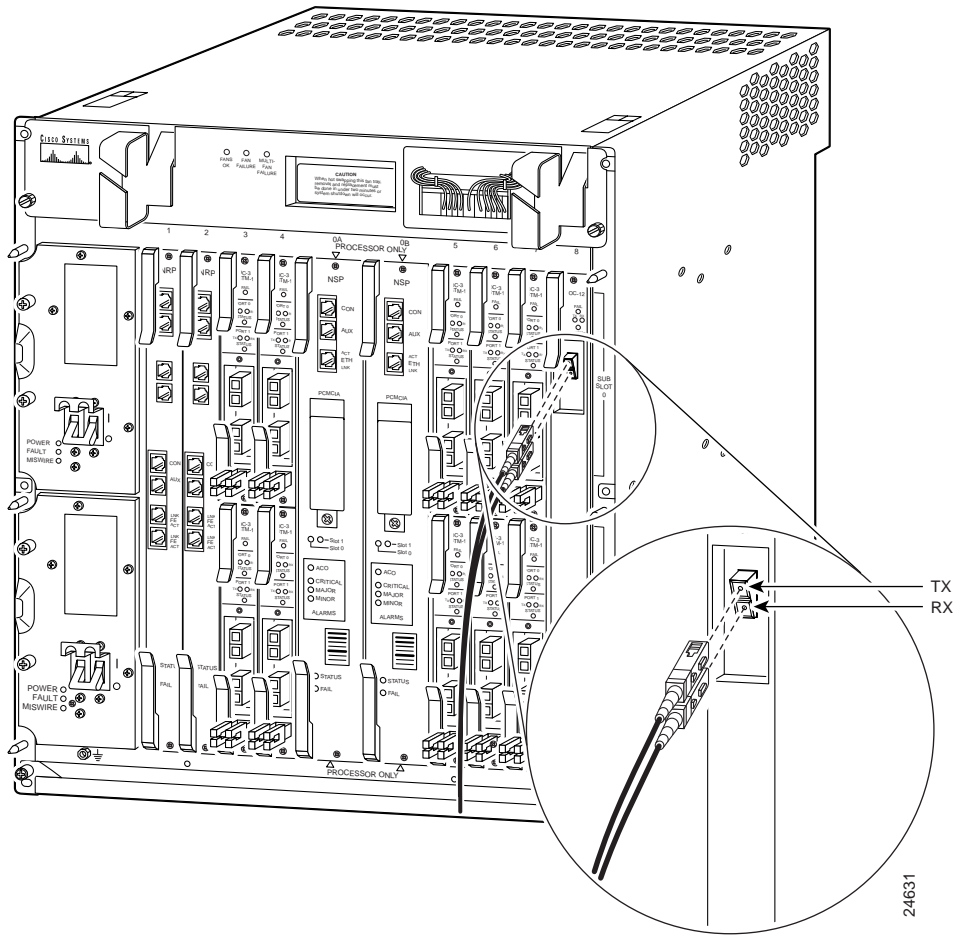
Figure 32 shows suggested cable management for the OC-12/STM-4 fiber-optic cable.

Figure 32   OC-12 Fiber-Optic Cable Management
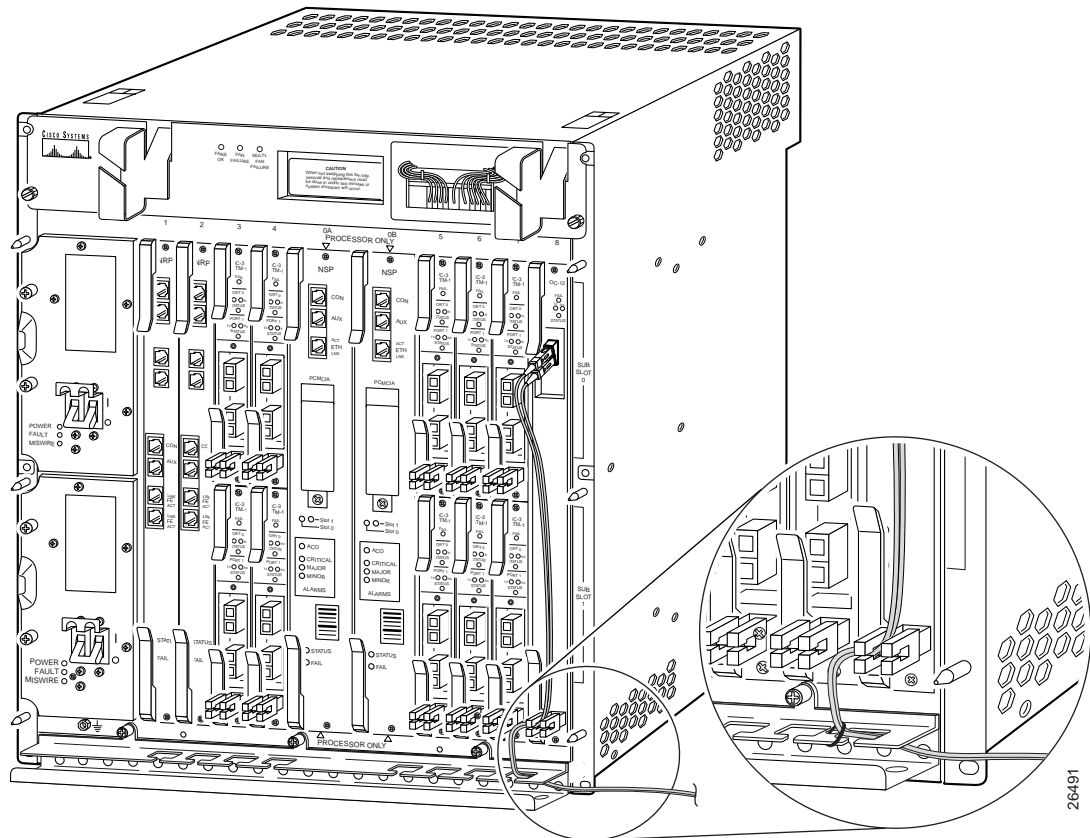
Removing a Full-Height Node Line Card

To remove a full-height NLC from the Cisco 6400 chassis:

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

Step 2   Disconnect any cables connected to the NLC module that you are about to remove.

Step 3   Unfasten the upper and lower retaining screws.

Step 4   Grasp the upper and lower extraction levers. Pull up on the upper lever while pushing down on the lower lever. This action disengages the NLC carrier from the connectors on the backplane.

Step 5   Slide the module out of the slot.

Step 6   Place the NLC module on an antistatic surface. If the module will be out of the chassis for several minutes or longer, put it in a static-shielding bag or in a box lined with antistatic material.

Step 7   Insert another NLC module or a blank faceplate in the empty slot.

Replacing a DC Power Entry Module

This section describes procedures for removing and installing a DC power entry module (PEM) plug-in unit in the Cisco 6400 chassis (Figure 33).

Figure 33   DC Power Entry Module
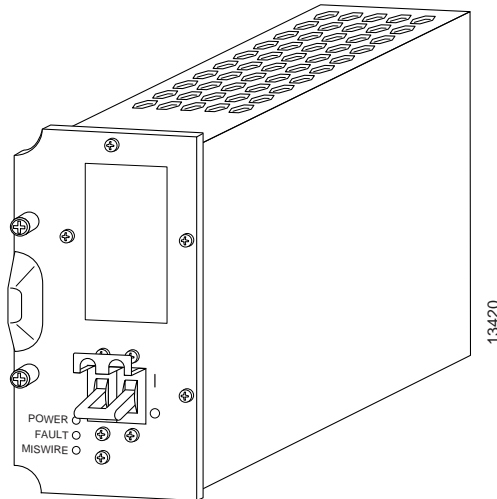
There are two PEM power bays in the system for redundancy. The PEM power bays are located at the front left side of the chassis:

- The top bay is wired to power circuit A
- The bottom bay is wired to power circuit B

Note   The circuits are identified at the power terminals on the backplane.

The PEMs meet critical safety, isolation, and EMC requirements associated with the connection of the CO DC-input power distribution system.

Warning   **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals. Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Removing a DC Power Entry Module

If you remove a redundant DC PEM, the chassis continues to operate normally. If you plan to remove the only operating PEM from a chassis, you must first power down the Cisco 6400 system. Refer to the procedure in the "Powering Down the System" section on page 10.

To remove a PEM from the Cisco 6400 chassis:

Step 1 Ensure that the circuit breaker on the DC PEM you are removing is turned Off.

Step 2 Unscrew the retaining screws on the DC PEM faceplate.

Step 3 Grasp the DC PEM by the handle on the faceplate and pull it out of the chassis.

⚠

Caution Always install a filler panel over an empty PEM power bay to protect the connectors from contamination and ensure proper air flow.

Installing a DC Power Entry Module

Figure 34 shows a DC PEM unit being installed in the Cisco 6400 chassis. You can insert a PEM unit into the Cisco 6400 without powering down the system.

Figure 34   Installing a DC Power Entry Module
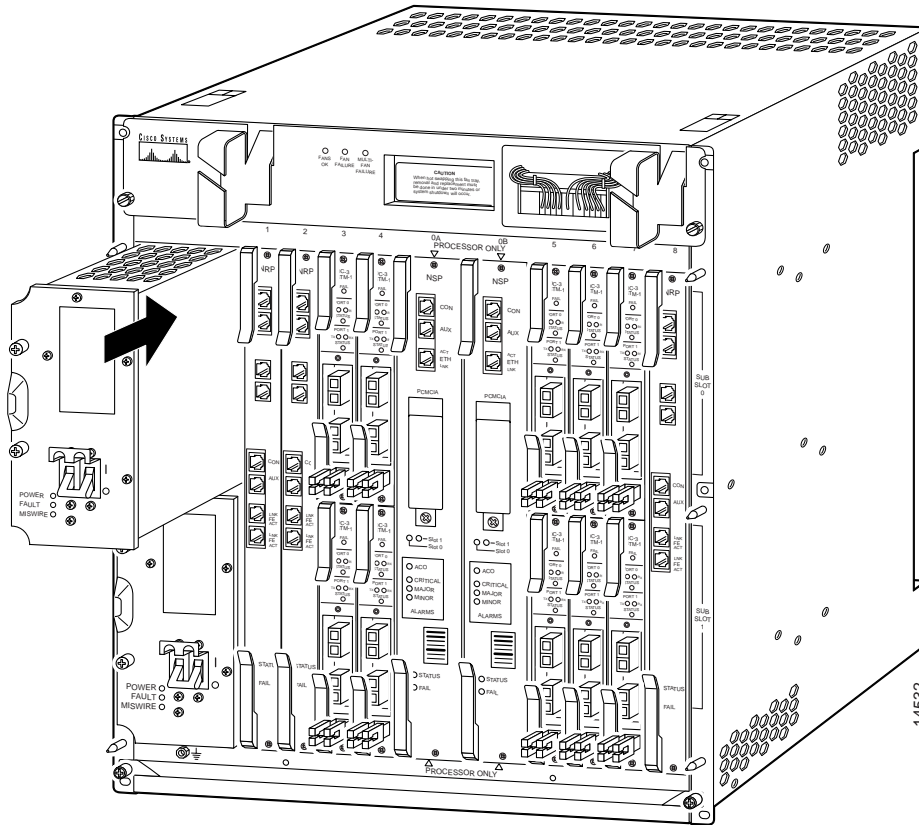
To install a DC PEM in the Cisco 6400 chassis:

Step 1 Ensure that the circuit breaker on the DC PEM is turned to Off.

Step 2 Align the PEM and insert it into the power bay.

Step 3 Firmly push the PEM all the way into the power bay to ensure that the power connectors mate.

Step 4 Tighten the captive screws on the faceplate of the PEM to secure the PEM to the chassis.

Step 5 If the chassis is connected to power, turn the circuit breaker on the DC PEM to On. The green POWER LED on the faceplate turns on to indicate that the DC PEM is providing power to the chassis. The yellow FAULT LED goes out.

✎

Note If the miswire LED is on, reverse the connections on the DC PEM.

Replacing an AC Power Entry Module
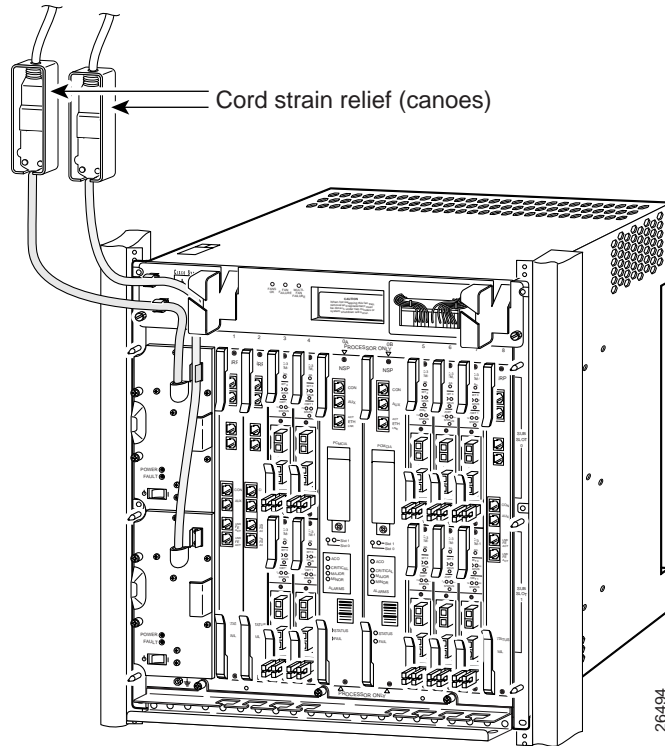
This section describes procedures for removing and installing an AC power entry module (PEM) plug-in unit in the Cisco 6400 chassis (Figure 35).

Figure 35   AC Power Entry Module
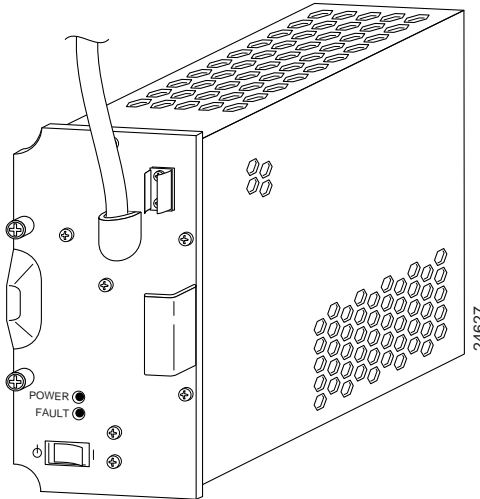
There are two PEM power bays in the system for redundancy. The PEM power bays are located at the front left side of the chassis:

- The top bay is wired to power circuit A
- The bottom bay is wired to power circuit B

Note   The circuits are identified at the power terminals on the backplane.

Warning   **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.Translations of this warning can be found in the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Removing an AC Power Entry Module

If you remove a redundant AC PEM, the chassis continues to operate normally. If you plan to remove the only operating PEM from a chassis, you must first power down the Cisco 6400 system. Refer to the procedure in the "Powering Down the System" section on page 10.

To remove a PEM from the Cisco 6400 chassis:

Step 1 Turn OFF the power enable switch on the AC PEM you are removing.

Step 2 Unplug the AC power cable.

Step 3 Unscrew the retaining screws on the AC PEM faceplate.

Step 4 Grasp the AC PEM by the handle on the faceplate and pull it out of the chassis.

⚠
Caution Always install a filler panel over an empty PEM power bay to protect the connectors from contamination and to ensure proper air flow.

Installing an AC PEM

Figure 36 shows an AC PEM unit being installed in the Cisco 6400 chassis. You can insert a PEM unit into the Cisco 6400 without powering down the system.

To install an AC PEM in the Cisco 6400 chassis:

Step 1 Ensure that the power enable switch on the AC PEM is turned to Off.

Step 2 Align the PEM and insert it into the power bay.

Step 3 Firmly push the PEM all the way into the power bay to ensure that the power connectors mate.

Step 4 Tighten the captive screws on the faceplate of the PEM to secure the PEM to the chassis.

Step 5 Plug in the AC power cable.

Step 6 Turn the power enable switch on the AC PEM to ON. The green POWER LED on the faceplate turns on to indicate that the AC PEM is providing power to the chassis. The yellow FAULT LED goes out.

Figure 36   Installing an AC PEM

24629

✎
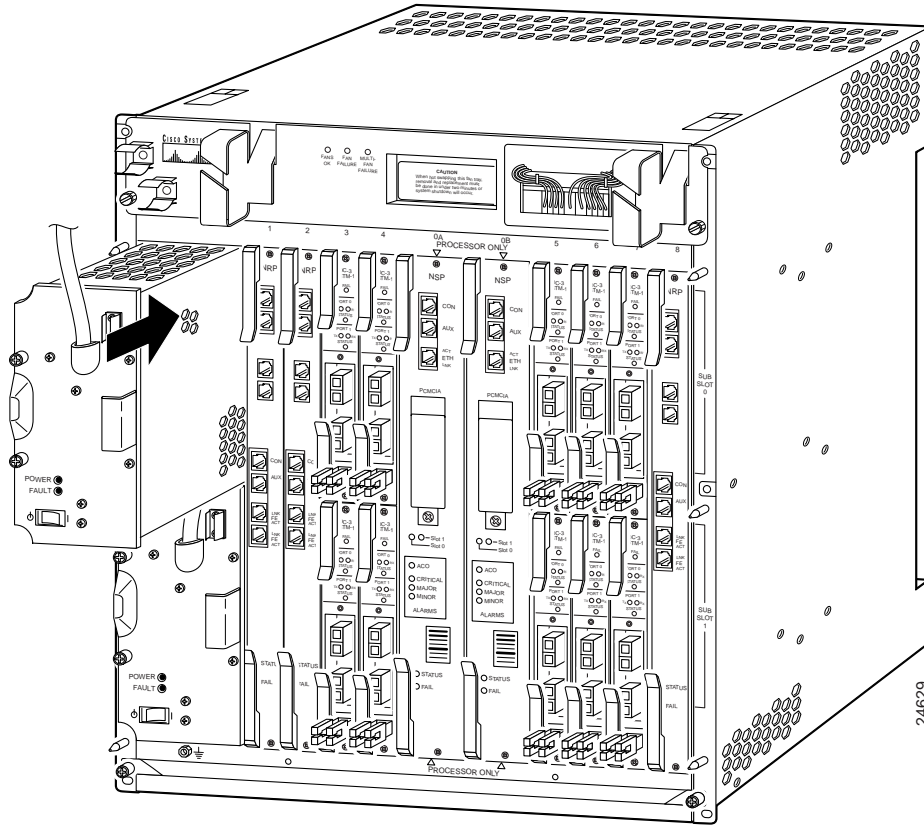
Note   When a single PEM is used, it should be installed in the top slot.

Figure 37 shows suggested power cord connections for the AC PEM.

*Figure 37   AC PEM Power Cord Connections*

Cord strain relief (canoes)

26494

Replacing the Blower Module

This section describes procedures for removing and installing the blower module in the Cisco 6400 chassis. The blower module is located in the top part of the chassis, above the plug-in modules and cards. Figure 38 shows the blower module.

Figure 38   Blower Module

13419
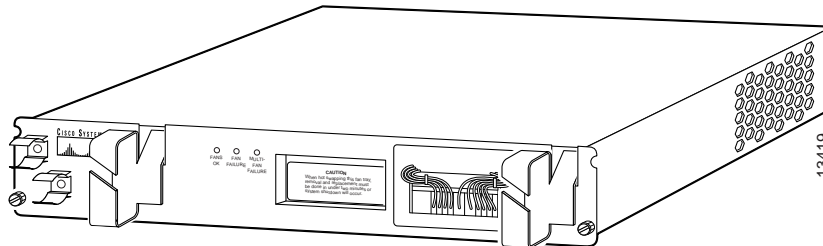
Removing the Blower Module

To remove the blower module from the Cisco 6400 chassis:

Step 1   If you are using AC PEMs, remove the AC power cords from the clips on the blower module.

Step 2   Detach the cable management brackets ([Figure 39](#)).

Figure 39   Detaching a Cable Management Bracket
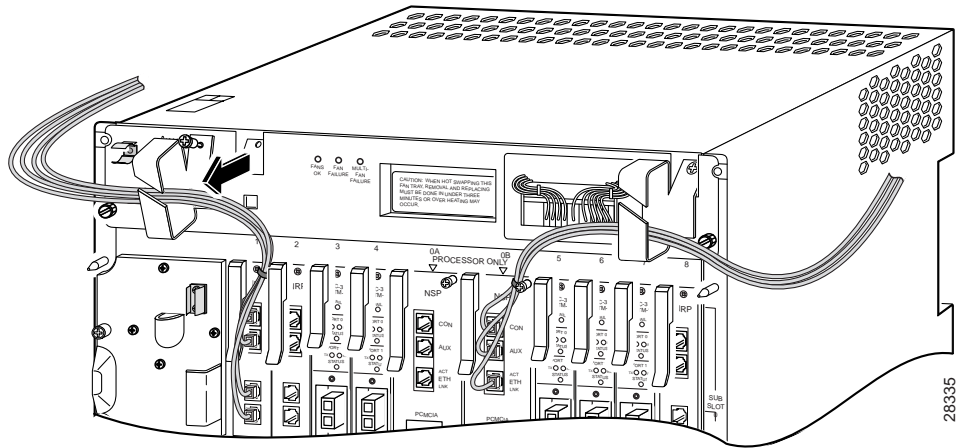
Step 3   Fold the loaded brackets to either side of the Cisco 6400 chassis, leaving the cables attached. The 20-inch service loop will allow you to pull the cables out of the way of the blower ([Figure 40](#)).

Figure 40   Folding Cables and Brackets away from the Blower
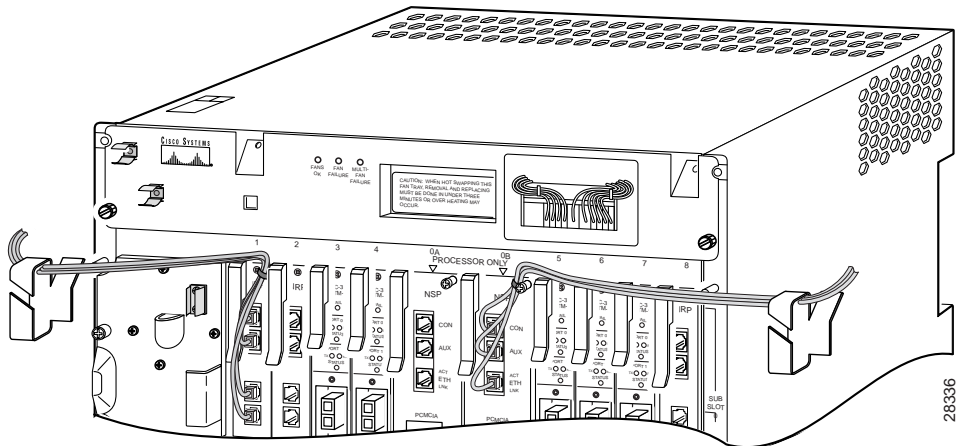
Step 4   Remove the two screws on the front of the blower module. (See [Figure 41](#).)

Step 5   Carefully slide the blower out of the chassis.

Step 6   Place the blower module on a flat work surface.

⚠

Caution If the blower module is removed for longer than two minutes, the Cisco 6400 system automatically shuts down.

Figure 41   Removing the Blower Module
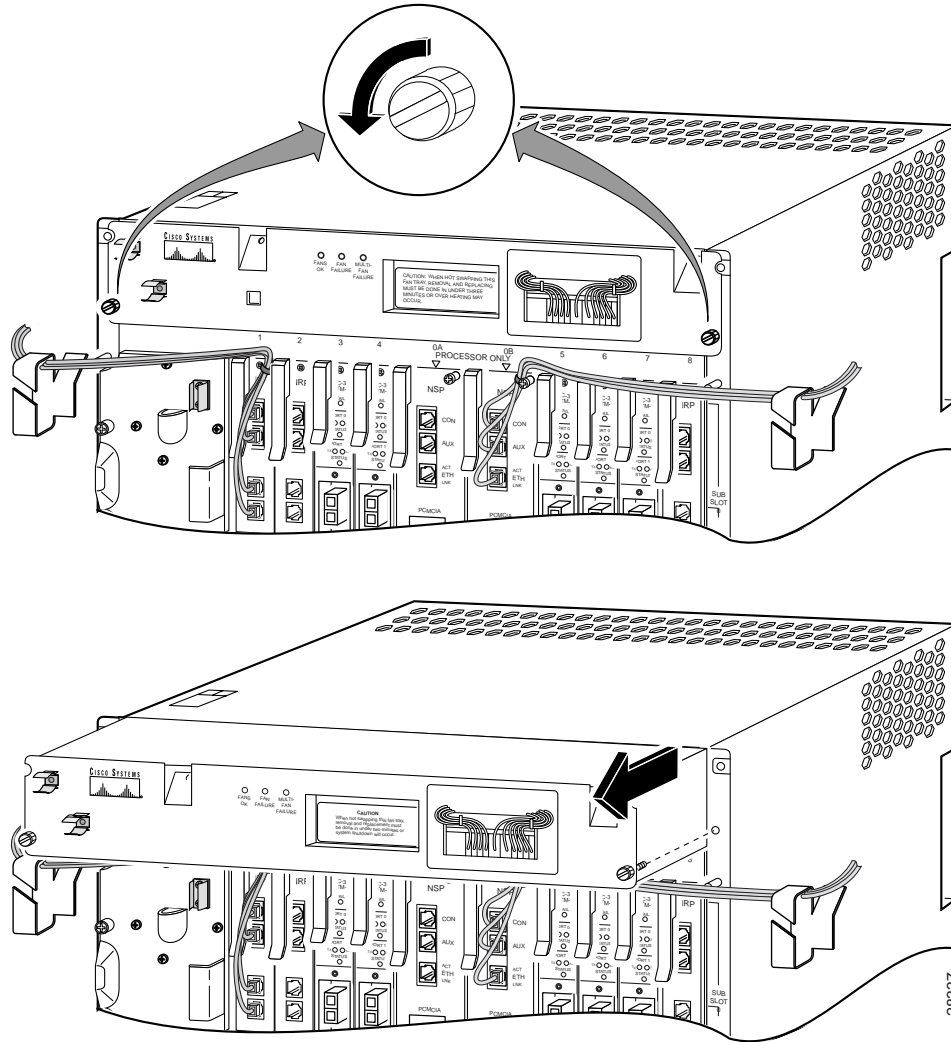
Installing the Blower Module

To replace the blower module:

Step 1 Slide the new blower module in until the rear connector engages (Figure 42).

Figure 42   Installing the Blower Module
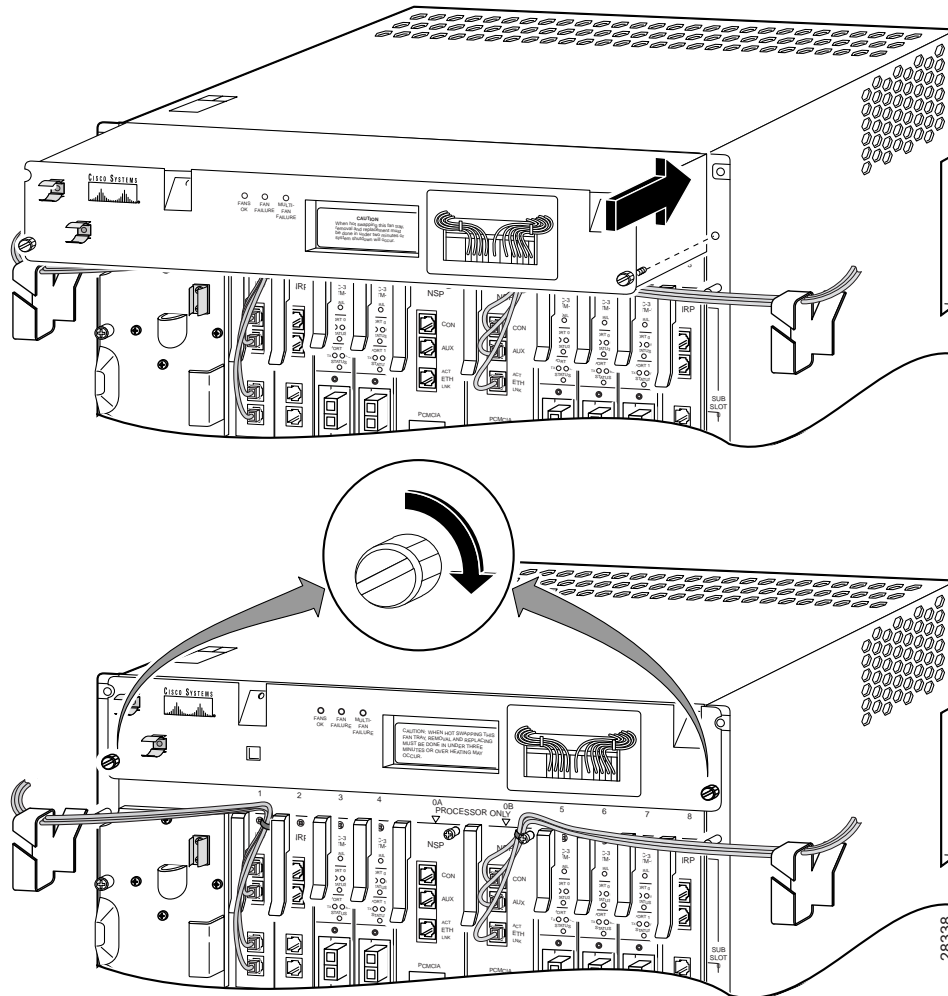
Step 2 Tighten the screws that secure the blower module to the chassis.

Step 3 Reattach the loaded cable brackets, reestablishing the service loops (Figure 43).

Step 4 Check the front panel of the blower module to make sure the FANS OK LED is On and both FAN FAILURE LEDs are Off.

Figure 43   Reattaching the Cable Management Brackets
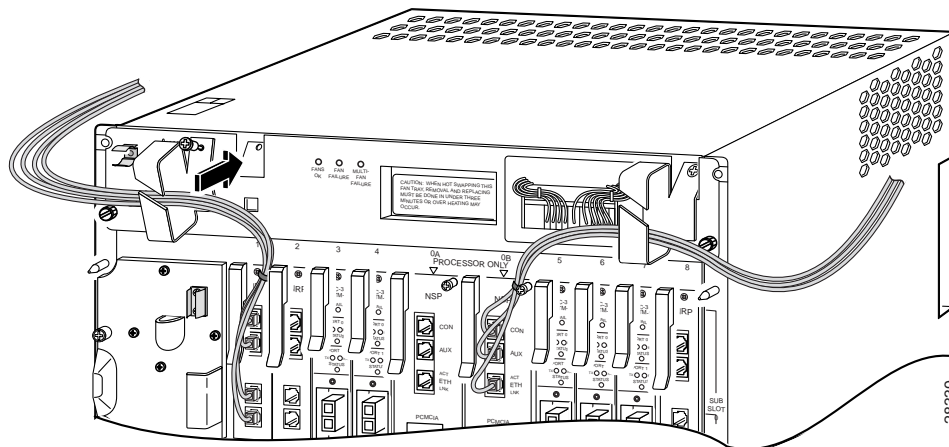
Verifying Plug-In Module and Component Installation

After you perform a replacement procedure, verify that any new plug-in module or component is installed correctly. To verify the installation, check the status of the interfaces:

• If this item is a replacement card, use the **show configuration** or **show atm interface** [*slot_num*/*mod_num*/*port_num*] command to verify that the system acknowledges the new interfaces and that they are online.

• Refer to *Cisco 6400 Software Setup Guide* and *Cisco 6400 Command Reference* for all software instructions and information.

Obtaining Documentation

The following sections explain how to obtain documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following URL:

http://www.cisco.com

Translated documentation is available at the following URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which is shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription.

Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order Cisco product documentation from the Networking Products MarketPlace:

  http://www.cisco.com/cgi-bin/order/order_root.pl

- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:

  http://www.cisco.com/go/subscription

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Documentation Feedback

If you are reading Cisco product documentation on Cisco.com, you can submit technical comments electronically. Click **Feedback** at the top of the Cisco Documentation home page. After you complete the form, print it out and fax it to Cisco at 408 527-0730.

You can e-mail your comments to bug-doc@cisco.com.

To submit your comments by mail, use the response card behind the front cover of your document, or write to the following address:

Cisco Systems
Attn: Document Resource Connection
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain documentation, troubleshooting tips, and sample configurations from online tools by using the Cisco Technical Assistance Center (TAC) Web Site. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC Web Site.

Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com is a highly integrated Internet application and a powerful, easy-to-use tool that provides a broad range of features and services to help you to

- Streamline business processes and improve productivity

- Resolve technical issues with online support

- Download and test software packages

- Order Cisco learning materials and merchandise

- Register for online skill assessment, training, and certification programs

You can self-register on Cisco.com to obtain customized information and service. To access Cisco.com, go to the following URL:

http://www.cisco.com

Technical Assistance Center

The Cisco TAC is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two types of support are available through the Cisco TAC: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

Inquiries to Cisco TAC are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.

- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.

- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.

- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

Which Cisco TAC resource you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

Cisco TAC Web Site

The Cisco TAC Web Site allows you to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC Web Site, go to the following URL:

http://www.cisco.com/tac

All customers, partners, and resellers who have a valid Cisco services contract have complete access to the technical support resources on the Cisco TAC Web Site. The Cisco TAC Web Site requires a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to the following URL to register:

http://www.cisco.com/register/

If you cannot resolve your technical issues by using the Cisco TAC Web Site, and you are a Cisco.com registered user, you can open a case online by using the TAC Case Open tool at the following URL:

http://www.cisco.com/tac/caseopen

If you have Internet access, it is recommended that you open P3 and P4 cases through the Cisco TAC Web Site.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses issues that are classified as priority level 1 or priority level 2; these classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer will automatically open a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to the following URL:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled; for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). In addition, please have available your service agreement number and your product serial number.