CISCO SYSTEMS

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Cisco uBR7200 Series Universal Broadband Router Subchassis and Midplane Replacement Instructions

Product Numbers: MAS-UBR-7246VXRMP=, MAS-UBR-7246MP=, MAS-UBR-7223MP=

This document explains how to remove and replace the subchassis and the midplane in the Cisco uBR7200 series universal broadband routers (which consist of the Cisco uBR7246 VXR, Cisco uBR7246, and the Cisco uBR7223). It includes instructions for powering down the routers, removing the subchassis, and installing the new subchassis in the routers. This document also includes steps for verifying a successful router boot after powering up a Cisco uBR7200 series router.

The router midplane is part of the subchassis. To replace the router midplane, you must replace the entire subchassis. The subchassis and midplanes for the Cisco uBR7246 VXR, the Cisco uBR7246, and the Cisco uBR7223 are not interchangeable.

Note Use this document in conjunction with the and *Regulatory Compliance and Safety Information for the Cisco uBR7200 Series Universal Broadband Router* that shipped with your Cisco uBR7246 VXR, Cisco uBR7246, or Cisco uBR7223.

The following sections are included in this document:

- If You Need More Information, page 2
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- Removing and Replacing the Subchassis, page 9
- Cisco Connection Online, page 35
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If You Need More Information

The Cisco IOS software running on your router contains extensive features and functionality. The effective use of many of these features is easier if you have more information at hand. For additional information on configuring and maintaining the Cisco uBR7200 series, the following documentation resources are available:

- For Cisco IOS software configuration information, refer to the modular configuration and modular command reference publications in the Cisco IOS software configuration documentation set that corresponds to the software release installed on your Cisco hardware.

    Note You can access Cisco IOS software configuration documentation on the World Wide Web at http://www.cisco.com, http://www-china.cisco.com, or http://www-europe.cisco.com. For more information, see the "Cisco Connection Online" section on page 35.

- For hardware installation and maintenance information on the Cisco uBR7200 series, refer to the Cisco uBR7200 series universal broadband router

- For international agency compliance, safety, and statutory information for wide-area network (WAN) interfaces for the Cisco uBR7200 series, refer to the *Regulatory Compliance and Safety Information for the Cisco uBR7200 Series Universal Broadband Router* that shipped with your

- To obtain general information about documentation, refer to the "Cisco Connection Online" section on page 35, or call customer service at 800 553-6387 or 408 526-7208. Customer service hours are 5:00 a.m. to 6:00 p.m. Pacific time, Monday through Friday (excluding Cisco-observed holidays). You can also send e-mail to cs-rep@cisco.com. You can also refer to the *Cisco Information Packet* that shipped with your router.

Subchassis Overview

The Cisco uBR7246 VXR and Cisco uBR7246 subchassis, shown in Figure 1, has two bays for up to two 550W, AC-input or DC-input power supplies, and one slot for the network processing engine. The Cisco uBR7223 subchassis, shown in Figure 2, has one bay for one 550W, AC-input or DC-input power supply, and one slot for the network processing engine.

Both subchassis also house the router midplane. To replace the router midplane, you *must* replace the entire subchassis. The network processing engine and power supplies are field-replaceable units (FRUs), which means they can be replaced independently of the subchassis.

Figure 1 **Cisco uBR7246 VXR and Cisco uBR7246Subchassis**
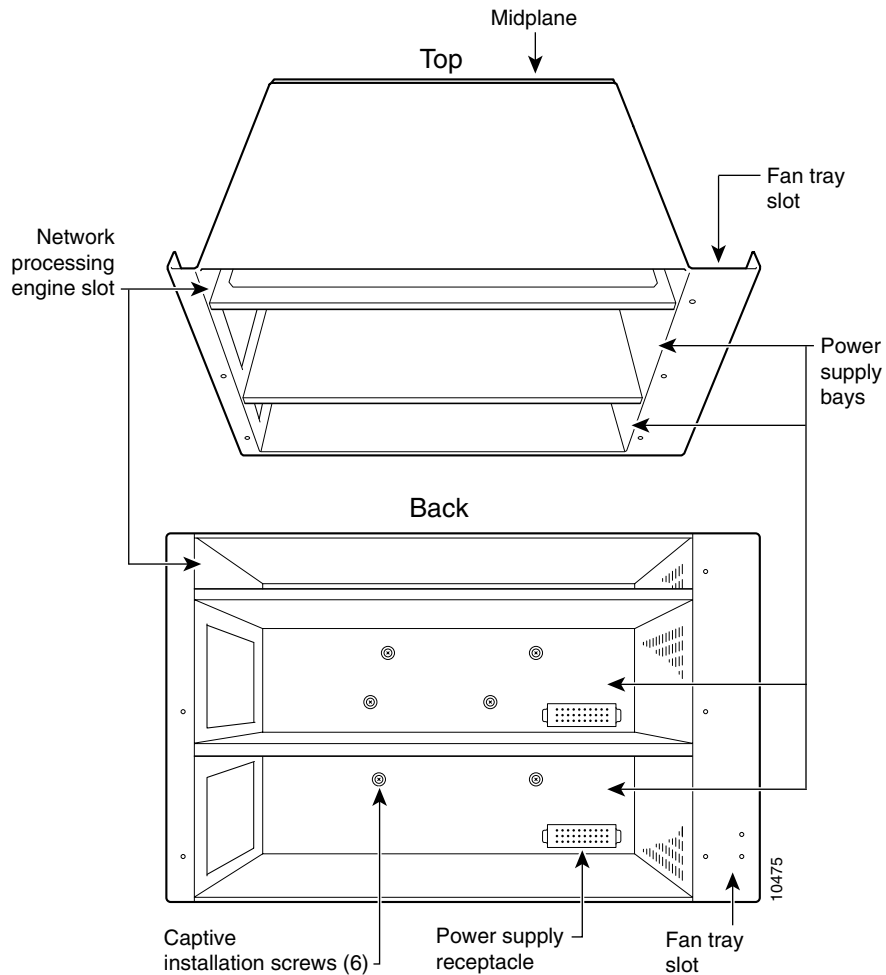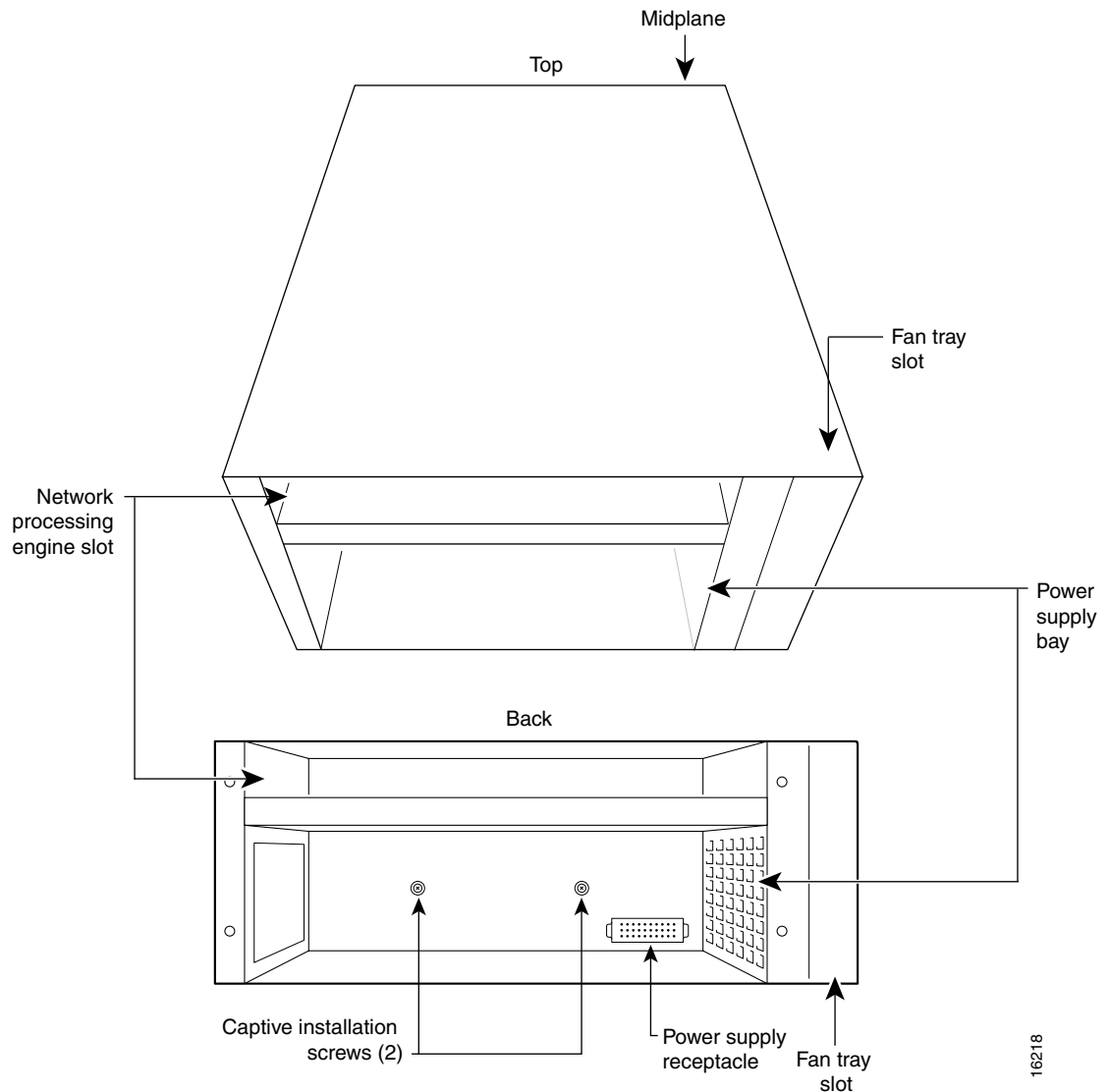
Figure 2   Cisco uBR7223 Subchassis

Installation Prerequisites

This section provides a list of parts and tools you need to remove and replace the subchassis and midplane in the Cisco uBR7200 series. This section also includes safety and ESD-prevention guidelines to help you avoid injury to yourself and damage to the equipment.

Parts and Tools

You need the following tools and parts to remove and replace the subchassis and midplane assembly. If you need additional equipment, contact a service representative for ordering information. See the "Cisco Connection Online" section on page 35 for information on contacting a service representative.

- New subchassis and midplane assembly (MAS-UBR-7246VXRMP= for a Cisco uBR7246 VXR, MAS-UBR-7246MP= for a Cisco uBR7246, or MAS-UBR-7223MP= for a Cisco uBR7223)

- Number 2 Phillips screwdriver

- 3/16-inch, flat-blade screwdriver

- 8 mm wrench or nut driver (for connecting a grounding lug to a Cisco uBR7200 series DC-input power supply)

- 7 mm wrench or nut driver, or adjustable wrench (for connecting the DC-input power lead strain-relief cover to a DC-input power supply)

- Tape (for securing the handle of a DC circuit breaker in the OFF position when the DC-input power supply is powered down)

- Your own ESD-prevention equipment or the disposable grounding wrist strap included with all upgrade kits, FRUs, and spares

- Antistatic mat or surface, or static-shielding bag

Note If your Cisco uBR7200 series router is mounted in a 4-post or telco-type rack, at least one other person should be available to assist you with removing the chassis from the rack.

Safety Guidelines

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

Safety Warnings

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

Electrical Equipment Guidelines

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.

- Disconnect all power and external cables before moving a chassis.

- Do not work alone if potentially hazardous conditions exist.

- Never assume that power has been disconnected from a circuit; always check.

- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.

- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

Telephone Wiring Guidelines

Use the following guidelines when working with any equipment that is connected to telephone wiring or to other network cabling:

- Never install telephone wiring during a lightning storm.

- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

- Use caution when installing or modifying telephone lines.

Preventing Electrostatic Discharge Damage

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

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

Figure 3 shows how to handle the I/O controller, network processing engine, and cable modem cards.

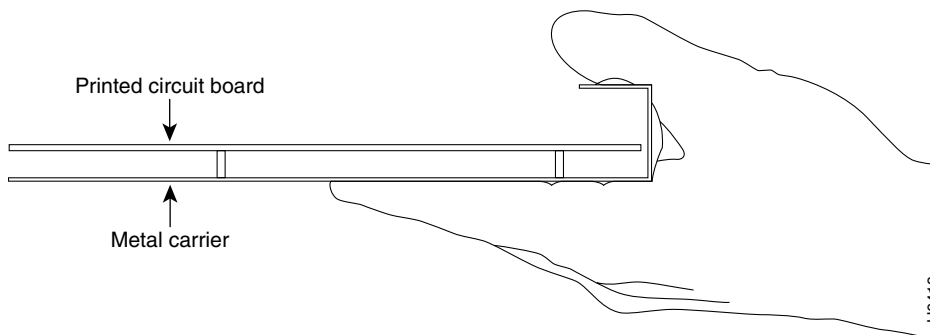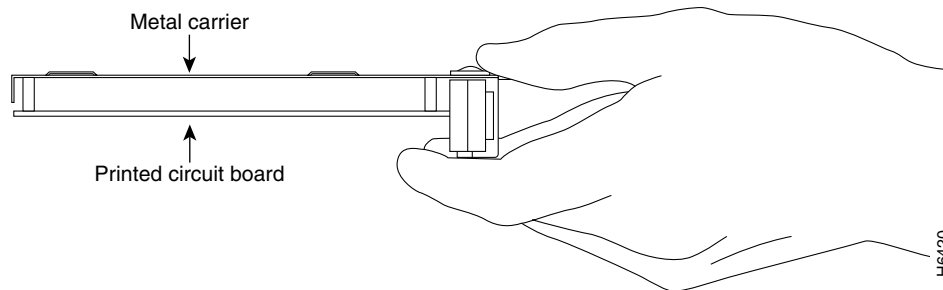**Figure 3   Handling the I/O Controllers, Network Processing Engine, and Cable Modem Cards**

Figure 4 shows how to handle a port adapter.

Figure 4   Handling a Port Adapter

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

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

⚠ **Caution**   Make sure to tighten the captive installation screws on the network processing engine, I/O controller, and cable modem cards (use a number 2 Phillips or a 3/16-inch, flat-blade screwdriver). These screws prevent accidental removal, provide proper grounding for the router, and help to ensure that the network processing engine, the I/O controller, and the cable modem cards are properly seated in the router midplane.

Following are guidelines for preventing ESD damage:

- Always use an ESD wrist strap or ankle strap when installing or replacing the I/O controller, network processing engine, cable modem cards, or port adapters. Ensure that the ESD strap makes contact with your skin.

- Handle the I/O controller, network processing engine, cable modem cards, or port adapters by their metal carrier edges and handles only; avoid touching the printed circuit board components or any connector pins.

- When removing the I/O controller, network processing engine, cable modem cards, or port adapters, place them on an antistatic surface with the printed circuit board components facing upward, or in a static shielding bag. If you are returning an I/O controller, network processing engine, cable modem cards, or port adapter to the factory, immediately place it in a static shielding bag.

⚠ **Caution**   Periodically check the resistance value of the antistatic strap. The measurement should be within the range of 1 and 10 megohm (Mohm).

Ensuring Easy Access to the Router

If your Cisco uBR7200 series router is installed in a standard 19-inch, 4-post or telco-type rack, cables from other equipment in the rack may obstruct access to the rear of the router. Also, rack power strips or other permanent fixtures may obstruct access to the router. Review the following guidelines to ensure easy access to the rear of the router when it is installed in a rack. If the router is not installed in a rack, or if you already have clear access to the rear of the router, proceed to the following section "Removing and Replacing the Subchassis."

Use the following guidelines to ensure easy access to the rear of the router when it is installed in a rack:

- Ensure that you have at least 3 to 4 feet of working space at the rear of the router.

- If cables from other equipment in the rack fall in front of the rear end of the router, carefully gather the cables (using care not to strain them) and use cable ties to anchor them away from the rear of the router.

- If access to the rear of the router is partially blocked by a power strip or some other permanent rack fixture, detach the router from the rack and carefully slide it forward until there is enough clearance to remove the power supply, the network processing engine, and the subchassis from the router. Detailed steps for detaching the router from the rack are contained in the following section "Removing and Replacing the Subchassis."

Caution   Make sure that at least one other person is available to support the front of the router as you slide it out from the rack and, if necessary, to continue to support it while you remove and insert the power supply, network processing engine, or subchassis.

Note   Each DC-input power supply has an electrical current rating of 14A, 700 VA. Use a minimum of 12 AWG (4 mm2) wire for the input to each DC-input power supply. The power input must be protected by a 20A circuit breaker or fuse that is in compliance with your local electric regulations.

Each AC-input power supply has an electrical current rating of 7A.

Removing and Replacing the Subchassis

Removing and replacing the subchassis in the Cisco uBR7200 series involves the following tasks:

- Powering Down the Router
- Disconnecting AC-Input Power
- Removing a Power Supply and the Network Processing Engine
- Disengaging the Cable Modem Cards, Port Adapters, Input/Output Controller, and Fan Tray
- Removing the Subchassis
- Replacing the Subchassis
- Replacing the Power Supply and the Network Processing Engine
- Reseating the I/O Controller, Port Adapters, Cable Modem Cards, and Fan Tray
- Reconnecting AC-Input Power
- Reconnecting DC-Input Power
- Powering Up the Router

These tasks are described in detail in the following subsections.

⚠️ **Caution** When the input power to a Cisco uBR7200 series power supply is disconnected or lost, the power supply will enter a reset cycle for 90 seconds. Wait at least 90 seconds or move the power switch from one position to the other to restart the power supply. For example, if the power supply was ON when the power was disconnected or lost, move the power switch to the OFF position then back to the ON position. If you do not wait the full 90 seconds or move the power switch from one position to the other, the power supply will not restart.

Powering Down the Router

Note Before powering down the router, use the **copy running-config startup-config** command to save the router's running configuration to nonvolatile memory.

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

Step 2 Observe the following items:

- The green OK LED on the power supply goes off.

- The fans stop operating.

- The LEDs on the I/O controller go off.

- The LEDs on the port adapters go off.

- The LEDs on the cable modem cards go off.

This completes the procedure for powering down the router. If you have an AC-input power supply installed, proceed to the next section, "Disconnecting AC-Input Power." If you have a DC-input power supply installed, skip to the "Disconnecting DC-Input Power" section on page 11.
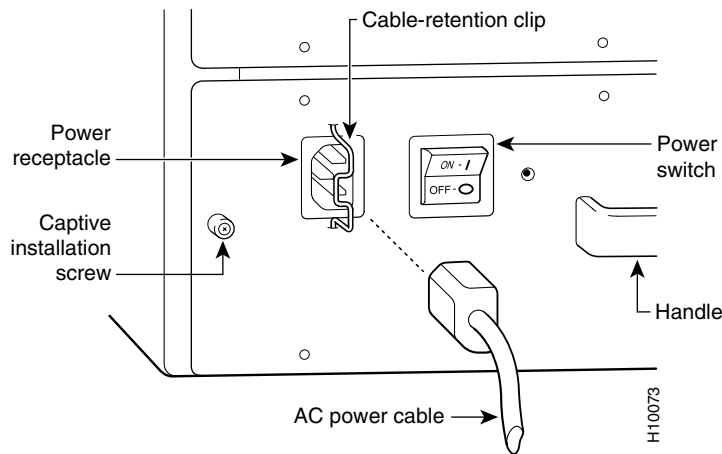
Disconnecting AC-Input Power

The faceplate of the 550W AC-input power supply has a green OK LED, a power switch, a handle for removing, installing, and handling the power supply, an AC-input power receptacle, and two captive installation screws. (See Figure 5.)

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

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

Step 3 Unplug the other end of the input power cable from the power supply. (See Figure 5.)

Figure 5   **Disconnecting Power from a Cisco uBR7200 Series AC-Input Power Supply**

Step 4   Repeat Step 1 through Step 3 if a second power supply is installed.

This completes the procedure for disconnecting AC-input power. Proceed to the "Removing a Power Supply and the Network Processing Engine" section on page 13.

Disconnecting DC-Input Power

⚡ **Warning**   Before completing any of the following steps, and to prevent short-circuit or shock hazards, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.

⚡ **Warning**   When installing the unit, the ground connection must always be made first and disconnected last.

The faceplate of the 550W DC-input power supply has a green OK LED, a power switch, a handle for removing, installing, and handling the power supply, two DC-input power receptacles, two M5 grounding receptacles, a strain-relief cover that attaches to two M4 studs to secure the DC-input power leads, and two captive installation screws. (See Figure 7.)

Step 1   Ensure that the –48V and +48V leads are disconnected from the power source.
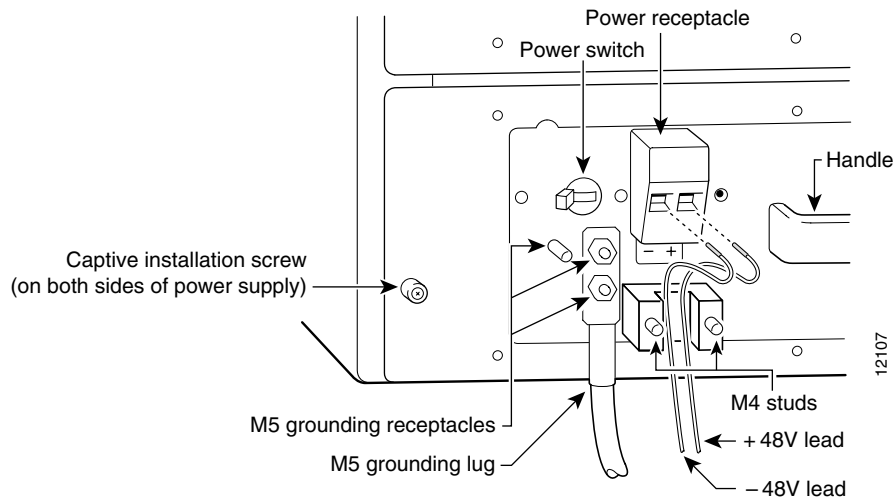
Step 2   Using a 7 mm wrench or nut driver (or adjustable wrench), loosen and remove the two M4 nuts from the strain-relief cover that secures the –48V and +48V leads to the power supply faceplate. (See Figure 6.)

Figure 6   **Removing the Strain-Relief Cover from a Cisco uBR7200 Series DC-Input Power Supply**
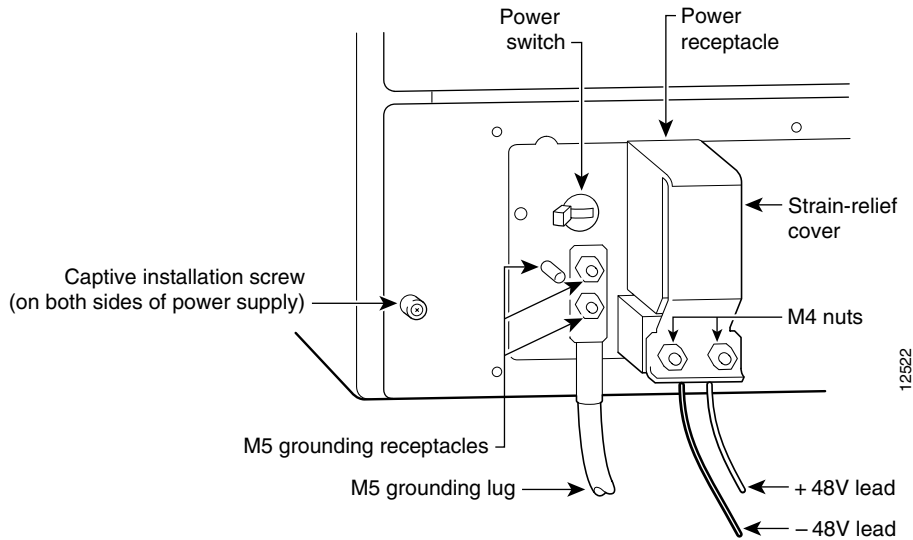
Step 3   Using a 3/16-inch flat-blade screwdriver, loosen the screw below the +48V lead receptacle and pull the lead from the connector. (See Figure 7.) Repeat this step for the –48V lead.

Figure 7   **Disconnecting Power from a Cisco uBR7200 Series DC-Input Power Supply**

Step 4   Using an 8 mm wrench or nut driver (or adjustable wrench), loosen and remove the two M5 nuts that secure the two-hole-grounding lug to the grounding receptacle, and pull the grounding lug and lead from the receptacle. (See Figure 7.)

> **Note** The color coding of the DC-input power supply leads depends on the color coding of the DC power source at your site. Typically, green or green/yellow is used for ground, black is used for +48V (return), and red or white is used for –48V. Make certain the lead color coding you choose for the DC-input power supply matches lead color coding used at the DC power source.

This completes the procedure for disconnecting DC-input power. Proceed to the following section "Removing a Power Supply and the Network Processing Engine."

Removing a Power Supply and the Network Processing Engine

The following sections explain how to remove an AC-input or DC-input power supply and the network processing engine from a Cisco uBR7200 series router. The power supplies and the network processing engine reside in the subchassis; therefore, you must remove them before you remove the subchassis from the router.

If you have an AC-input power supply installed, proceed to the following section "Removing an AC-Input Power Supply from a Cisco uBR7200 Series." If you have a DC-input power supply installed, proceed to the "Removing a DC-Input Power Supply from a Cisco uBR7200 Series" section on page 14.

Removing an AC-Input Power Supply from a Cisco uBR7200 Series

Step 1 Using a number 2 Phillips screwdriver, loosen the two captive screws on the faceplate of the power supply. Using a number 2 Phillips or a 3/16-inch, flat-blade screwdriver, loosen the two captive screws on the faceplate of the power supply. (See Figure 8.)

If the router is not installed in a standard 19-inch, 4-post or telco-type rack, skip to Step 5. If the router is installed in a rack, determine if any permanent rack fixtures, such as a power strip, are obstructing access to the power supply. If a rack fixture is obstructing access to the power supply, proceed to Step 2.
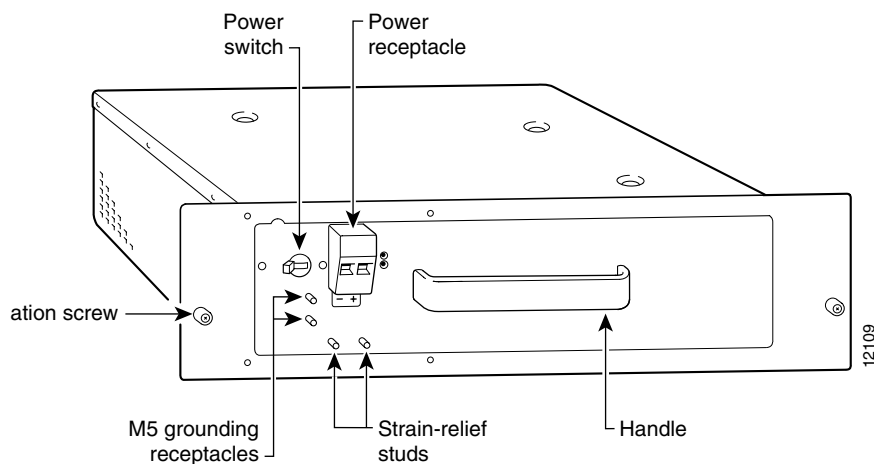
Figure 8 **Captive Installation Screws and Handle on the Cisco uBR7200 Series AC-Input Power Supply**
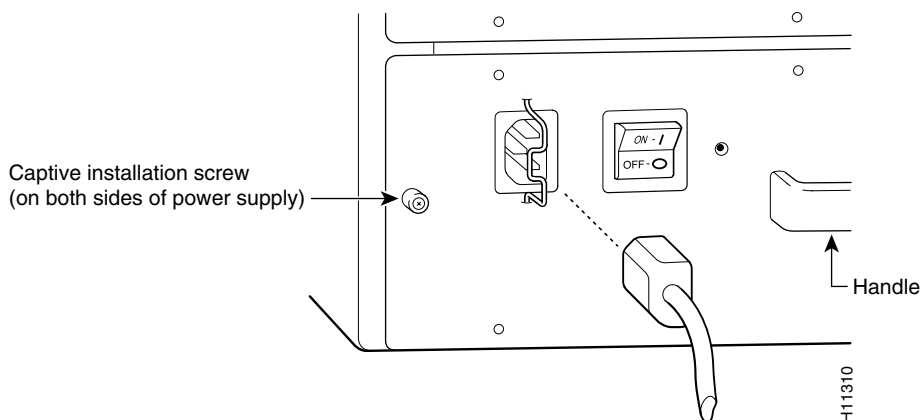
Step 2 Using a 3/16-inch flat-blade screwdriver, loosen the screws that secure the router to the front mounting strips of the rack.

Step 3 Position at least one person in front of the rack to support the front underside of the router.

Step 4 From the rear of the rack, carefully push the front of the router out of the rack until there is enough clearance to remove the power supply.

Step 5 Grasp the power supply handle with one hand and pull the AC-input power supply from the router. Place your other hand underneath the power supply for support. (See Figure 9.)

Figure 9 **Holding the Power Supply**
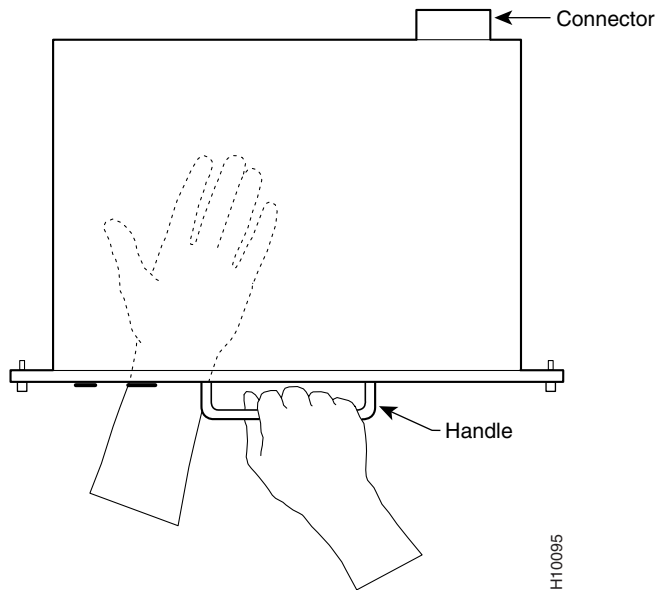
Step 6 Repeat Step 5 if a second power supply in installed.

This completes the procedure for removing an AC-input power supply. Proceed to the "Removing the Network Processing Engine" section on page 15.

Removing a DC-Input Power Supply from a Cisco uBR7200 Series

Step 1 Using a number 2 Phillips screwdriver, loosen the two captive screws on the faceplate of the power supply. (See Figure 10.)

Note If you are removing a power supply filler plate in preparation to install a second power supply, make sure you remove both the filler plate and its attached air dam from the second power supply bay.

If the router is not installed in a standard 4-post or telco-type rack, skip to Step 5. If the router is installed in a rack, determine if any permanent rack fixtures, such as a power strip, are obstructing access to the power supply. If a rack fixture is obstructing access to the power supply, proceed to Step 2.

Figure 10 **Captive Installation Screws and Handle on the Cisco uBR7200 Series DC-Input Power Supply**

Step 2 Using a 3/16-inch flat-blade screwdriver, loosen the screws that secure the router to the front mounting strips of the rack.

Step 3 Position at least one other person in front of the rack to support the front underside of the router.

Step 4 From the rear of the rack, carefully push the front of the router out of the rack until there is enough clearance to remove the power supply.

Step 5 Grasp the power supply handle with one hand and pull the DC-input power supply from the router. Place your other hand underneath the power supply for support. (See Figure 9.)

> **Caution** To maintain agency compliance requirements and meet EMI emissions standards for the Cisco uBR7246 VXR and Cisco uBR7246 with a single power supply, the power supply filler plate and its attached air dam must remain in the power supply adjacent to the installed power supply. Do not remove this filler plate or the attached air dam from the router unless you intend to install a redundant power supply.

This completes the procedure for removing a DC-input power supply. Proceed to the following section "Removing the Network Processing Engine."
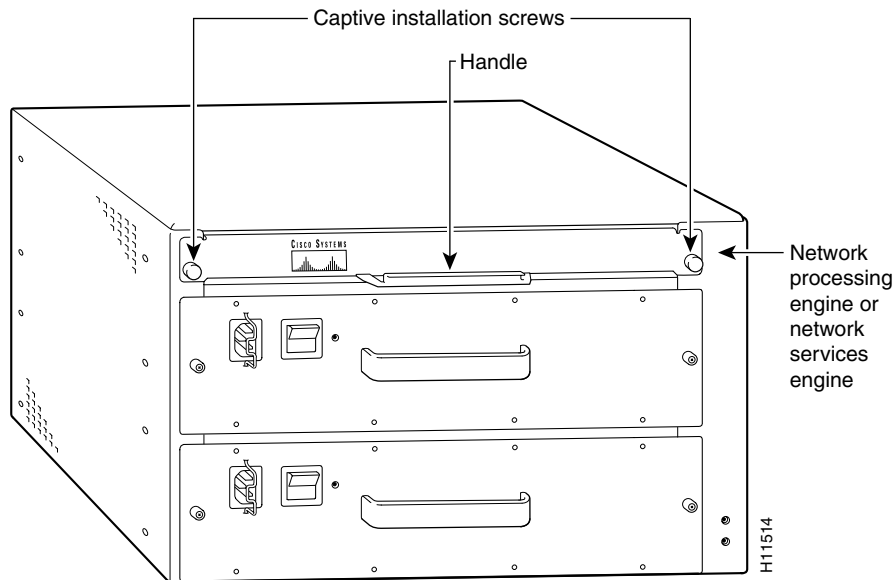
Removing the Network Processing Engine

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

Step 2 Using a number 2 Phillips or a 3/16-inch, flat-blade screwdriver, loosen the two captive installation screws on the faceplate of the network processing engine. (See Figure 11.)

> **Caution** Handle the network processing engine by the carrier edges and handles only; never touch the printed circuit board components or connector pins. (See Figure 3.)

Step 3 Grasp the network processing engine handle and carefully pull the network processing engine from its chassis slot.

Figure 11   Removing the Network Processing Engine

Step 4   Place the network processing engine on an antistatic surface with its printed circuit board components facing upward, or in a static shielding bag.

This completes the procedure for removing the network processing engine. Proceed to the following section "Disengaging the Cable Modem Cards, Port Adapters, Input/Output Controller, and Fan Tray."

Disengaging the Cable Modem Cards, Port Adapters, Input/Output Controller, and Fan Tray

The following sections explain how to disengage the cable modem cards, port adapters, I/O controller, and fan tray from the router midplane. These FRUs are not located in the subchassis; therefore, you do not have to remove them from the router when removing the subchassis. However, the cable modem cards, port adapters, I/O controller, and fan tray connect directly to the router midplane, so you must disengage them from the router midplane to remove the subchassis from the router.

Disengaging the Cable Modem Card

Step 1   Attach an ESD-preventive wrist strap between you and an unfinished chassis surface (if you have not already done so).

Step 2   Unscrew the captive installation screws on the front of the cable modem card. (See Figure 12.)

Step 3   Grasp the handle on the cable modem card and carefully pull the cable modem card from the midplane, about halfway out of its slot. (See Figure 12.)

Note   *Do not* remove the modem card from the slot and *do not* remove any interface cables from the front of the modem card.

Figure 12   Disengaging the Cable Modem Cards from the Midplane
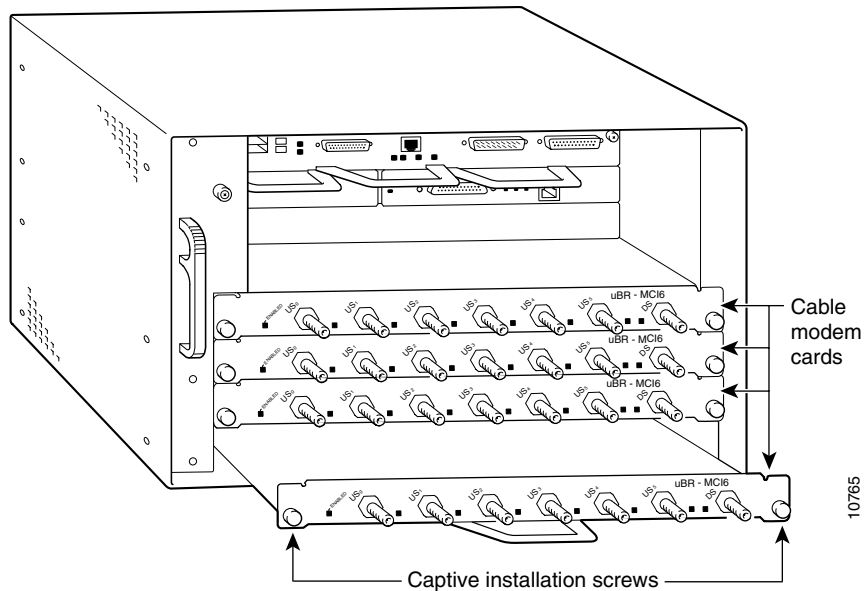
Step 4   Repeat Step 3 for each cable modem card that is installed in the router.

This completes the procedure for disengaging a cable modem card from the router midplane. Proceed to the following section "Disengaging the Port Adapters."

Disengaging the Port Adapters

Step 1   Attach an ESD-preventive wrist strap between you and an unfinished chassis surface (if you have not already done so).

Step 2   For a Cisco uBR7246 VXR or Cisco uBR7246, slide the port adapter retention clip down to the unlocked position. The retention clip remains in the unlocked position. (See Figure 13.)

For a Cisco uBR7223, place the port adapter lever in the unlocked position. The lever remains in the unlocked position. (See Figure 14.)

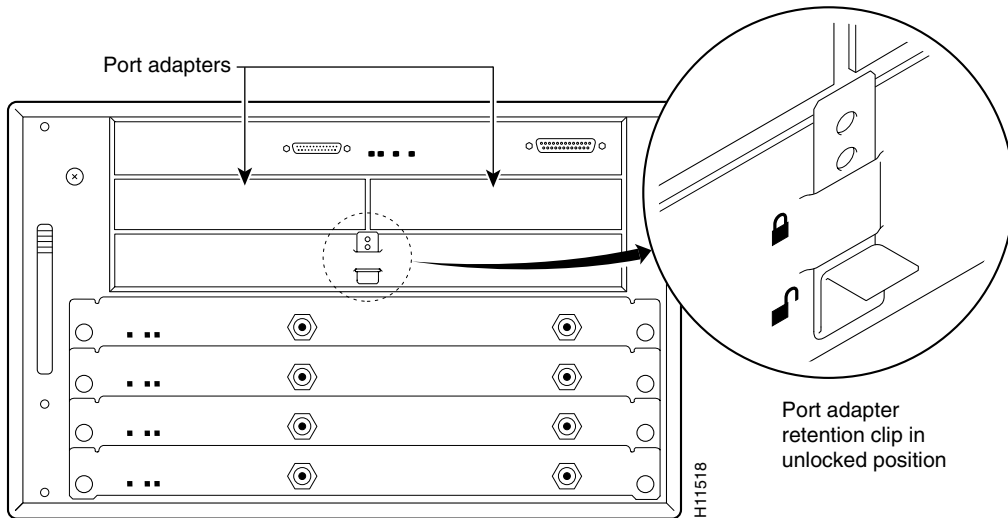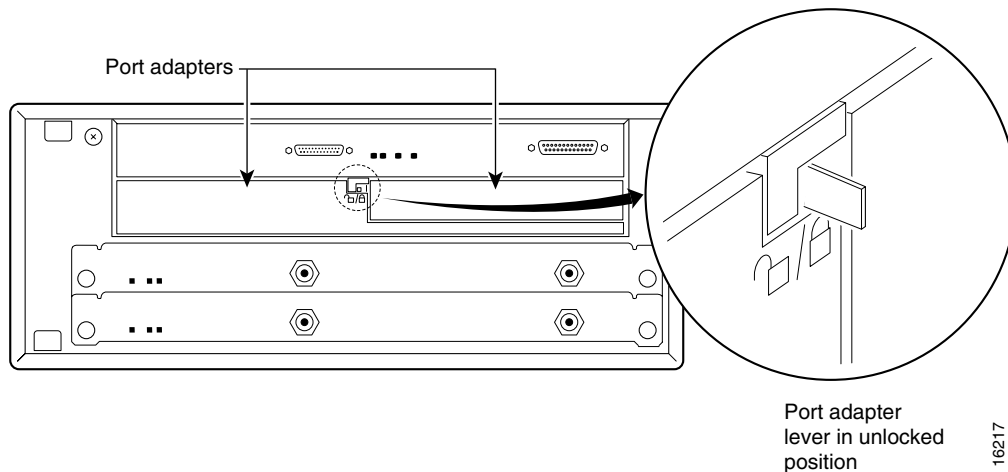**Figure 13** **Placing the Port Adapter Retention Clip in the Unlocked Position (Cisco uBR7246 Shown)**

Port adapters

Port adapter retention clip in unlocked position

H11518

Figure 14 **Placing the Port Adapter Lever in the Unlocked Position (Cisco uBR7223)**

Port adapters

Port adapter lever in unlocked position

16217

Step 3 Grasp the handle on the port adapter and pull the port adapter from the midplane, about halfway out of its slot. (See Figure 15.)

Note *Do not* remove the port adapter from the slot and *do not* remove any interface cables from the front of the port adapter.

Figure 15   **Disengaging the Port Adapters from the Midplane (Cisco uBR7246 Shown)**
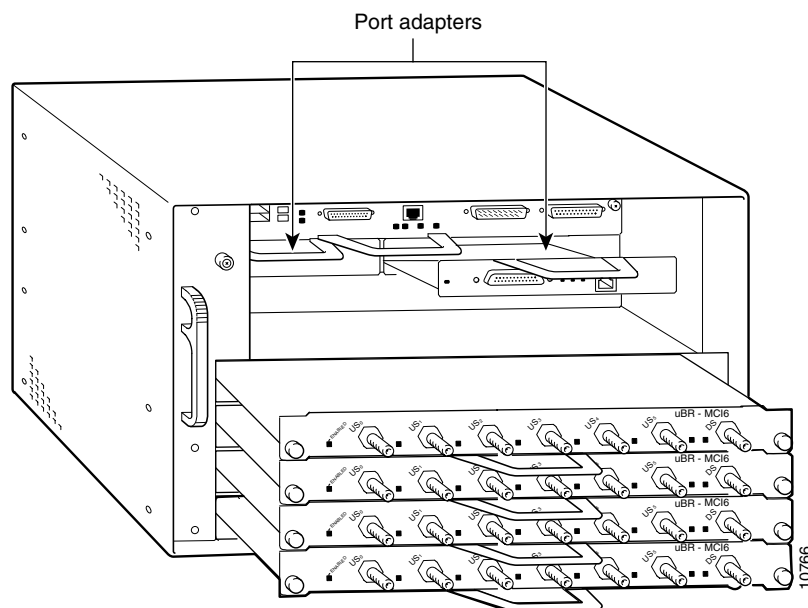
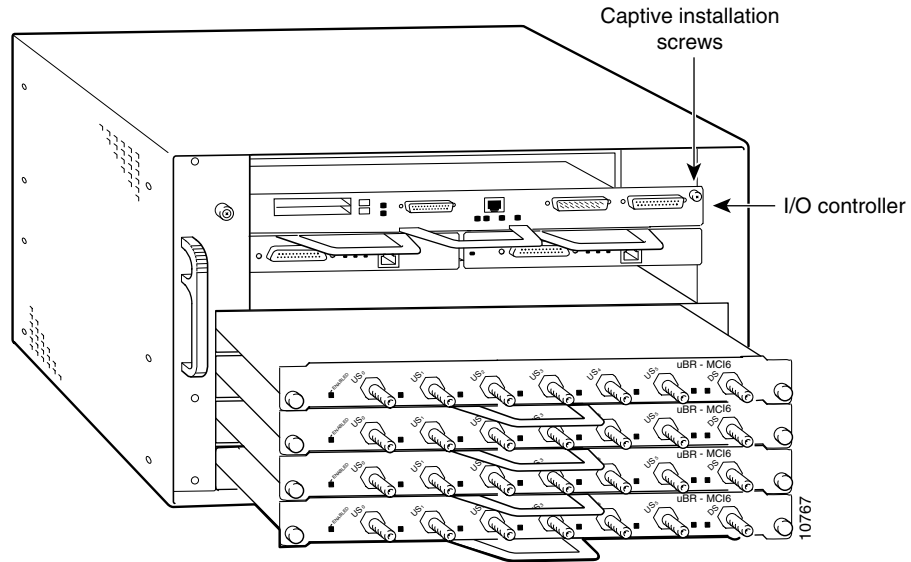**Step 4**   Repeat Step 3 for each port adapter that is installed in the router.

This completes the procedure for disengaging a port adapter from the router midplane. Proceed to the following section "Disengaging the Input/Output Controller."

Disengaging the Input/Output Controller

Step 1   Attach an ESD-preventive wrist strap between you and an unfinished chassis surface (if you have not already done so).

Step 2   Using a number 2 Phillips or a 3/16-inch, flat-blade screwdriver, loosen the two captive installation screws on the faceplate of the I/O controller. (See Figure 16.)

Step 3   Grasp the handle on the I/O controller and pull the controller from the midplane about halfway out of its slot. (See Figure 16.)

Note   *Do not* remove the I/O controller from the slot and *do not* remove any interface cables from the I/O controller.

Figure 16   Disengaging the I/O Controller from the Midplane (Cisco uBR7246 Shown)

This completes the procedure for disengaging the I/O controller from the router midplane. Proceed to the following section "Disengaging the Fan Tray."

Disengaging the Fan Tray

Step 1   Using a number 2 Phillips screwdriver, or your fingers, loosen the captive installation screw that secures the fan tray to the chassis. (For the Cisco uBR7246 VXR and Cisco uBR7246 fan tray, see Figure 17. For the Cisco uBR7223 fan tray, see Figure 18.)

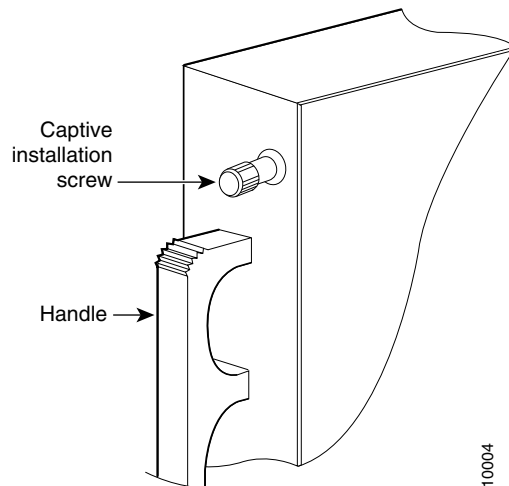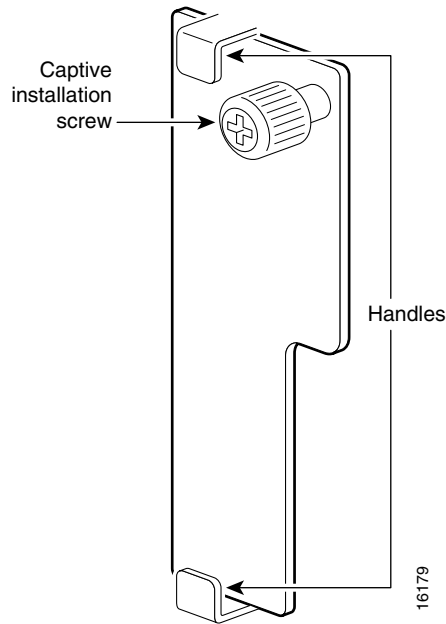**Figure 17   Fan Tray Captive Installation Screw (Cisco uBR7246 VXR and Cisco uBR7246)**

Figure 18   Fan Tray Captive Installation Screw (Cisco uBR7223)

Captive installation screw

Handles

16179

Step 2   Grasp the fan tray handle with one hand and the outside of the chassis with the other hand.

Step 3   Pull the fan tray backward toward you to disengage it from the power receptacle on the midplane. (For the Cisco uBR7246 VXR and Cisco uBR7246 fan tray, see Figure 19. For the Cisco uBR7223 fan tray, see Figure 20.)

Figure 19   Disengaging the Fan Tray (Cisco uBR7246 VXR and Cisco uBR7246)
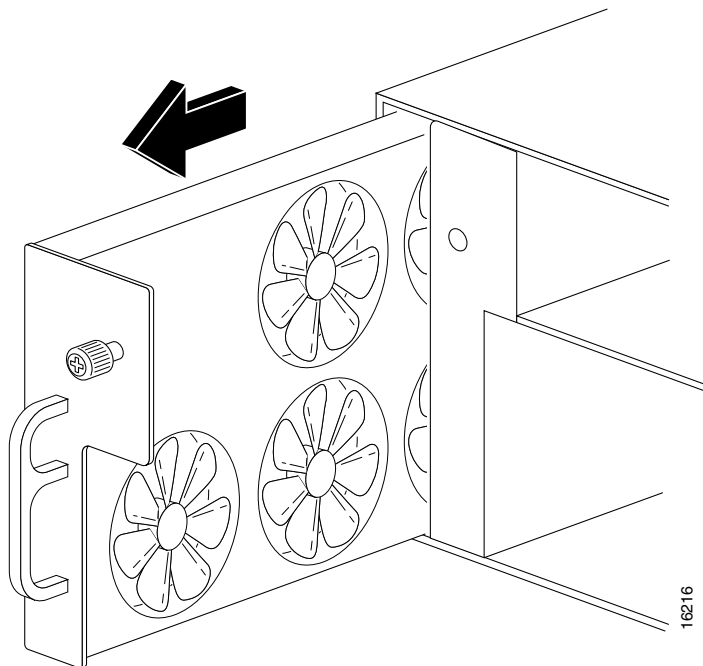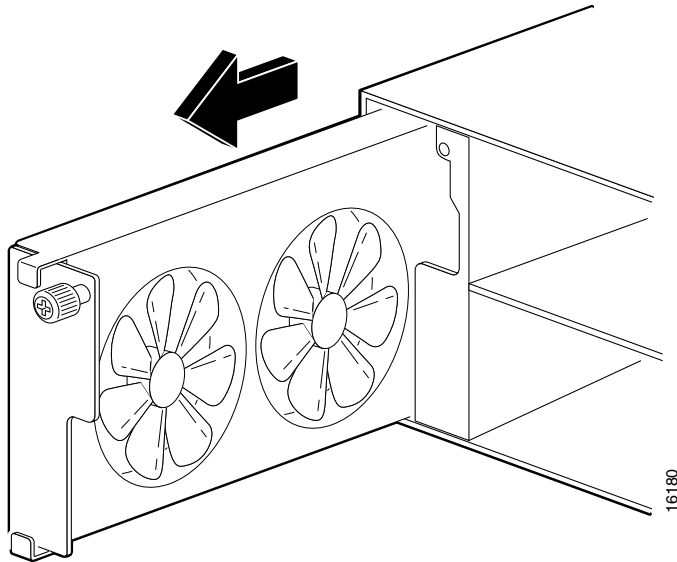

16216

Figure 20   Disengaging the Fan Tray (Cisco uBR7223)

This completes the steps for disengaging the fan tray from the midplane. Proceed to the following section "Removing the Subchassis."

Removing the Subchassis

Step 1   For a Cisco uBR7246 VXR or Cisco uBR7246, using a number 2 Phillips screwdriver, reach into a power supply bay and loosen the six subchassis captive installation screws. (See Figure 21.)

For a Cisco uBR7223, using a number 2 Phillips screwdriver, reach into the power supply bay and loosen the four subchassis captive installation screws. (See Figure 22.)

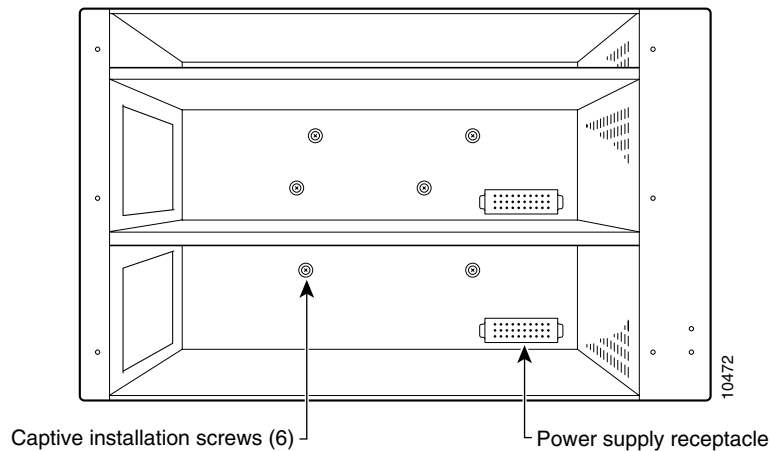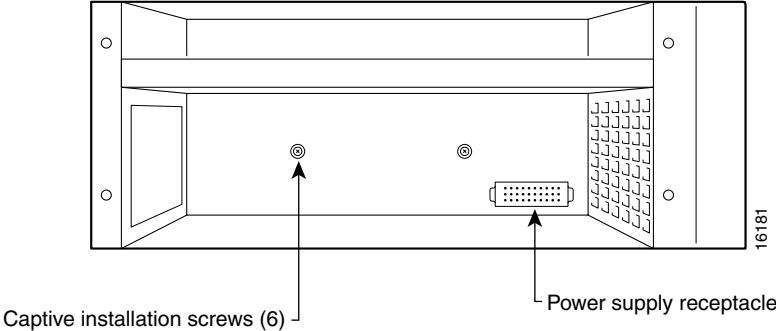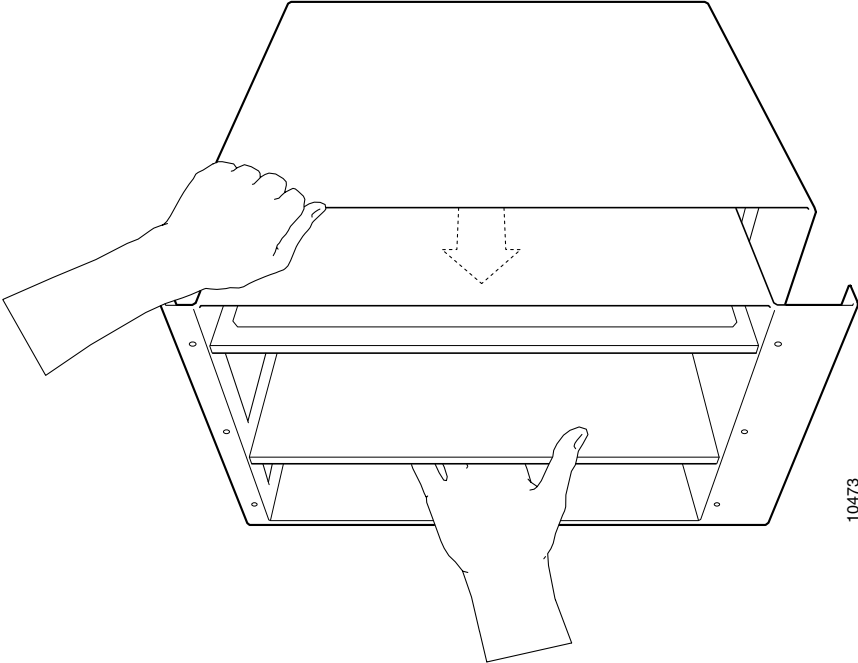**Figure 21   Subchassis Captive Installation Screws (Cisco uBR7246)**

Captive installation screws (6) ┘   └ Power supply receptacle

Figure 22   **Subchassis Captive Installation Screws (Cisco uBR7223)**

Captive installation screws (6)

Power supply receptacle

Step 2   Place one hand on the subchassis center post and your other hand on top of the router, and pull the subchassis from the router. (See Figure 23.) The subchassis fits tightly in the router. Be prepared to use your hand on top of the router for leverage.

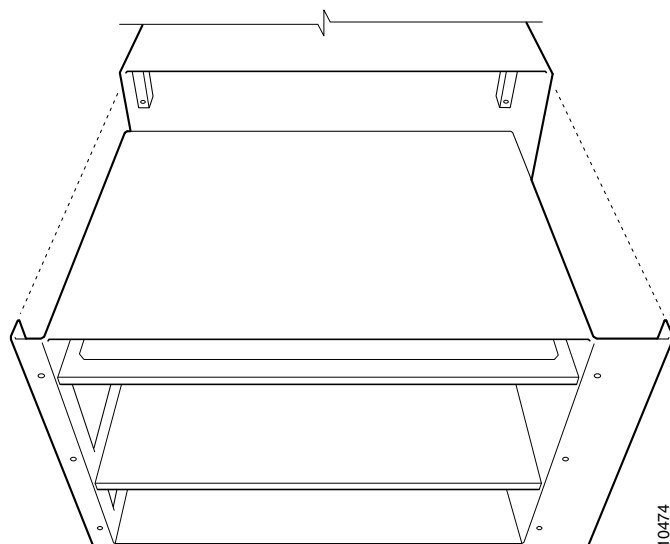**Figure 23**   **Pulling the Subchassis from the Router (Cisco uBR7246 Shown)**

This completes the steps for removing the subchassis. Proceed to the following section "Replacing the Subchassis."

Replacing the Subchassis

Step 1 Carefully slide the subchassis into the router until the subchassis is flush with the rear panel of the router. (See Figure 24.) You may have to shift the subchassis a little to get it into the router.

Figure 24   **Aligning the Subchassis (Cisco uBR7246 Shown)**

Step 2 Using a number 2 Phillips screwdriver, reach into a power supply bay and tighten the subchassis captive installation screws. (See Figure 21.)

> **Note**   The subchassis is not fully seated in the router midplane until you tighten all of the captive installation screws (use a number 2 Phillips screwdriver).

This completes the steps for replacing the subchassis in the router. Proceed to the following section "Replacing the Power Supply and the Network Processing Engine."

Replacing the Power Supply and the Network Processing Engine

The following sections explain how to replace an AC-input or DC-input power supply and the network processing engine in a Cisco uBR7200 series router. The procedure for replacing an AC-input or DC-input power supply are the same.

Replacing a Power Supply

Step 1   Make sure the power switch on the power supply is in the OFF (0) position.

> **Note**   If you are adding a second power supply to a Cisco uBR7246 VXR or Cisco uBR7246 that previously only had one power supply installed, make sure the power supply filler plate and its attached air dam have been removed from the subchassis' power supply bay.

Step 2   Grasp the power supply handle with one hand and place your other hand underneath the power supply for support. (See Figure 9.)

Step 3   Align the power supply to the power supply bay.

Step 4   Slide the power supply completely in to the power supply bay until its faceplate is flush with the router's rear panel.

> ⚠ **Caution**   When inserting a power supply into the router, do not use unnecessary force; slamming the power supply into the bay can damage the connectors on the rear of the supply and on the midplane.

Step 5   Seat the power supply in the router by tightening the captive screws with a number 2 Phillips screwdriver.

> **Note**   The power supply is not fully seated in the router midplane until you tighten the captive installation screws.

Step 6   If there is no second power supply, replace the filler plate and its attached air dam on the empty power supply bay. Using a number 2 Phillips screwdriver, tighten the filler plate's captive screws.

Step 7   If you pushed the router from the rack, slowly guide the router back into the rack.

Step 8   Use a 3/16-inch flat-blade screwdriver to tighten the screws that secure the router to front mounting strips of the rack.

> ⚠ **Caution**   To maintain agency compliance requirements and meet EMI emissions standards for the Cisco uBR7246 VXR and Cisco uBR7246 with a single power supply, the power supply filler plate and its attached air dam must remain in the power supply adjacent to the installed power supply. Do not remove this filler plate or the air dam from the router unless you intend to install a redundant power supply.

This completes the procedures for replacing a power supply in a Cisco uBR7200 series router. Proceed to the following section "Replacing the Network Processing Engine."
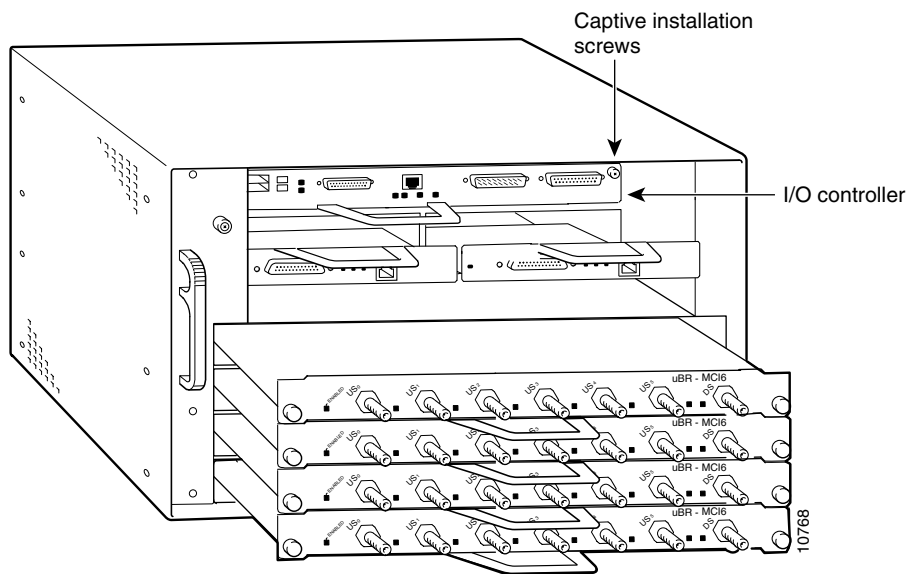
Replacing the Network Processing Engine

Step 1 Attach an ESD-preventive wrist strap between you and an unfinished chassis surface (if you have not already done so).

Step 2 Using both hands, grasp the network processing engine by its metal carrier edges and orient the network processing engine so that its printed circuit board components are upward. (See Figure 3.)

⚠ **Caution** Always handle the network processing engine by the carrier edges and handles only; never touch the printed circuit board components or connector pins.

Step 3 Align the left and right edge of the network processing engine printed circuit board between the guides in the network processing engine slot. (See Figure 25.)

Figure 25 **Aligning the Network Processing Engine between the Slot Guides (Cisco uBR7246 Shown)**

⚠ **Caution** Do not align the network processing engine's *metal carrier* between the slot guides. Doing so will damage components on the network processing engine's printed circuit board as you slide the network processing engine into its chassis slot.

Step 4 Gently slide the network processing engine all the way into its slot until you feel the connectors seat with the midplane.

Step 5 Secure the network processing engine to the midplane by tightening its captive screws with a number 2 Phillips or a 3/16-inch, flat-blade screwdriver.

**Note** The network processing engine is not fully seated in the router midplane until you tighten its captive installation screws (use a number 2 Phillips or a 3/16-inch, flat-blade screwdriver).

This completes the procedure for replacing the network processing engine. Proceed to the following section "Reseating the I/O Controller, Port Adapters, Cable Modem Cards, and Fan Tray."

Reseating the I/O Controller, Port Adapters, Cable Modem Cards, and Fan Tray

The following sections explain how to reseat the I/O controller, port adapters, cable modem cards, and fan tray that you disengaged from the router midplane earlier in these procedures.

Reseating the I/O Controller

Step 1 Attach an ESD-preventive wrist strap between you and an unfinished chassis surface (if you have not already done so).

Step 2 Using both hands, grasp the I/O controller by its metal carrier edges and gently slide the controller all the way into its slot until you feel the connectors mate with the midplane.

Step 3 Seat the I/O controller in the midplane by tightening its captive screws with a number 2 Phillips or a 3/16-inch, flat-blade screwdriver. (See Figure 26.)

Figure 26   Reseating the I/O Controller (Cisco uBR7246 Shown)

Note The I/O controller is not fully seated in the router midplane until you tighten the captive installation screws (use a number 2 Phillips or a 3/16-inch, flat-blade screwdriver).

This completes the procedure for reseating an I/O controller. Proceed to the following section "Reseating the Port Adapters."

Reseating the Port Adapters

Step 1 Attach an ESD-preventive wrist strap between you and an unfinished chassis surface (if you have not already done so).

Step 2 With the port adapter retention clip (for a Cisco uBR7246 VXR or Cisco uBR7246) or lever (for a Cisco uBR7223) still in the unlocked position, grasp the handle on the port adapter and gently push the port adapter all the way into its slot until you feel the connectors seat with the midplane. (See Figure 27.)

Figure 27 Reseating the Port Adapter (Cisco uBR7246 Shown)
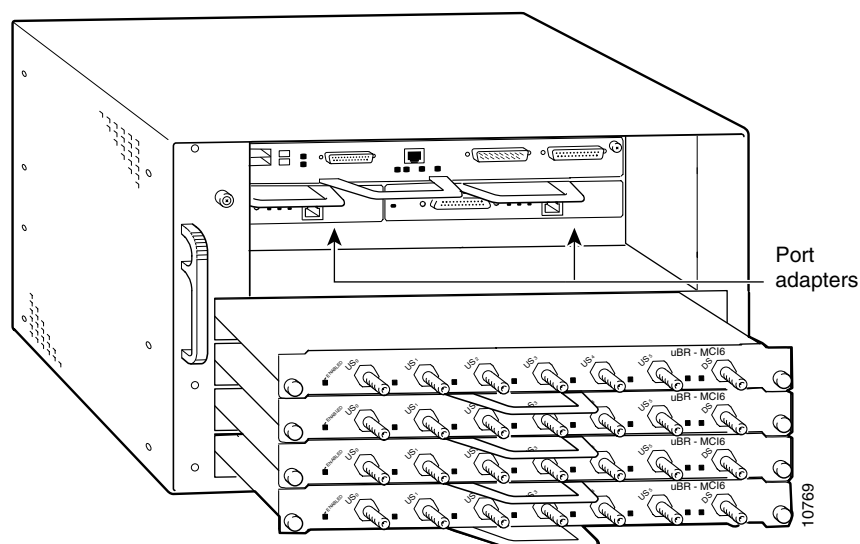
Port adapters

Step 3 For the Cisco uBR7246 VXR and Cisco uBR7246, slide the port adapter retention clip up to the locked position. Figure 28 shows the retention clip in the locked position.

Note If the retention clip does not slide up to the locked position, the port adapter is not completely seated in the midplane. Slide the retention clip completely down to the unlocked position. Carefully pull the port adapter halfway out of the slot, reinsert it, and slide the retention clip up to the locked position.

For the Cisco uBR7223, place the port adapter lever in the locked position. Figure 29 shows the lever in the locked position.

Note If the lever does not move to the locked position, the port adapter is not completely seated in the midplane. Move the lever to the unlocked position. Carefully pull the port adapter halfway out of the slot, reinsert it, and move the lever to the locked position.

Figure 28   **Placing the Port Adapter Retention Clip in the Locked Position (Cisco uBR7246 Shown)**

Port adapters

Port adapter
retention clip in
locked position

H11517
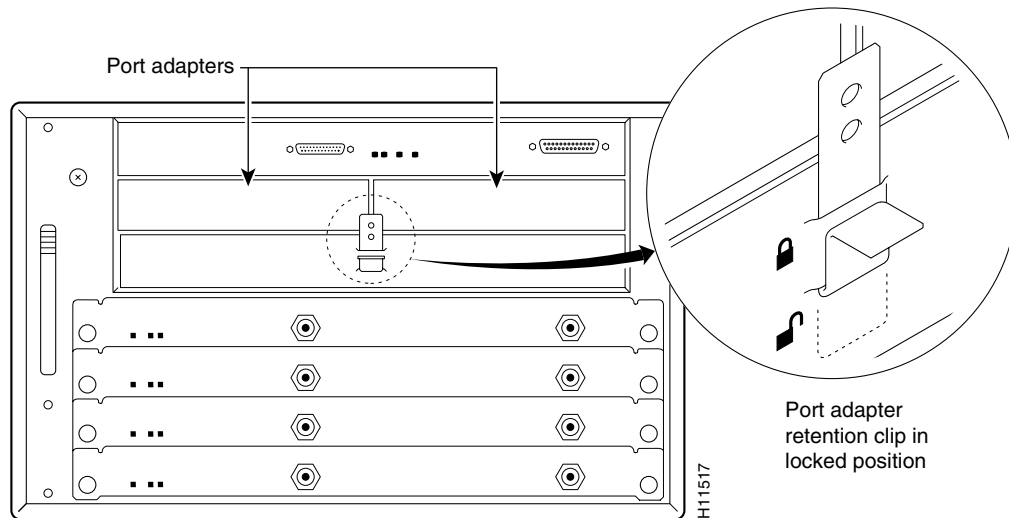
**Figure 29**   **Placing the Port Adapter Lever in the Locked Position (Cisco uBR7223)**

Port adapters

Port adapter
lever in locked
position

16177
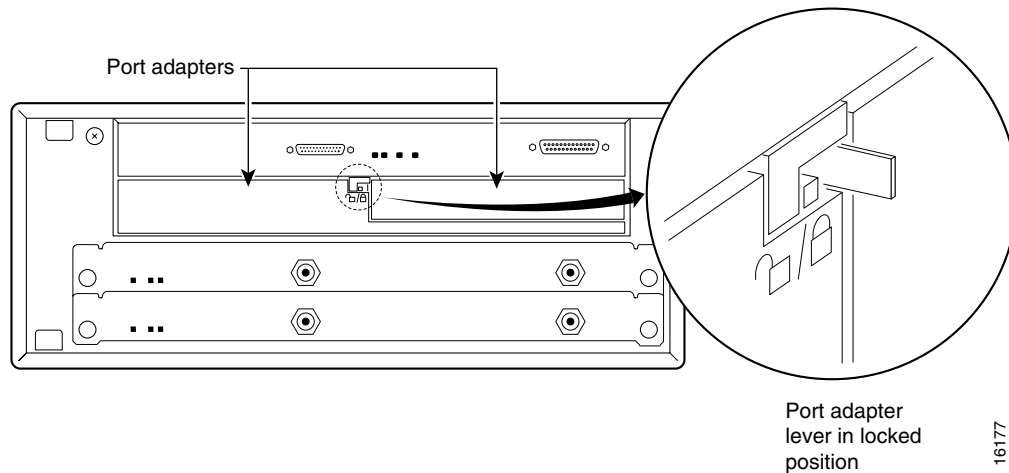
This completes the procedure for reseating a port adapter. Proceed to the following section "Reseating the Cable Modem Cards."

Reseating the Cable Modem Cards

Step 1 Attach an ESD-preventive wrist strap between you and an unfinished chassis surface (if you have not already done so).

Step 2 Grasp the handle on the cable modem card and gently push the modem card all the way into its slot until you feel the connectors mate with the midplane.

Step 3 Tighten the captive installation screws on the cable modem card. (See Figure 30.)

Note If the cable modem card captive installation screws do not tighten all the way, the cable modem card is not completely seated in the midplane. Carefully pull the cable modem card halfway out of the slot, reinsert it, and tighten the captive installation screws.

Figure 30 **Reseating the Cable Modem Cards (Cisco uBR7246 Shown)**
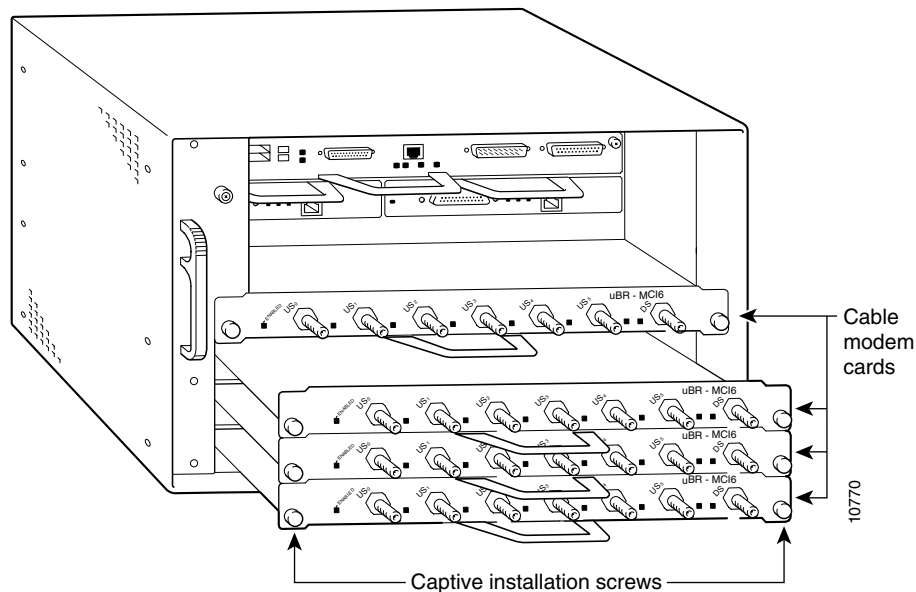
Step 4 Repeat this step for each cable modem card installed in the router.

This completes the procedure for reseating a cable modem card. Proceed to the following section "Reseating the Fan Tray."

Reseating the Fan Tray

Step 1 Guide the fan tray into the chassis making sure the power connector on the fan tray is aligned with the receptacle on the midplane.

Step 2 Secure the fan tray to the chassis using the attached captive installation screw. (For the Cisco uBR7246 VXR and Cisco uBR7246, see Figure 17. For the Cisco uBR7223, see Figure 18.)

This completes the procedure for reseating a fan tray. This also completes the procedure for reseating the I/O controller, port adapters, cable modem cards, and fan tray. If you have an AC-input power supply installed, proceed to the "Reconnecting AC-Input Power" section on page 31. If you have a DC-input power supply installed, proceed to the "Reconnecting DC-Input Power" section on page 32.

Reconnecting AC-Input Power

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

Step 2 Push the cable-retention clip to the left, away from the AC receptacle, and plug in the power cable.

> **Note** Each AC-input power supply has an electrical current rating of 7A.

Step 3 Secure the cable in the power supply AC receptacle by pushing the cable-retention clip to the right until it snaps around the connector. The cable-retention clip provides strain relief for the AC power cable. (See Figure 31.)

Figure 31 **Connecting AC-Input Power**
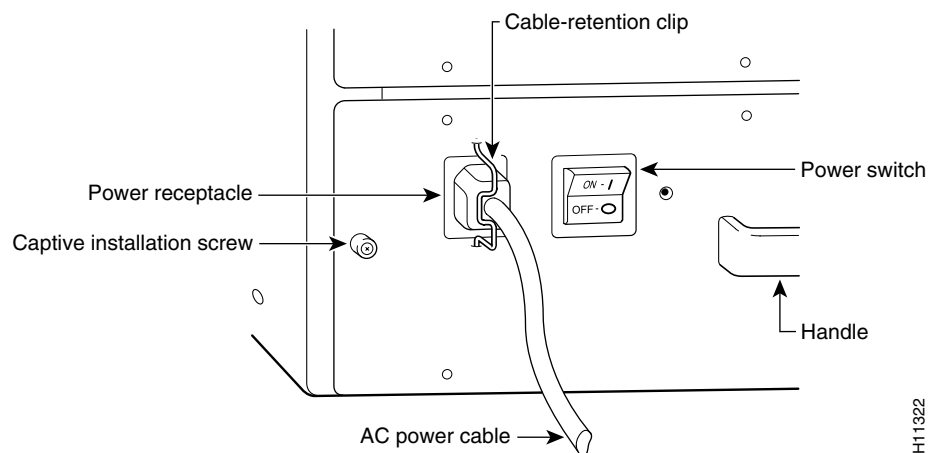
Step 4 Plug the AC power supply cable into the AC power source.

> **Note** Each AC-input power supply operating at 120 VAC requires a minimum of 7A service.

This completes the steps for reconnecting AC-input power. Proceed to the "Powering Up the Router" section on page 34.

Reconnecting DC-Input Power

Note   The color coding of the DC-input power supply leads depends on the color coding of the DC power source at your site. Typically, green or green/yellow is used for ground, black is used for +48V (return), and red or white is used for –48V. Make certain the lead color coding you choose for the DC-input power supply matches lead color coding used at the DC power source.

Warning   Before completing any of the following steps, and to prevent short-circuit or shock hazards, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.

Warning   When installing the unit, the ground connection must always be made first and disconnected last.

Step 1   Ensure that the –48V and +48V leads are disconnected from the power source.

Step 2   At the rear of the router, check that the power switch on the power supply is in the OFF (0) position.

Step 3   Connect the two-hole grounding lug on the grounding lead to the M5 grounding receptacles with the M5 nuts. Tighten the nuts using an 8 mm wrench or nut driver (or adjustable wrench). (See Figure 33.)

Step 4   If necessary, use a wire stripper to strip approximately 0.55 inch (14 mm) from the –48V and +48V leads. (See Figure 32.)

Figure 32   **Stripping the DC-Input Leads**
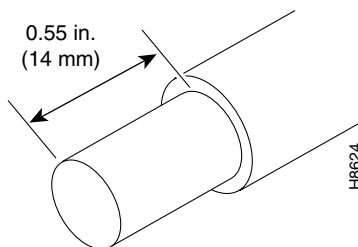
Step 5   Insert the stripped end of the +48V lead all the way into the +48V lead receptacle and tighten the receptacle screw using the same 3/16-inch flat-blade screwdriver. Repeat Step 5 for the –48V lead.

Note   Make sure the entire stripped end of each lead is inserted all the way into its receptacle. If any exposed wire at the stripped end of a lead is visible after inserting the lead into its receptacle, remove the lead from the receptacle, use the wire stripper to cut the stripped end of the lead, and repeat Step 4 through Step 5.

Step 6   After tightening the receptacle screws and nuts for the ground, +48V, and –48V DC-input leads, run the +48V and –48V leads between the two strain-relief studs on the power supply faceplate. (See Figure 33.)

Figure 33   Connecting DC-Input Power
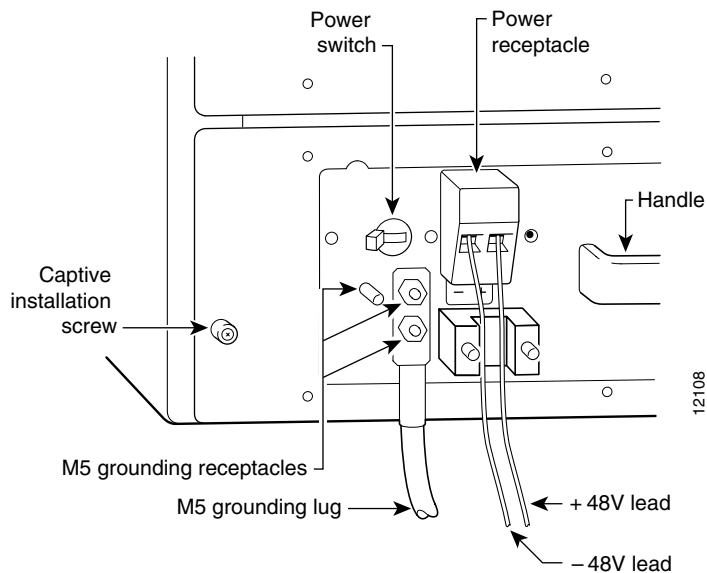
Step 7   Replace the strain-relief cover over the +48V and –48V leads and secure the cover to the strain-relief studs using the two M4 nuts with a 7 mm wrench or nut driver (or adjustable wrench). (See Figure 34.)

Figure 34   Replacing the Strain-Relief Cover on a Cisco uBR7200 Series DC-Input Power Supply
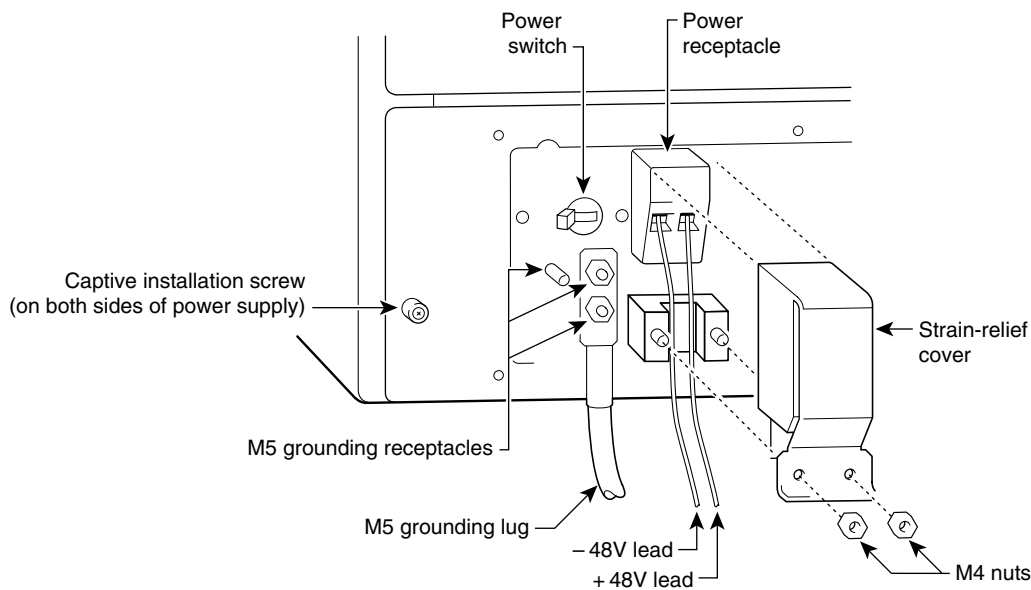
Step 8 Connect the ground, +48V, and –48V leads to the power source.

Note Each DC-input power supply has an electrical current rating of 14A, 700 VA. Use a minimum of 12 AWG (4 mm2) wire for the input to each DC-input power supply. The power input must be protected by a 20A circuit breaker or fuse that is in compliance with your local electric regulations.

This completes the procedure for connecting DC-input power. Proceed to the following section "Powering Up the Router."

Powering Up the Router

Step 1 Check for the following:

- Each port adapter is inserted in its slot, and the port adapter retention clip (Cisco uBR7246 VXR and Cisco uBR7246) or lever (Cisco uBR7223) is in the locked position.

- Each cable modem card is inserted in its slot, and the captive installation screws are tightened.

- The network processing engine and the I/O controller are inserted in their respective slots, and the captive installation screws are tightened.

- All network interface cables are connected to the port adapters.

- A Flash memory card is installed in its PCMCIA slot (if present).

- Each AC-input power cable is connected and secured with the cable-retention clip. (AC-input power supplies only.)

- Each DC lead is connected and secured to the power supply faceplate (the grounding lug is secured to the M5 grounding receptacle, and the +48V and –48V leads are secured behind the strain-relief cover [DC-input power supplies only]).

- For installed DC-input power supplies, the tape (that you applied earlier) is removed from the circuit breaker switch handle, and power is restored by moving the circuit breaker handle to the ON position. (DC-input power supplies only.)

- The console terminal is turned on.

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

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

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

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

```
Cisco Internetwork Operating System Software
IOS (tm) uBR7200 Software (uBR7200-I-M), Version 11.3(2)XA1 [smith 100]
Copyright (c) 1986-1998 by cisco Systems, Inc.
Compiled Mon 09-Mar-98 04:10 by smith
```

This completes the procedures for powering up the router. This also completes the procedure for replacing the subchassis and midplane in a Cisco uBR7200 series router.

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