# Chassis Installation Procedures for Cisco 2800 Series Routers

This document describes how to install your Cisco 2800 series integrated services router on a desktop or in a rack. It includes the following sections:



**Note** To see translations of the warnings that appear in this publication, see the *Cisco 2800 Series and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information* document that accompanied this device.

**Warning** **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

**Warning** **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

**Warning** **Blank faceplates and cover 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, faceplates, front covers, and rear covers are in place.** Statement 1029


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**Warning** **The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed.** Statement 1077

# Installing Modules and Interface Cards

Cisco routers are normally shipped with network modules, high-speed WAN interface cards (HWICs), and voice interface cards (VICs) already installed. If you need to remove or install any of these items, see the following product installation documents, either online or shipped with the product:

**For Network Modules**

- Installing Network Modules in Cisco 2800 Series Routers
- *Quick Start Guide: Cisco 2800 Series Intergrated Services Routers Quick Start Guide*
- *Installing Network Modules in Cisco 2800 Series Routers*

**For HWICs and VICs:**

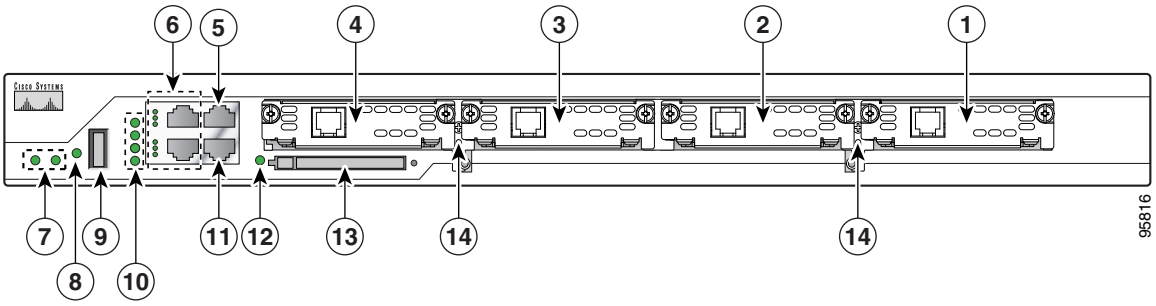
- Installing Interface Cards in Cisco 2800 Series Routers
- *Quick Start Guide: Interface Cards for Cisco 1600, 1700, 2600, 3600, and 3700 Series ---and Cisco 2800 Series*
- *Installing Interface Cards in Cisco 2800 Series Routers*

The chassis slots for network modules and interface cards are identified in Figure 1, Figure 2, Figure 3, and Figure 4.

If the required network modules, interface cards, and internal field-replaceable units (FRUs) are already installed, proceed to the "Setting Up the Chassis" section on page 5.

If you need to remove or install any internal FRUs, see the "Installing Internal Field-Replaceable Units (FRUs)" section on page 4.

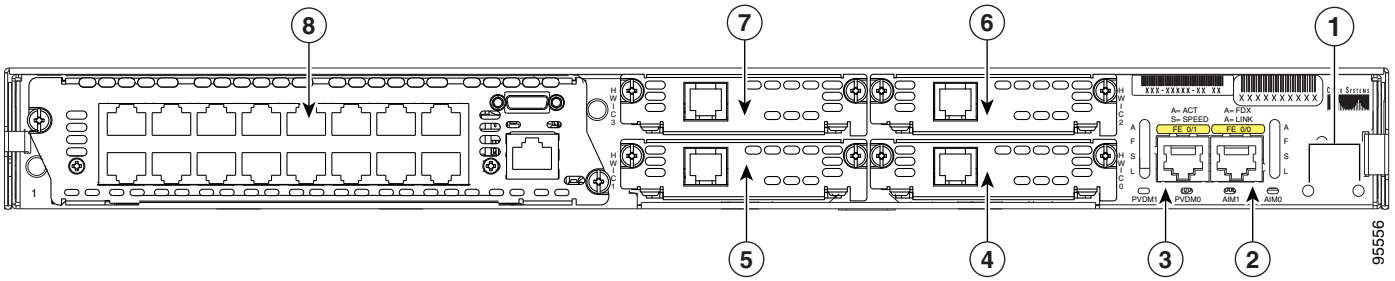
***Figure 1 Chassis Slot Locations in Cisco 2801 Routers***




| | | | |
|---|---|---|---|
| **1** | Slot 0 (VIC or VWIC, voice only—no PRI) | **8** | Auxiliary power (AUX/PWR) LED |
| **2** | Slot 1 (WIC, VIC, VWIC, or HWIC) | **9** | Universal serial bus (USB) port |
| **3** | Slot 2 (WIC, VIC, or VWIC) | **10** | AIM/PVDM LEDs |
| **4** | Slot 3 (WIC, VIC, VWIC, or HWIC) | **11** | Auxiliary port |

| | | | |
|---|---|---|---|
| **5** | Console port | **12** | CompactFlash (CF) LED |
| **6** | Fast Ethernet ports and LEDs | **13** | External CompactFlash memory card slot |
| **7** | System LEDs | **14** | Removable center card guides to allow double-wide HWIC-D installation |

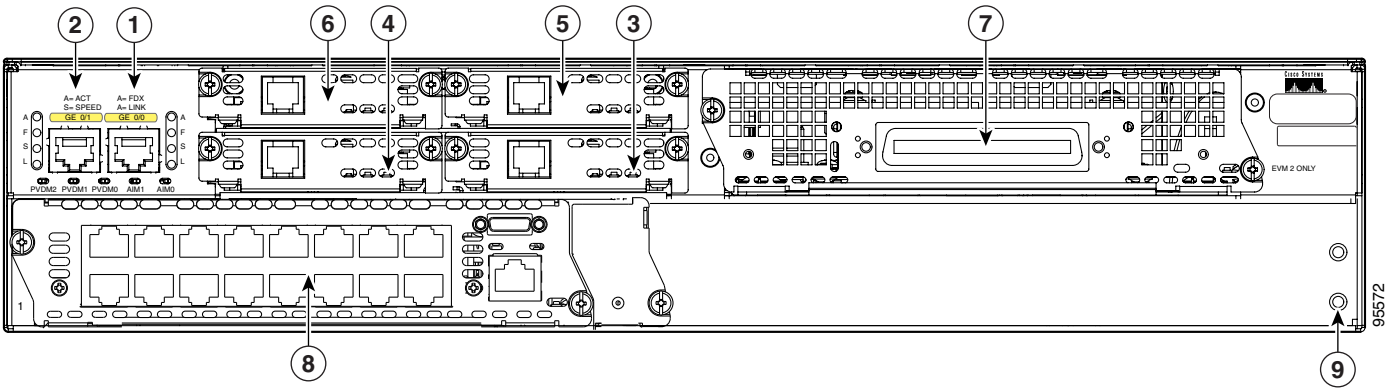
***Figure 2 Chassis Slot Locations in Cisco 2811 Routers***




| | | | |
|---|---|---|---|
| **1** | Screw holes for ground lug | **5** | High-speed WAN interface card slot 1 |
| **2** | Fast Ethernet port 0/0 | **6** | High-speed WAN interface card slot 2 |
| **3** | Fast Ethernet port 0/1 | **7** | High-speed WAN interface card slot 3 |
| **4** | High-speed WAN interface card slot 0 | **8** | Network module enhanced (NME) slot[1] |

1. The network module slot is compatible with Cisco network modules of type NM (network module) and NME (network module enhanced).

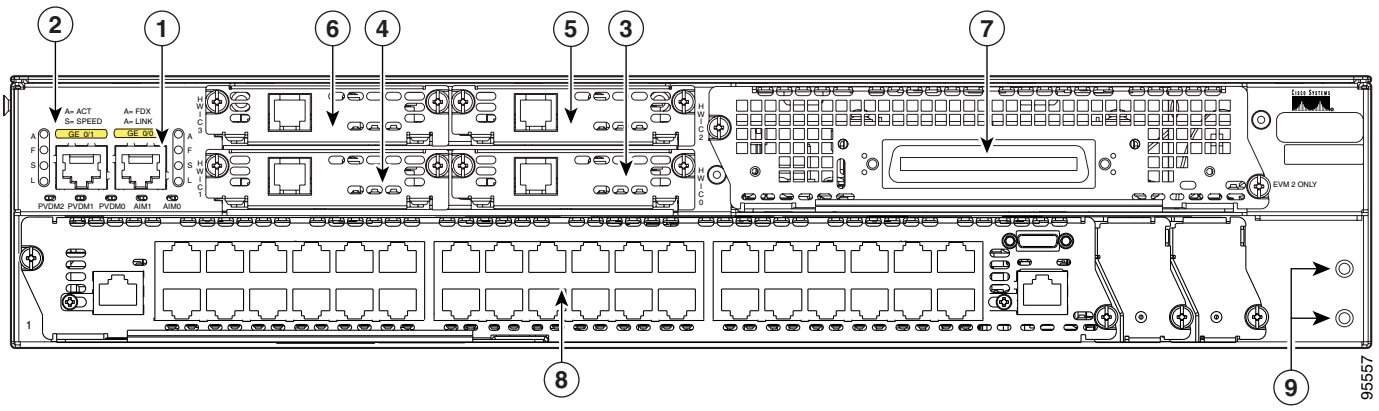
***Figure 3 Chassis Slot Locations in Cisco 2821 Routers***




| | | | |
|---|---|---|---|
| **1** | Gigabit Ethernet port 0/0 | **6** | High-speed WAN interface card slot 3 |
| **2** | Gigabit Ethernet port 0/1 | **7** | Extension voice module slot |
| **3** | High-speed WAN interface card slot 0 | **8** | Network module enhanced (NME) slot[1] |
| **4** | High-speed WAN interface card slot 1 | **9** | Screw holes for ground lug |
| **5** | High-speed WAN interface card slot 2 | | |

1. The network module slot is compatible with Cisco network modules of type NM (network module), NME (network module enhanced), and NME-X (enhanced extended).

*Figure 4 Chassis Slot Locations in Cisco 2851 Routers*




| | | | |
|---|---|---|---|
| **1** | Gigabit Ethernet port 0/0 | **6** | High-speed WAN interface card slot 3 |
| **2** | Gigabit Ethernet port 0/1 | **7** | Extension voice module slot |
| **3** | High-speed WAN interface card slot 0 | **8** | Network module enhanced (NME) slot[1] |
| **4** | High-speed WAN interface card slot 1 | **9** | Screw holes for ground lug |
| **5** | High-speed WAN interface card slot 2 | | |

1. The network module slot is compatible with Cisco network modules of type NM (network module), NME (network module enhanced), NME-X (enhanced extended), NMD (double-wide), and NME-XD (enhanced extended double-wide).

# Installing Internal Field-Replaceable Units (FRUs)

Cisco routers are shipped with default memory and power supplies already installed, and usually configured and shipped with interface cards, network module cards, packet voice data modules (PVDMs) and advanced integration modules (AIMs). If you need to remove or install any of the internal items, see the following product installation documents:

### For AIMs

The "Installing and Removing AIMs" section of the *Installing and Upgrading Internal Modules in Cisco 2800 Series Routers* online document

### For PVDMs

- The "Installing and Removing PVDMs" section of the *Installing and Upgrading Internal Modules in Cisco 2800 Series Routers* online document

### For Internal Power Supplies

- The "Replacing the Power Supply" section of the *Installing and Upgrading Internal Modules in Cisco 2800 Series Routers* online document

### For Installing DRAM, SDRAM, or NVRAM

- The "Installing and Removing DRAM DIMMs" section of the *Installing and Upgrading Internal Modules in Cisco 2800 Series Routers* online document

**For Installing CompactFlash Memory Cards**

- The "Installing a CompactFlash Memory Card" section of the *Removing and Installing CompactFlash Memory Cards in Cisco 2800 Series Routers* online document

**Note** If there are internal FRUs to be removed or installed, perform the installation or removal before you install the chassis in a rack on a wall. To remove internal FRUs, you have to remove the chassis cover; this requires removal of the chassis from the rack.

If the required internal FRUs are already installed, proceed to the next section, "Setting Up the Chassis".

# Setting Up the Chassis

**Note** Cisco 2800 series routers are normally ordered with modules and interface cards preinstalled. Before you remove or install any modules or interface cards, see the documents that accompany those items or to the online Cisco 2800 series hardware installation documentation at the following URL:

http://www.cisco.com/en/US/docs/routers/access/2800/hardware/installation/guide/hw.html

For module and interface card compatibility information, see the data sheet for each module and interface card.

**Warning** **Before working on a system that has an on/off switch, turn OFF the power and unplug the power cord.** Statement 1

You can set any Cisco 2800 series router on a desktop or install it in a rack. A Cisco 2811 router can also be mounted on a wall or other flat surface. See the applicable instructions in the following sections.

- Rack-Mounting the Chassis
- Setting the Chassis on a Desktop
- Mounting a Cisco 2811 Router on a Wall

**Caution** To prevent damage to the chassis, never attempt to lift or tilt the chassis by the plastic panel on the front. Always hold the chassis by the metal body.

## Rack-Mounting the Chassis

If you are planning to rack-mount the router, do so before making network and power connections. If you need to install network modules or interface cards, you can do so either before or after rack-mounting the router. Ideally, you would install modules and interface cards when you have the best access to the rear panel of the router. Internal modules, such as advanced integration modules (AIMs) or packet voice data modules (PVDMs), should be installed prior to rack-mounting.

Cisco 2811, Cisco 2821, and Cisco 2851 routers can be installed in 19 (48.26-cm)- and 23-inch (58.42-cm) racks. Cisco 2801 routers can be installed only in 19-inch racks, and cannot be center mounted. Use the standard brackets shipped with the router for mounting the chassis in a 19-inch rack; you can order optional larger brackets for mounting the chassis in a 23-inch rack.

**Note** Brackets for 23-inch (58.42-cm) equipment racks are not available for Cisco 2801 routers.

You can mount the router in the following ways:

- Center mounting—Brackets attached in the center of the chassis with only the front panel facing forward. (This option is not available on Cisco 2801 routers.)
- Front mounting—Brackets attached at the front of the chassis with the front panel facing forward.
- Rear mounting—Brackets attached at the rear of the chassis with the rear panel facing forward.

The brackets are shown in Figure 5, Figure 6, and Figure 7.

***Figure 5 Rack-Mounting Brackets for Cisco 2801 Routers for 19-Inch Rack***

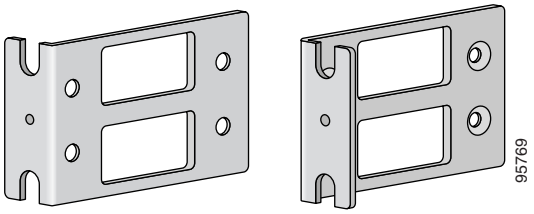



***Figure 6 Rack-Mounting Brackets for Cisco 2811 Routers***

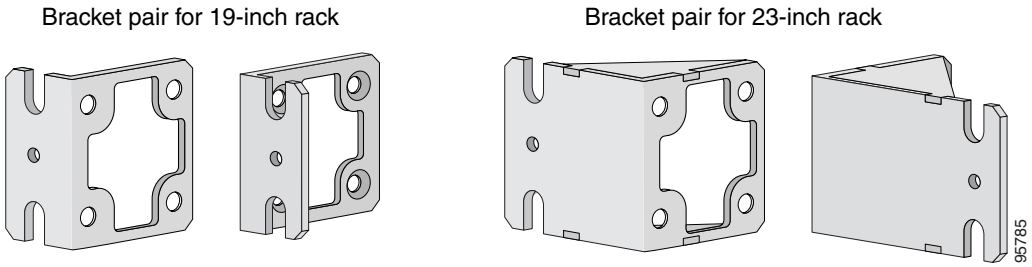
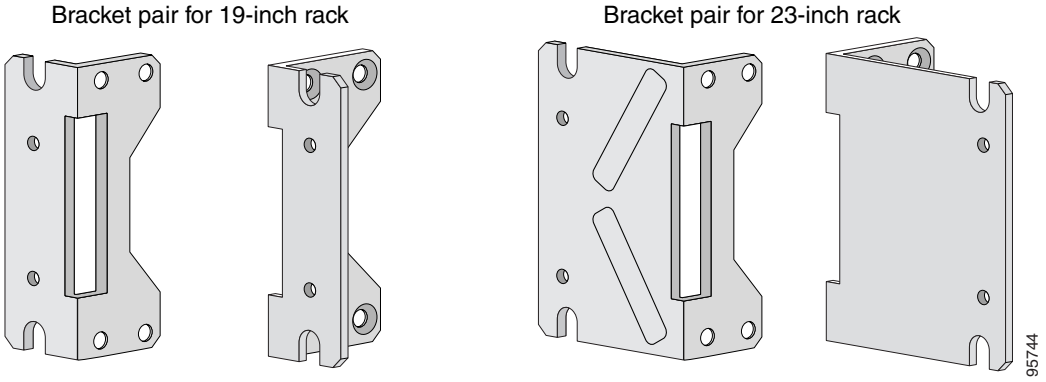


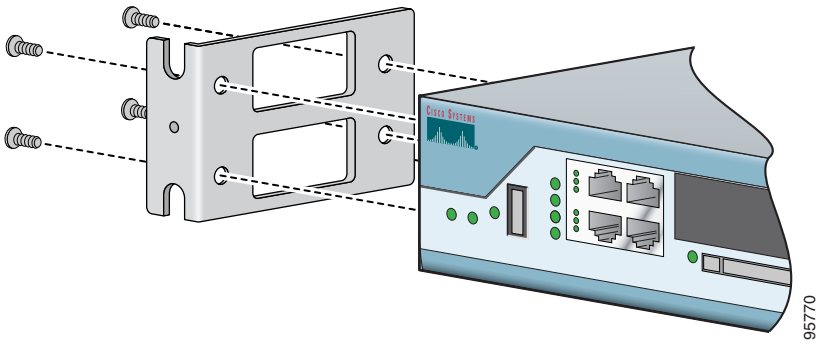

***Figure 7 Rack-Mounting Brackets for Cisco 2821 and Cisco 2851 Routers***



## Attaching Rack-Mount Brackets to Cisco 2801 Routers

Use four of the supplied number-8 Phillips flat-head screws to attach the long side of each bracket to the router. Figure 8 shows how to attach the brackets to the sides of the router with the front panel forward.

*Figure 8 Attaching Rack-Mounting Brackets to a Cisco 2801 Router*




## Attaching Rack-Mount Brackets to Cisco 2811, Cisco 2821, and Cisco 2851 Routers

Attach the mounting brackets to the router chassis as shown in Figure 9 through Figure 11, using the screws provided.

**Caution** Do not overtorque the screws. The recommended torque is 15–18 inch-lb (1.7–2.0 N-m).

Attach the second bracket to the opposite side of the chassis. Use a number 2 Phillips screwdriver to install the bracket screws.

**Caution** Your chassis installation must allow unrestricted airflow for chassis cooling.

*Figure 9 Bracket Installation for Front Mounting*

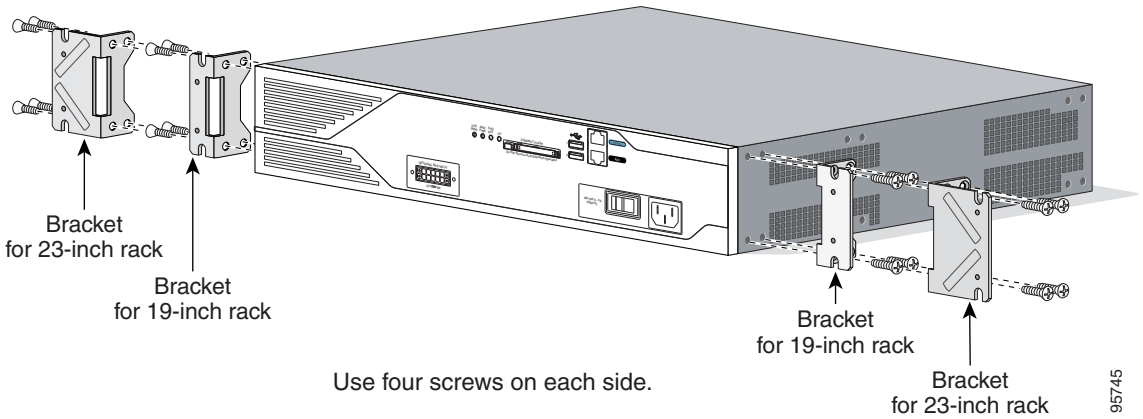


*Figure 10 Bracket Installation for Rear Mounting*

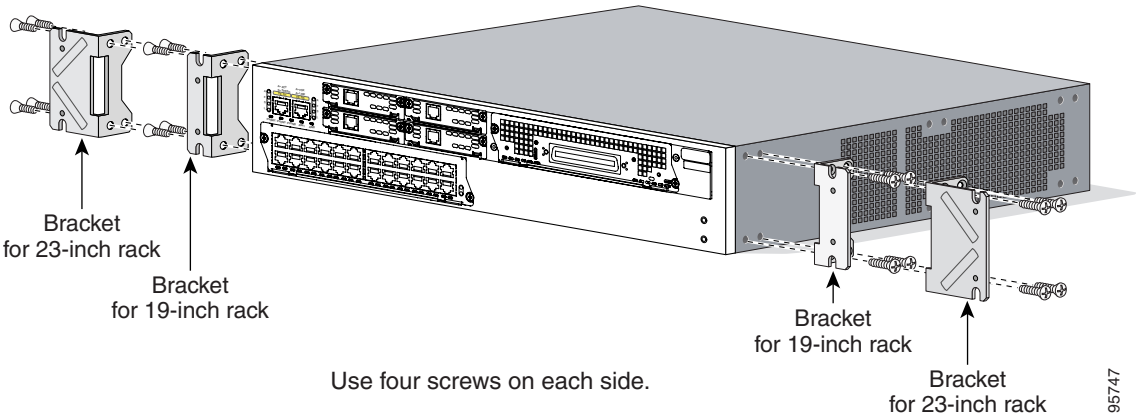
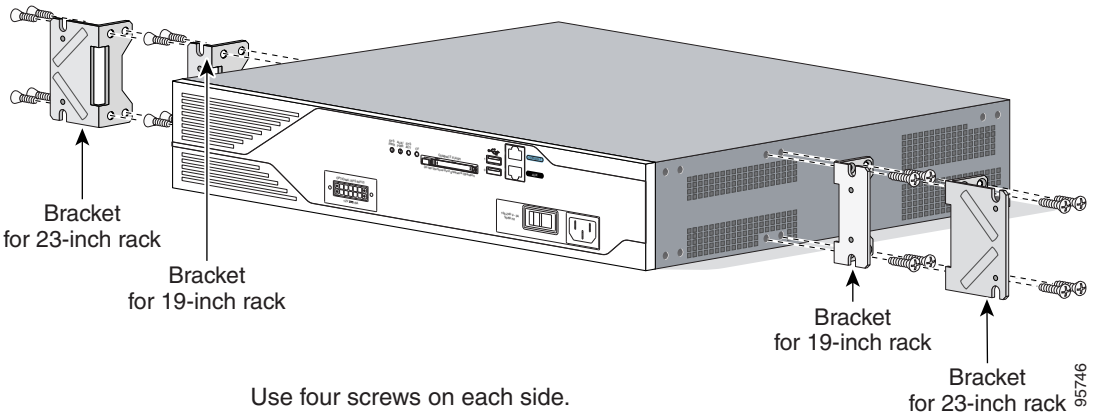



*Figure 11 Bracket Installation for Center Mounting with Front Panel Forward*




## Installing the Router in a Rack

After you have attached the brackets to the router chassis, use the screws provided with the rack to install the chassis in the rack. (See Figure 12.)

**Tip** Start the lower pair of screws first, and rest the brackets on the lower screws while you insert the upper pair of screws.

**Tip** The screw slots in the brackets are spaced to line up with every *second* pair of screw holes in the rack. When the correct screw holes are used, the small threaded holes in the brackets line up with unused screw holes in the rack. If the small holes do not line up with the rack holes, you must raise or lower the brackets to the next rack hole.

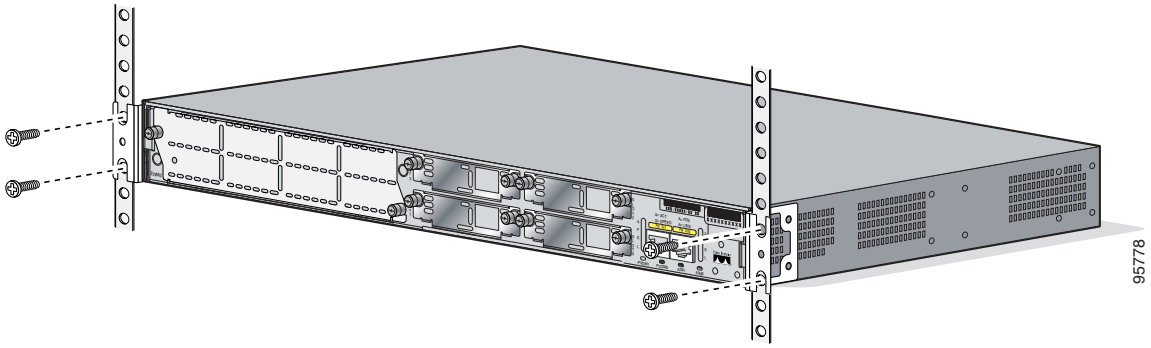
**Warning** **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

- **This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**
- **When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**
- **If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

**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.** Statement 1032

**Caution** Be sure to leave space above and below each router in a rack, to allow for cooling air circulation.

*Figure 12 Mounting the Chassis in a Rack (Typical)*




## Attaching Optional Cable Management Bracket

The optional cable management bracket provides attachment points for organizing and routing cables. On brackets for the Cisco 2801 and Cisco 2811 routers, attach the cable management bracket to the left or right rack-mount bracket using the screw provided, as shown in Figure 13 and Figure 14. On brackets for 2-rack-unit-high Cisco 2821 and Cisco 2851 routers, you can attach the cable management bracket to either the upper or lower threaded hole on either the left or right rack-mount brackets using the screw provided.

*Figure 13 Attaching the Optional Cable Management Bracket to the Cisco 2801 Router*

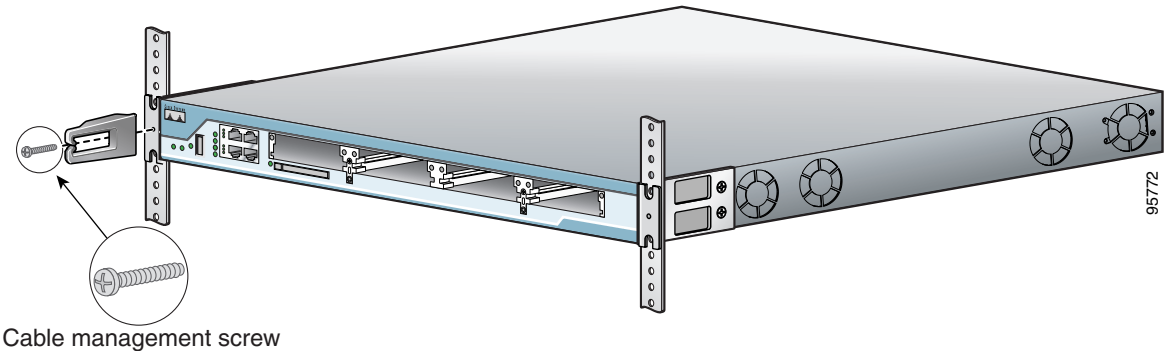
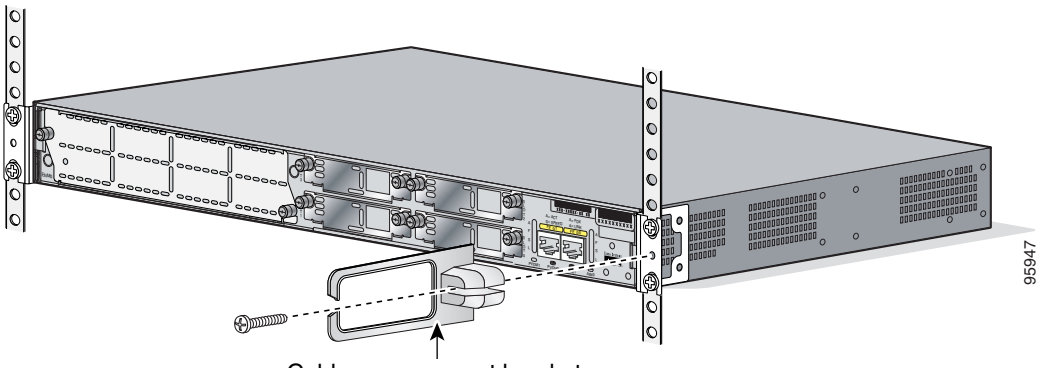



*Figure 14 Attaching the Optional Cable Management Bracket to a Cisco 2811, 2821, or 2851 Router*




## Chassis Grounding

After the router is installed, you must connect the chassis to a reliable earth ground. For the chassis ground connection procedures, see the "Installing the Chassis Ground Connection" section on page 13.

# Setting the Chassis on a Desktop

You can place Cisco 2800 series routers on a desktop or shelf. If you are placing a Cisco 2801 router on a desktop, you must first install the four rubber feet that are supplied in the accessory kit. They provide space for air circulation and antiskid protection. Peel the rubber feet from the adhesive strip, and stick them onto the features marked "+" on the bottom of the chassis.

**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.** Statement 1032

**Caution** Do not place anything on top of the router that weighs more than 10 pounds (4.5 kg), and do not stack routers on a desktop. Excessive distributed weight of more than 10 pounds, or pound point load of 10 pounds on top could damage the chassis.

**Caution** Your chassis installation must allow unrestricted airflow for chassis cooling. For placing the router on a desktop, keep at least 1 inch (2.54 cm) of clear space beside the cooling inlet and exhaust vents.

After the router is installed, you must connect the chassis to a reliable earth ground. For the chassis ground connection procedures, see the "Installing the Chassis Ground Connection" section on page 13.

# Mounting a Cisco 2811 Router on a Wall

This section explains how to mount Cisco 2811 routers on a wall or other vertical surface. Mounting Cisco 2801, Cisco 2821, and Cisco 2851 routers on a wall is not recommended.

The following warning applies to Cisco 2811 routers:

**Warning** **This unit is intended to be mounted on a wall. Please read the wall mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system.** Statement 248

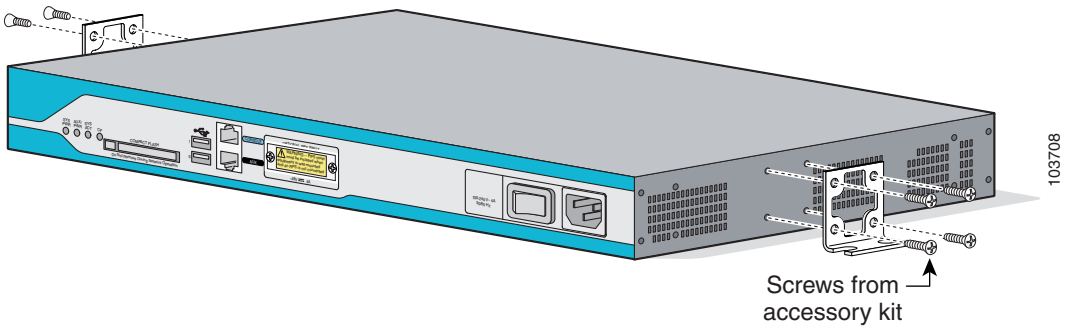
**Tip** When choosing a wall mounting location, consider cable limitations and wall structure.

Use brackets designed for 23-inch rack-mounting (shown in Figure 6) to wall-mount the chassis.

## Attaching Brackets to the Router for Wall Mounting

Attach the standard brackets to the chassis as shown in Figure 15, using the four screws provided for each bracket.

*Figure 15 Attaching the Brackets for Wall-Mounting a Cisco 2811 Router*



## Attaching the Router to a Wall

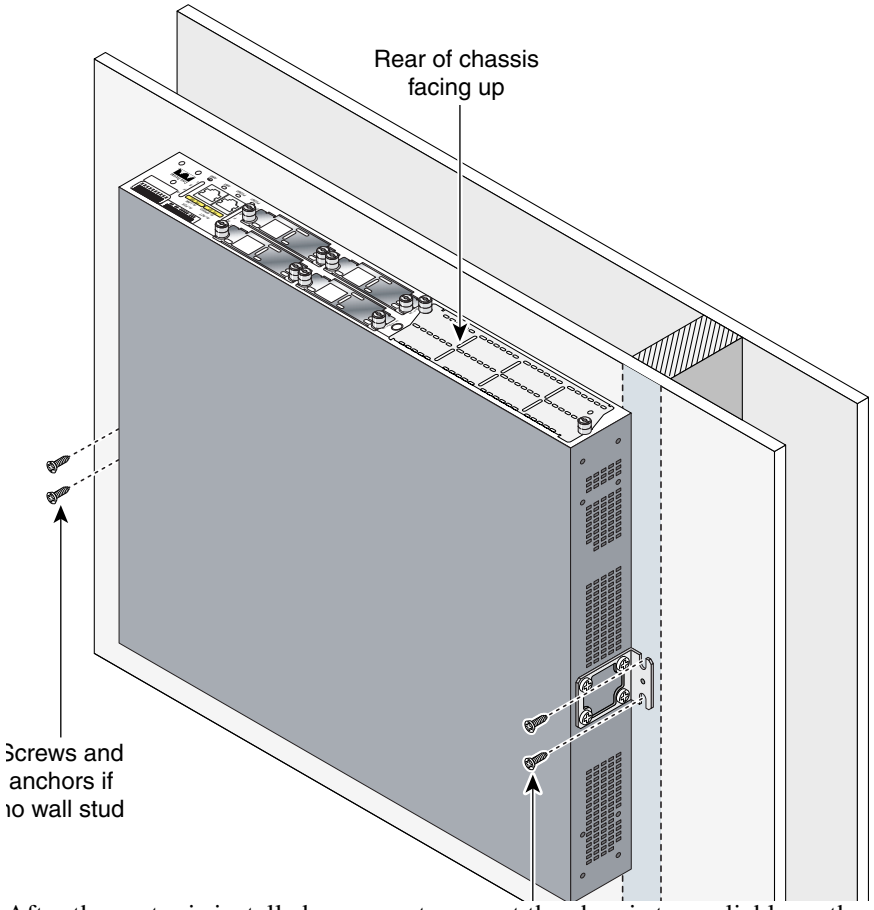
Attach the router to the wall using the brackets previously attached and attachment hardware that you provide as follows:

- For attaching to a wall stud, each bracket requires two #10 wood screws (round- or pan-head) with #10 washers, or two #10 washer-head screws. The screws must be long enough to penetrate at least 3/4 inch (20 mm) into supporting wood or metal wall stud.
- For hollow-wall mounting, each bracket requires two wall anchors with washers. Wall anchors and washers must be size #10.

**Caution** The router must be mounted with the power connections oriented downward. Failure to do so could present a fire hazard.

- Figure 16 shows a typical wall-mounted installation.

***Figure 16 Mounting the Chassis on the Wall***




After the router is installed, you must connect the chassis to a reliable earth ground. For the chassis ground connection procedures, see the "Installing the Chassis Ground Connection" section on page 13.

# Installing the Chassis Ground Connection

**Warning** **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024

**Warning** **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you chould shock yourself.** Statement 94

You must connect the chassis to a reliable earth ground; the ground wire must be installed in accordance with local electrical safety standards.

- For NEBS-compliant grounding, use size 6 AWG (13 $mm^2$) copper wire and the ground lug provided in the accessory kit.

  **Note** NEBS-compliant grounding is not supported on the Cisco 2801 router.

- For NEC-compliant grounding, use size 14 AWG (2 $mm^2$) or larger copper wire and an appropriate user-supplied ring terminal with an inner diameter of 1/4 in. (5–7 mm).
- For EN/IEC 60950-compliant grounding, use size 18 AWG (1 $mm^2$) or larger copper wire and an appropriate user-supplied ring terminal.

To install the ground connection for a Cisco 2800 series router, perform the following steps:

**Step 1** Strip one end of the ground wire to the length required for the ground lug or terminal.

- For the NEBS ground lug—approximately 0.75 in. (20 mm)
- For user-provided ring terminal—as required

**Step 2** Crimp the ground wire to the ground lug or ring terminal, using a crimp tool of the appropriate size.

**Step 3** Attach the ground lug or ring terminal to the chassis as shown in Figure 17, Figure 18, Figure 19, Figure 20, or Figure 21. For a ground lug, use the two screws with captive locking washers provided. For a ring terminal, use one of the screws provided. Tighten the screws to a torque of 8 to 10 in-lb (0.9 to 1.1 N-m).

**Step 4** Connect the other end of the ground wire to a known reliable earth ground point at your site.

*Figure 17 Chassis Ground Connection Using Ring Terminal on Cisco 2801 Chassis*

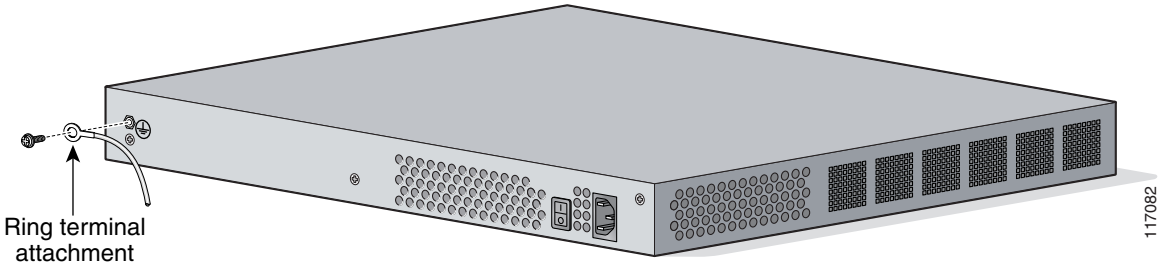



*Figure 18 NEBS-Compliant Chassis Ground Connection on Cisco 2811 Chassis*

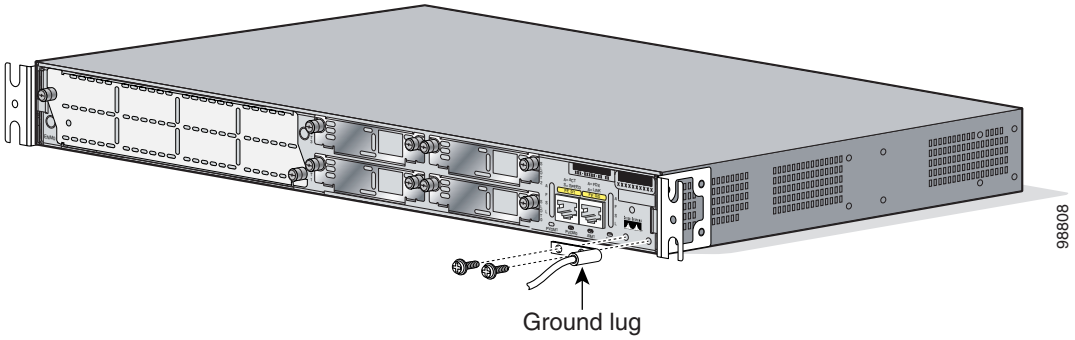



*Figure 19 Chassis Ground Connection Using Ring Terminal on Cisco 2811 Chassis*

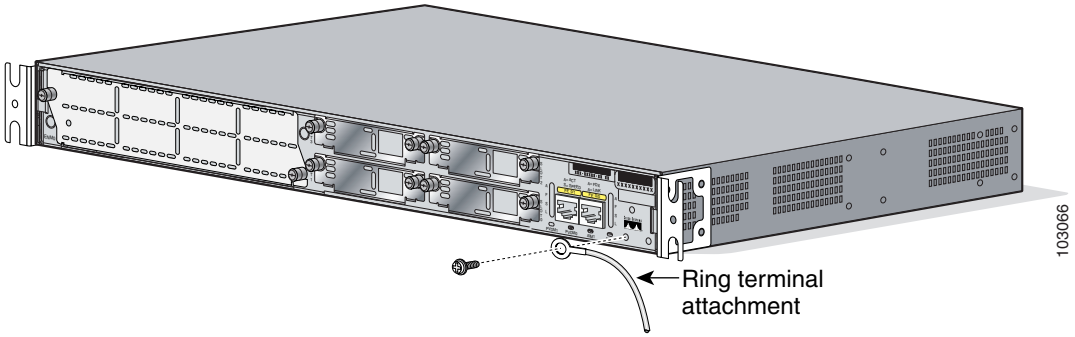


*Figure 20 NEBS-Compliant Chassis Ground Connection on Cisco 2821 or Cisco 2851 Chassis*

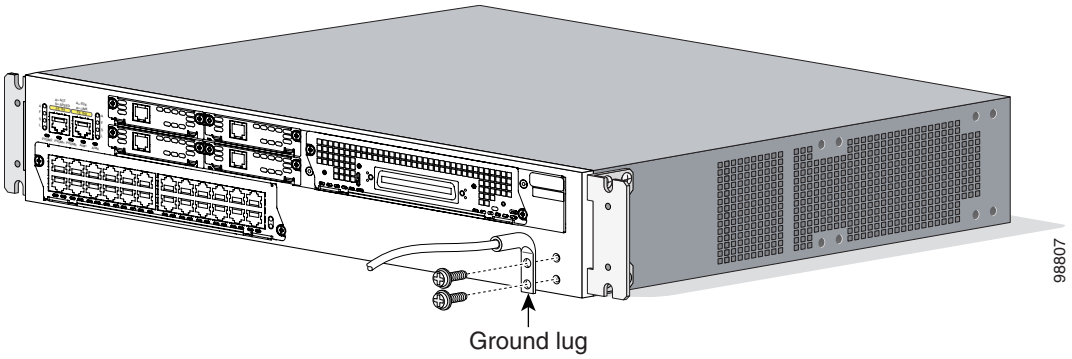
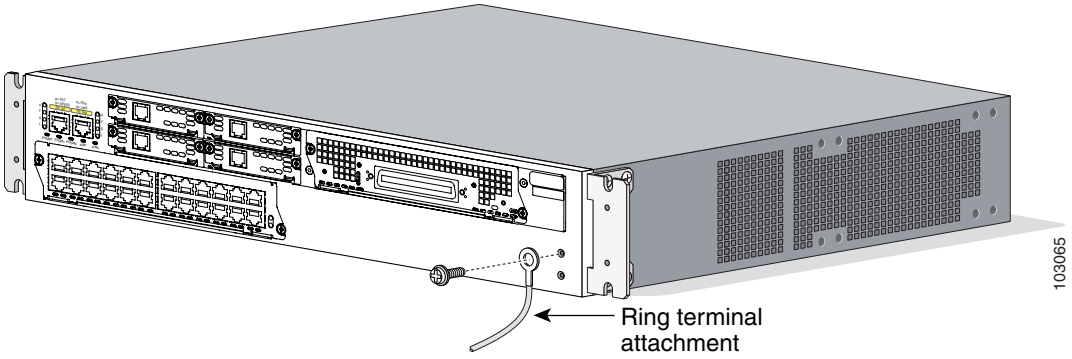



*Figure 21 Chassis Ground Connection Using Ring Terminal on Cisco 2821 or Cisco 2851 Chassis*




After the router has been installed and properly grounded, you can connect the power wiring; the WAN, LAN, and voice cables; and the cables for administrative access as required for your installation. For information about connecting the cables, see the Cable Connection Procedures for Cisco 2800 Series Routers online document.

This document is to be used in conjunction with the *Cisco 2800 Series Integrated Services Routers Quick Start Guide*.