



## CHAPTER 3

# Installing the Cisco uBR7200 Series Router

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This chapter explains how to install and connect a Cisco uBR7200 series universal broadband router and contains the following sections:

- [Cisco uBR7200 Series Router Installation Checklist, page 3-1](#)
- [Cisco uBR7200 Series Chassis Rack-Mounting Options, page 3-2](#)
- [Installing the Brackets on the Chassis, page 3-7](#)
- [Installing the Chassis in a Workbench or Tabletop Environment, page 3-13](#)
- [Cabling, page 3-14](#)
- [Console and Auxiliary Port Connection Equipment, page 3-16](#)
- [Connecting Power, page 3-21](#)
- [Powering On the Cisco uBR7200 Series Router, page 3-25](#)

## Cisco uBR7200 Series Router Installation Checklist

A rack-mount and cable-management kit is included in the shipping container. The rack-mount brackets in the kit are for mounting the Cisco uBR7200 series in standard, 19-inch-wide, four-post equipment racks or telco-type equipment racks. The rack-mount brackets are not suitable for use with other racks, such as 23-inch telco racks. The cable-management brackets are designed to relieve the strain on port adapter interface cables that are installed on port adapters in a Cisco uBR7200 series.

If you are installing an equipment shelf or using mounting hardware other than that supplied with the chassis, review the guidelines in the [“Equipment Racks” section on page 2-17](#), then proceed to the [“Cisco uBR7200 Series Chassis Rack-Mounting Options” section on page 3-2](#).

If you do not plan to install your Cisco uBR7200 series in an equipment rack, proceed to the [“Installing the Chassis in a Workbench or Tabletop Environment” section on page 3-13](#).

To assist you with your installation and to provide a historical record of what was done, and by whom, use the [“Table 3-1 Cisco uBR7200 Series Router Installation Checklist” section on page 3-2](#). Make a copy of this checklist and indicate when each procedure or verification is completed. When the checklist is completed, place it in your site log (see [Appendix G, “Site Log”](#)) along with the other records for your new router.

**Table 3-1 Cisco uBR7200 Series Router Installation Checklist**

Task	Verified by	Date
Router and all accessories unpacked		
Types and numbers of interfaces verified		
Verify shipping container contents see the <a href="#">“Shipping Container Contents” section on page 2-10</a>		
Router mounted in rack (optional)		
Cable-management brackets installed (optional but recommended)		
Chassis properly grounded		
AC or DC power cables connected to power sources and router; cables secured		
Captive installation screws on I/O controller and network processing engine checked		
Network interface cables and devices connected		
ASCII terminal attached to console port		
Console port set for 9600 baud, 8 data bits, no parity, and 1 stop bit (9600 8N1)		
System power turned on (DC OK LED is on)		
System boot complete (I/O controller ENABLED LED is on)		
I/O controller, network processing engine, all cable interface cards, all port adapters, and cable clock card operational (ENABLED LEDs on the port adapters and the I/O controller are turned on)		
System ready for global and interface-specific configuration		

## Cisco uBR7200 Series Chassis Rack-Mounting Options

The chassis mounts to two rack posts with brackets that attach to either the front, middle, or rear sides of the chassis. The inside width between the posts or mounting strips (left and right) must be at least 17.5 inches (44.45 cm).

Some equipment racks provide a power strip along the length of one of the mounting strips. [Figure 3-1](#) shows a typical 4-post equipment rack with a power strip along one of the back posts. If your rack has this feature, consider the position of the strip when planning fastener points and ensure that you will be able to pull port adapters and other FRUs straight out of their respective slots.

The inlet and exhaust ports for cooling air are located on the right and left of the chassis, respectively, so multiple universal broadband routers can be stacked in a rack with little or no vertical clearance.



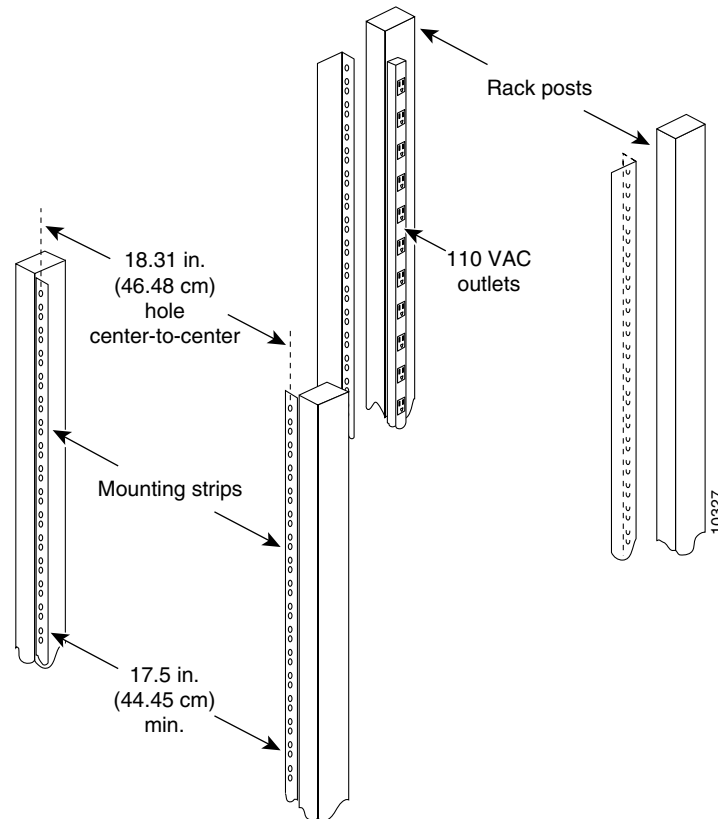
### Note

To illustrate the different methods for rack-mounting the Cisco uBR7200 series universal broadband router, this section displays figures specific to the Cisco uBR7246. The setup necessary to rack-mount the Cisco uBR7246VXR router is the same as for the Cisco uBR7246 router in all cases.

**Note**

We recommend the rear bracket mounting system for 4-post racks. This method enables you to keep cables from protruding too far out in front of the Cisco uBR7200 series router and to simultaneously manage the cables at the front of the chassis with the cable-management bracket.

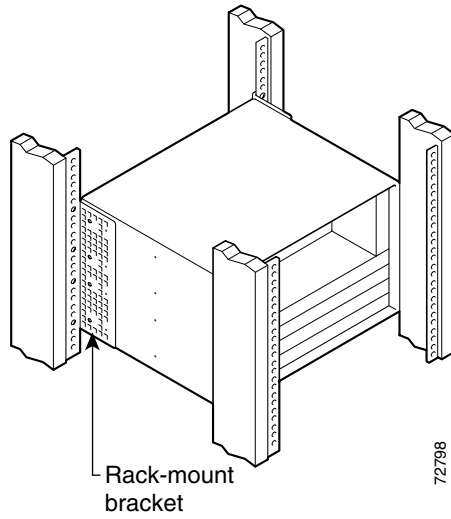
**Figure 3-1** Typical 4-Post Equipment Rack Posts and Mounting Strips



Mounting options are as follows:

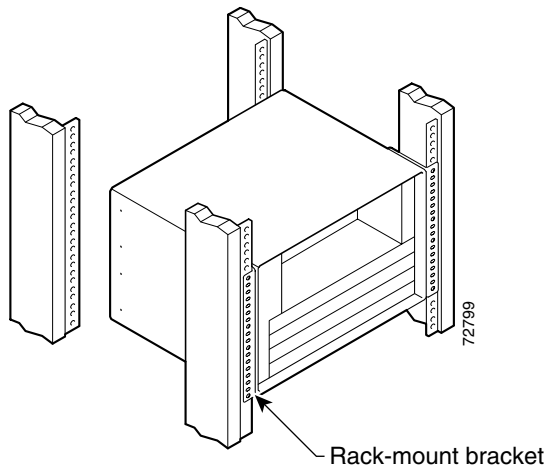
- If you want the port adapter and cable interface card end (the front) of the chassis recessed in the rack, install the rack-mount brackets at the rear of the chassis in the orientation shown in [Figure 3-2 on page 3-4](#).
- If you want the front of the chassis mounted flush with the front posts of the rack, install the rack-mount brackets at the front of the chassis in the orientation shown in [Figure 3-3 on page 3-4](#).
- If you want the front of the chassis protruding out of the rack, install the rack-mount brackets at the front of the chassis in the orientation shown in [Figure 3-4 on page 3-5](#).
- If you want the chassis in a telco-type rack, install the rack-mount brackets in the middle of the chassis in the orientation shown in [Figure 3-5 on page 3-5](#).

**Figure 3-2** *Installing the Chassis in a 4-Post Rack—Rear Installation*



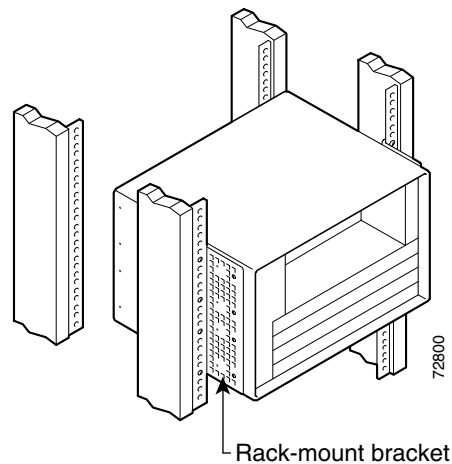
See the [“Installing Rack-Mount Brackets on the Rear of the Chassis”](#) section on page 3-7.

**Figure 3-3** *Installing the Chassis in a 4-Post Rack—Flush-Mounted Front Installation*



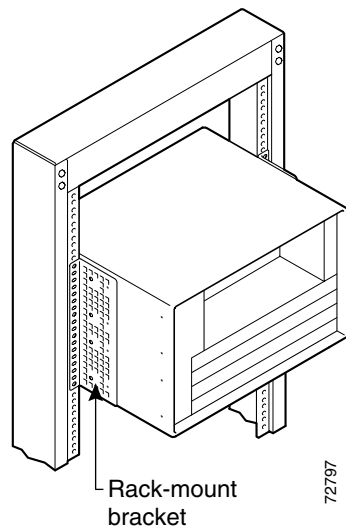
See the [“Installing Rack-Mount Brackets on the Front of the Chassis”](#) section on page 3-8 for bracket mounting information.

**Figure 3-4** Installing the Chassis in a 4-Post Rack-Chassis Protruding Front Installation



See the “[Installing Rack-Mount Brackets in the Middle of the Chassis](#)” section on page 3-10 for bracket mounting information.

**Figure 3-5** Installing the Chassis in a Telco-Type Rack



## Cable-Management Bracket Requirements

There are two cable-management bracket configurations available for rack-mounting the Cisco uBR7200 series router. In the first configuration, for a 4-post rack, the rack-mount brackets are installed at the rear of the chassis and the cable-management bracket is installed at the right front of the chassis. (See [Figure 3-6 on page 3-6](#).) You must install both sets of brackets before you install the chassis in the rack.



### Note

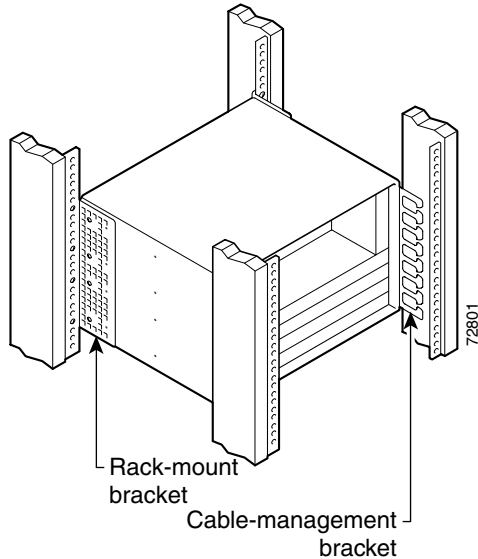
If you rack-mount a Cisco uBR7246 or Cisco uBR7246VXR router from the front, you cannot install a cable-management bracket.

In the second configuration, for a telco-type rack, the rack-mount brackets are installed at the middle of the chassis and the cable-management bracket is installed at the right front of the chassis. (See [Figure 3-7 on page 3-6](#).) You must install both sets of brackets before you install the chassis in the rack.

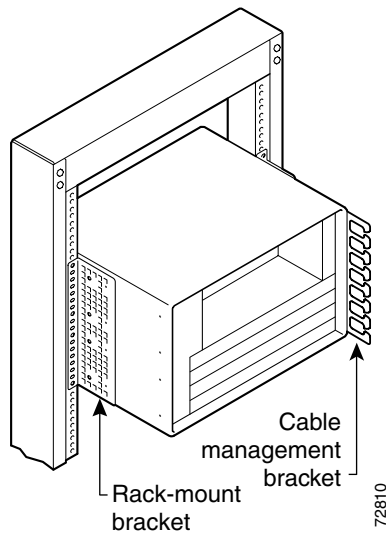
**Note**

The cable-management bracket must be installed on the right side of the chassis when viewed from the front for the Cisco uBR7246 and Cisco uBR7246VXR routers.

**Figure 3-6** *Installing the Chassis in a 4-Post Rack with an Installed Cable-Management Bracket*



**Figure 3-7** *Installing the Chassis in a Telco-Type Rack with an Installed Cable-Management Bracket*



## Installing the Brackets on the Chassis

This section explains how to install the rack-mount brackets and cable-management brackets on a Cisco uBR7200 series universal broadband router. Before installing the chassis in the rack, you must install a rack-mount bracket on each side of the front, middle, or rear of the chassis. If you are rack-mounting the Cisco uBR7246 or Cisco uBR7246VXR chassis from the front, you cannot use the cable-management bracket.

If you are rack-mounting the Cisco uBR7246 or Cisco uBR7246VXR chassis from the rear or middle of the chassis, you can install the rack-mount brackets and cable-management bracket separately; however, both rack-mount brackets and the single cable-management bracket must be installed on the chassis before the chassis is installed in the rack.

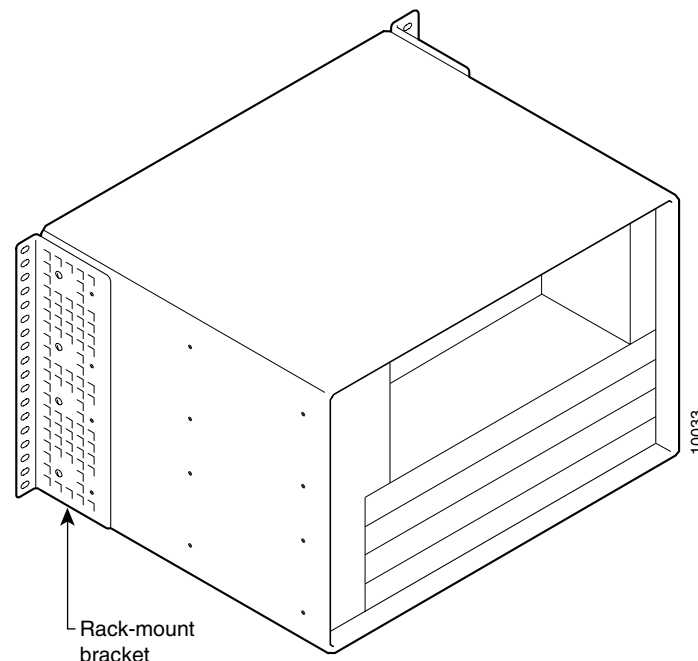
The parts and tools required for installing the rack-mount and cable-management brackets are listed in the “[Installation Tools](#)” section on page 2-8.

### Installing Rack-Mount Brackets on the Rear of the Chassis

To install the rack-mount brackets and cable-management bracket on the chassis for a rear rack-mount configuration, complete the following steps:

- 
- Step 1** Locate the threaded holes in the rear sides of the chassis.
  - Step 2** Align the first rack-mount bracket to the threaded holes in the right side of the chassis. See [Figure 3-8](#).

**Figure 3-8** Installing the Rack-Mount Brackets on the Rear of the Chassis



**Note**

There are eight holes in each of the rack-mount brackets for the Cisco uBR7246VXR and Cisco uBR7246 chassis. You may use either set of four holes to align the bracket to the threaded holes in the sides of the chassis.

- Step 3** Thread four M4 x 6-mm Phillips flathead screws through the rack-mount bracket and into the side of the chassis. Use a number 2 Phillips screwdriver to tighten the screws.
- Step 4** Repeat [Step 1](#) through [Step 3](#) for the other rack-mount bracket.
- Step 5** If you plan to include the cable-management bracket in your rear rack-mount configuration, align the bracket with the four right front-side holes.



**Note** The cable-management bracket must be installed on the right side of the Cisco uBR7246 and Cisco uBR7246VXR chassis when viewed from the front.

- Step 6** Thread two four M3 x 6-mm Phillips panhead screws through the cable-management bracket and into the chassis, and tighten the screws.

This completes the procedure for installing the rack-mount brackets and the cable-management bracket on the chassis for a rear rack-mount configuration. Proceed to the [“Installing the Chassis in the Rack”](#) section on page 3-11.



**Caution**

To prevent injury, review the safety precautions in [Chapter 2, “Preparing the Cisco uBR7200 Series Router for Installation,”](#) before installing the universal broadband router in a rack.

## Installing Rack-Mount Brackets on the Front of the Chassis

To install the rack-mount brackets on the chassis for a front rack-mount configuration, complete the following steps:



**Note** If you plan to use the cable-management bracket in your rack-mount configuration for the Cisco uBR7246 and Cisco uBR7246VXR, you must install your rack-mount brackets on the rear of the chassis. Proceed to the [“Installing Rack-Mount Brackets on the Rear of the Chassis”](#) section on page 3-7.

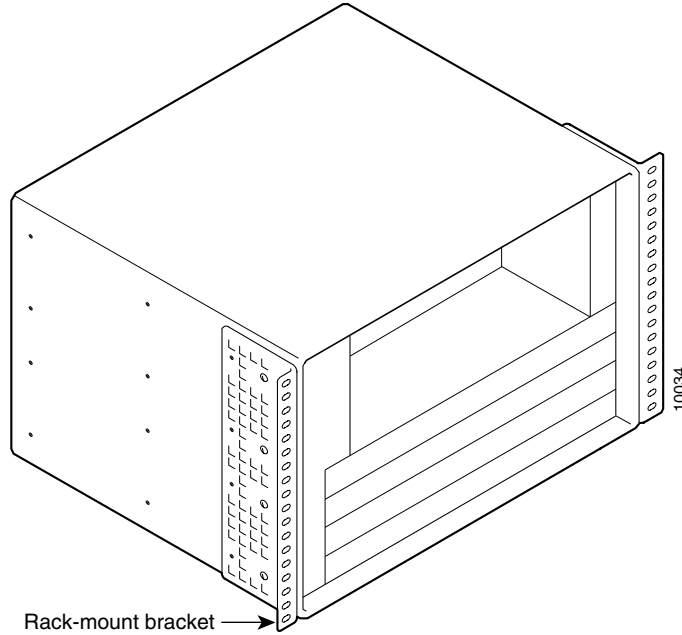
- Step 1** Locate the threaded holes in the front sides of the chassis.
- Step 2** If you want the front of the chassis flush with the front of the rack, align the first rack-mount bracket to the threaded holes in the right side of the chassis as shown in [Figure 3-9](#) on page 3-9.
- If you want the front of the chassis protruding from the rack, align the first rack-mount bracket to the threaded holes in the right side of the chassis as shown in [Figure 3-10](#) on page 3-9.



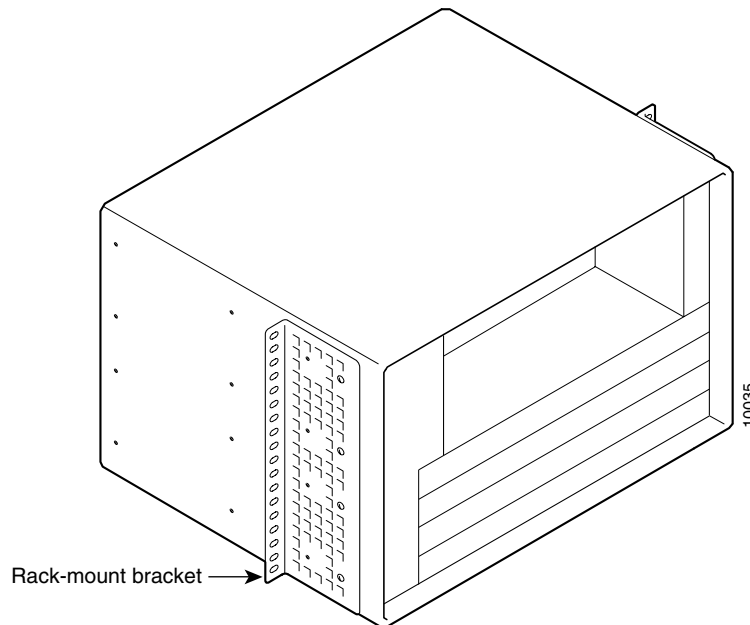
**Note** There are eight holes in each of the rack-mount brackets for the Cisco uBR7246VXR and Cisco uBR7246 chassis. You may use either set of four holes to align the bracket to the threaded holes in the sides of the chassis.



**Figure 3-9** Installing the Rack-Mount Brackets so the Front of the Chassis Is Flush with the Rack



**Figure 3-10** Installing the Rack-Mount Brackets so the Front of the Chassis Protrudes Out of the Rack



- Step 3** Thread four M4 x 6-mm Phillips flathead screws through the rack-mount bracket and into the side of the chassis. Use a number 2 Phillips screwdriver to tighten the screws.
- Step 4** Repeat Step 1 through Step 3 for the other rack-mount bracket.

This completes the procedure for installing the rack-mount brackets on the chassis for a front rack-mount configuration. Proceed to the [“Installing the Chassis in the Rack”](#) section on page 3-11.

**Caution**

To prevent injury, review the safety precautions in [Chapter 2, “Preparing the Cisco uBR7200 Series Router for Installation,”](#) before installing the universal broadband router in a rack.

## Installing Rack-Mount Brackets in the Middle of the Chassis

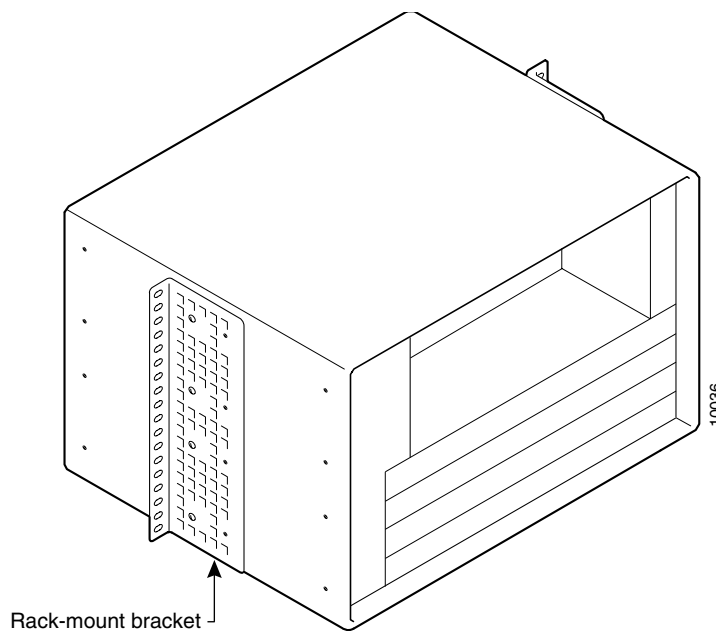
To install the rack-mount brackets and cable-management bracket at the middle of the chassis for a telco-type rack-mount configuration, complete the following steps:

- Step 1** Locate the threaded holes in the middle sides of the chassis.
- Step 2** Align the first rack-mount bracket to the threaded holes in the right side of the chassis. See [Figure 3-11](#).

**Note**

There are eight holes in each of the rack-mount brackets for the Cisco uBR7246 and Cisco uBR7246VXR chassis. You may use either set of four holes to align the bracket to the threaded holes in the sides of the chassis.

**Figure 3-11** Installing the Rack-Mount Brackets in the Middle of the Chassis for Telco-Type Racks



- Step 3** Thread four M4 x 6-mm Phillips flathead screws through the rack-mount bracket and into the side of the chassis. Use a number 2 Phillips screwdriver to tighten the screws.
- Step 4** Repeat [Step 1](#) through [Step 3](#) for the other rack-mount bracket.
- Step 5** If you plan to include the cable-management bracket in your telco-type rack-mount configuration, align the bracket with the four (Cisco uBR7246VXR or Cisco uBR7246) right front-side holes.

**Note**

The cable-management bracket must be installed on the right side of the Cisco uBR7246 and Cisco uBR7246VXR chassis when viewed from the front.

**Step 6**

Thread four M3 x 6-mm Phillips panhead screws through the cable-management bracket and into the chassis, and tighten the screws.

This completes the procedure for installing the rack-mount brackets and cable-management bracket on the Cisco uBR7200 series router. Proceed to the following section, “[Installing the Chassis in the Rack.](#)”

**Caution**

To prevent injury, review the safety precautions in [Chapter 2, “Preparing the Cisco uBR7200 Series Router for Installation,”](#) before installing the universal broadband router in a rack.

## Installing the Chassis in the Rack

When installing the chassis in a rack, remove the paint from the rack and apply an anti-oxidant at the contact points to ensure reliable metal-to-metal contact.

After installing the brackets on the chassis, mount the chassis by securing the rack-mount brackets to the posts or mounting strips in the rack using the slotted screws provided.

**Caution**

Because the brackets support the weight of the entire chassis, be sure to use all of the required slotted screws to fasten the two rack-mount brackets to the rack posts. [Figure 3-2 on page 3-4](#), [Figure 3-3 on page 3-4](#), [Figure 3-4 on page 3-5](#), and [Figure 3-5 on page 3-5](#) show typical installations in 19-inch, four-post and telco-type equipment racks.

**Warning**

**Two people are required to lift the chassis. Grasp the chassis underneath the lower edge and lift with both hands. To prevent injury, keep your back straight and lift with your legs, not your back. To prevent damage to the chassis and components, never attempt to lift the chassis with the handles on the power supplies or on the interface processors, or by the plastic panels on the front of the chassis. These handles were not designed to support the weight of the chassis.** Statement 5

**Warning**

**To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:** Statement 1006

- 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.

To install the chassis in the rack complete the following steps:

**Step 1** On the chassis, ensure that all captive installation screws on the network processing engine, the I/O controller, each cable interface card, and each power supply are tightened and the port adapter retention clip is in the locked position.

**Step 2** Make sure that your path to the rack is unobstructed. If the rack is on wheels, ensure that the brakes are engaged or that the rack is otherwise stabilized.

**Caution**

Two people should perform [Step 3](#) through [Step 6](#).

**Step 3** Position the chassis so that the front end is closest to you; then lift the chassis and move it to the rack. To prevent injury, avoid sudden twists or moves.

**Step 4** Slide the chassis into the rack, pushing it back until the brackets (installed at the front or rear of the chassis) meet the mounting strips or posts on both sides of the equipment rack.

**Note**

The rack-mount bracket must be placed behind the rack post or mounting strip in the rear installation configuration. (See [Figure 3-2 on page 3-4](#).)

**Step 5** While keeping the brackets flush against the posts or mounting strips, position the Cisco uBR7200 series so that the holes in the brackets are aligned with those in the mounting strips.

**Step 6** Insert the 10/32 x 3/8 slotted screws (two to a side) through the brackets and into the mounting strip (use the top and bottom bracket holes, shown in [Figure 3-2 on page 3-4](#), [Figure 3-3 on page 3-4](#), [Figure 3-4 on page 3-5](#), and [Figure 3-5 on page 3-5](#)). Using a 7/16-inch, flat-blade screwdriver, tighten all the screws.

This completes the procedure for installing the chassis in the rack. Proceed to the “[Cabling](#)” section on [page 3-14](#) to continue the installation.

# Installing the Chassis in a Workbench or Tabletop Environment

The Cisco uBR7200 series universal broadband router should already be in the area where you will install it, and your installation location should already be determined. If not, refer to the “[Site Requirements](#)” section on page 2-5.

When installing the router on a workbench or tabletop, ensure that the surface is clean and in a safe location and that you have considered the following:

- The Cisco uBR7200 series router requires at least 3 inches (7.72 cm) of clearance at the inlet and exhaust vents (the right and left sides of the universal broadband router).
- The Cisco uBR7200 series router should be installed off the floor. (Dust that accumulates on the floor can be drawn into the interior of the router by the cooling fans. Excessive dust inside the universal broadband router can cause overtemperature conditions and component failures.)
- There must be approximately 23.25 inches (59.06 cm) of clearance at the front, and 19 inches (48.3 cm) at the back of the Cisco uBR7200 series router for installing and replacing field-replaceable units (FRUs), or accessing network cables or equipment.
- Blank port adapters, cable interface card, cable clock card (Cisco uBR7246VXR), and power supply panels are installed.
- The Cisco uBR7200 series router will receive adequate ventilation (it is being installed in an enclosed cabinet where ventilation is adequate).
- If you plan to install the cable-management brackets on the front of the chassis, set aside the cable-management brackets and the four M4 x 6-mm Phillips panhead screws.

**Warning**

**Do not stack the chassis on any other equipment. If the chassis falls, it can cause severe bodily injury and equipment damage.** Statement 48

Complete the following steps to install the Cisco uBR7200 series router on a workbench or tabletop:

- Step 1** Remove any debris and dust from the tabletop or workbench, and the surrounding area. Also make sure that your path between the router and its new location is unobstructed.
- Step 2** On the chassis, ensure that all captive installation screws on the network processing engine, the I/O controller, cable interface line cards, the cable clock card, and each power supply are tightened and the port adapter retention clip is in the locked position.

**Warning**

**Two people are required to lift the chassis. To prevent injury, keep your back straight and lift with your legs, not your back.** Statement 164

- Step 3** Place the Cisco uBR7200 series router on the tabletop or workbench.
- Step 4** Ensure that there is the appropriate amount of space around the router.
- Step 5** Add the five rubber feet supplied with the accessory kit to the base of the chassis. Five indented circles are provided on the base of the chassis to indicate the location to which the rubber feet can be added.

If you want to install a cable-management bracket on the Cisco uBR7200 series router, proceed to the following section, “[Installing the Cable-Management Bracket on a Cisco uBR7200 Series Router in a Workbench or Tabletop Environment](#).” Otherwise, proceed to the “[Cabling](#)” section on page 3-14.

## Installing the Cable-Management Bracket on a Cisco uBR7200 Series Router in a Workbench or Tabletop Environment

To install the cable-management bracket on a Cisco uBR7200 series universal broadband router installed on a workbench or tabletop, complete the following steps:

- 
- Step 1** Locate the threaded holes in the right front side of the chassis.
- Step 2** Align the cable-management bracket with the four right front threaded holes in the chassis of the Cisco uBR7246 or Cisco uBR7246VXR. (See [Figure 3-7 on page 3-6.](#))



**Note** The cable-management bracket must be installed on the right side of the Cisco uBR7246 and Cisco uBR7246VXR chassis when viewed from the front.

- 
- Step 3** Thread four (Cisco uBR7246VXR or Cisco uBR7246) M3 x 6-mm Phillips flathead screws through the bracket and into the chassis. Use a number 2 Phillips screwdriver to tighten the screws.
- 

This completes the steps for installing the cable-management bracket on the Cisco uBR7200 series. Proceed to the following section, “[Cabling](#)” section on [page 3-14](#), to continue the installation.

## Cabling

This section provides information on connecting port adapter, cable clock card, cable interface card, and I/O controller cables to your Cisco uBR7200 series universal broadband router.



### Warning

**This product is not intended to be directly connected to the Cable Distribution System. Additional regulatory compliance and legal requirements may apply for direct connection to the Cable Distribution System. This product may connect to the Cable Distribution System ONLY through a device that is approved for direct connection.** Statement 1078

## Connecting Port Adapter Cables



### Warning

**To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.** Statement 1021

The instructions for connecting the cables for each port adapter installed in the Cisco uBR7200 series universal broadband router are contained in the respective installation document for each port adapter. For example, if you are connecting the cables for a HSSI port adapter, refer to *PA-H HSSI Port Adapter Installation and Configuration* at the following URL:

[http://www.cisco.com/en/US/docs/interfaces\\_modules/port\\_adapters/install\\_upgrade/cables\\_and\\_attenuator/hssi\\_cable\\_install/HSSCab.html](http://www.cisco.com/en/US/docs/interfaces_modules/port_adapters/install_upgrade/cables_and_attenuator/hssi_cable_install/HSSCab.html)

## Connecting Cisco Cable Clock Card Cables (Cisco uBR7246VXR Only)

The instructions for connecting the cables for the Cisco cable clock card installed in the Cisco uBR7246VXR are contained in the cable clock card installation document.

Refer to *Cisco Cable Clock Card Hardware Installation* at the following URL:

[http://www.cisco.com/en/US/docs/interfaces\\_modules/cable/clock\\_card/installation/guide/clk\\_card.html](http://www.cisco.com/en/US/docs/interfaces_modules/cable/clock_card/installation/guide/clk_card.html)

## Connecting Cable Interface Line Card Cables

The instructions for connecting the cables for each cable interface card installed in the Cisco uBR7200 series universal broadband router are contained in the cable interface card installation document. Refer to the *Cisco uBR7200 Series Interface Line Card Hardware Installation* at the following URL:

[http://www.cisco.com/en/US/docs/interfaces\\_modules/cable/line\\_cards/installation/guide/mcxxfru.html](http://www.cisco.com/en/US/docs/interfaces_modules/cable/line_cards/installation/guide/mcxxfru.html)

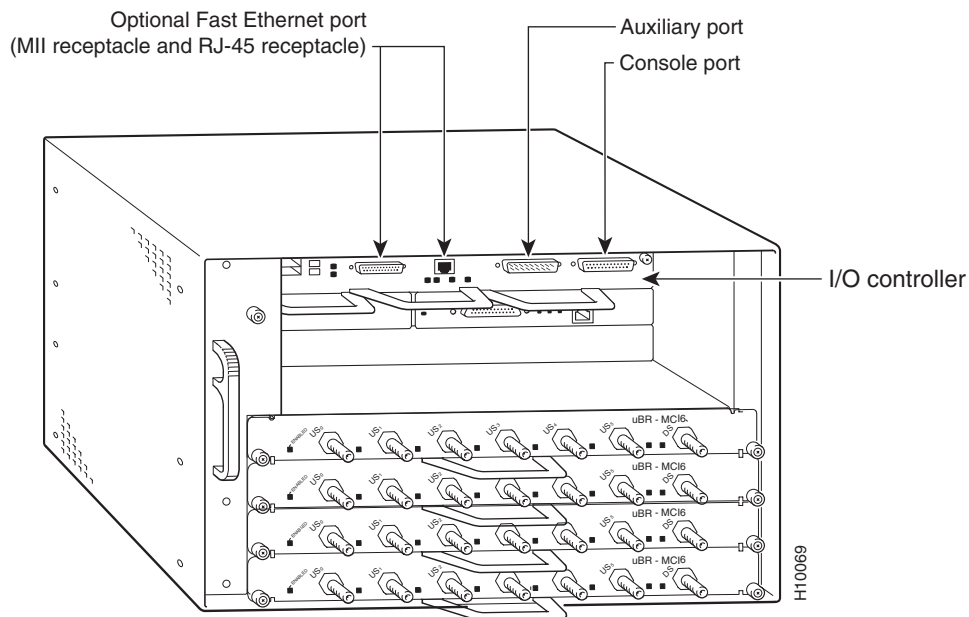
## Connecting I/O Controller Cables



**To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.** Statement 1021

The console and auxiliary ports for the Cisco uBR7200 series universal broadband router are located on the I/O controller. The I/O controller also has an optional Fast Ethernet port with a media-independent interface (MII) receptacle and an RJ-45 receptacle. (See [Figure 3-12](#).) This section contains connection equipment and pinout information for the console, auxiliary, and Fast Ethernet ports on the I/O controller.

Figure 3-12 Cisco uBR7246VXR and Cisco uBR7246 I/O Controller Connections

**Note**

If you have installed an I/O controller that has an optional Fast Ethernet port with the MII receptacle and RJ-45 receptacle, you can connect only to one of the Fast Ethernet receptacles—not both.

## Console and Auxiliary Port Connection Equipment

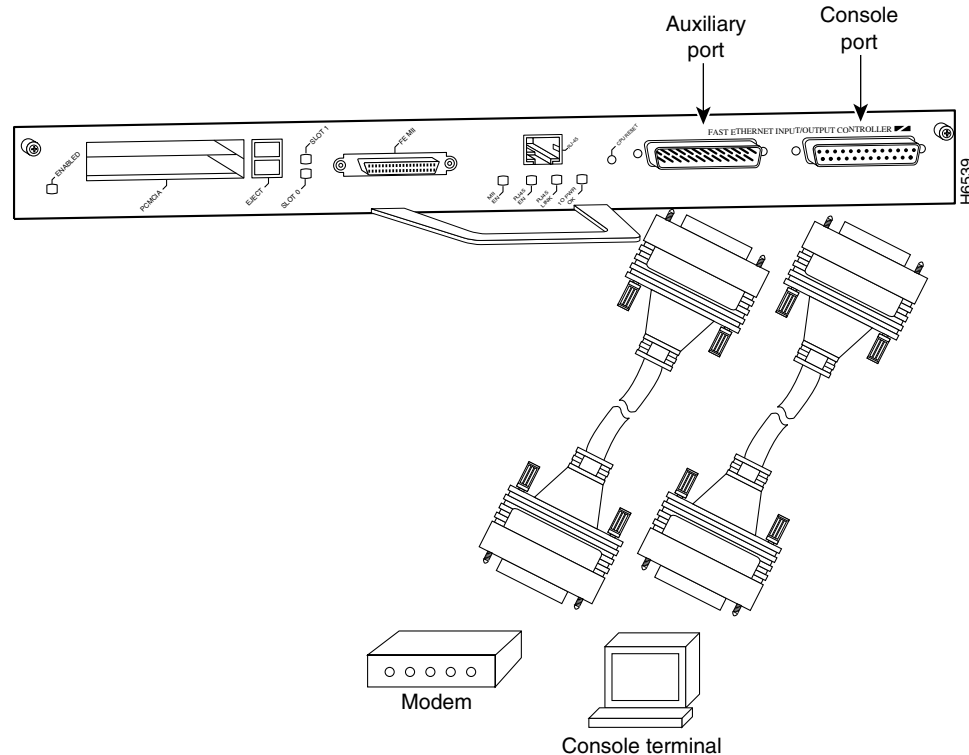
The I/O controller has two EIA/TIA-232 ports: a data communications equipment (DCE)-mode console port and a data terminal equipment (DTE)-mode auxiliary port. The console port is a DCE DB-25 receptacle for connecting a data terminal, which you use to configure the interfaces and bring up the Cisco uBR7200 series universal broadband router. The auxiliary port is a DTE DB-25 plug for connecting a modem or other DCE device (such as a channel service unit/data service unit [CSU/DSU] or other router) to the Cisco uBR7200 series router. (See [Figure 3-13 on page 3-17](#).)

**Note**

Both the console and auxiliary ports are asynchronous serial ports; any devices connected to these ports must be capable of asynchronous transmission. (Asynchronous is the most common type of serial device; for example, most modems are asynchronous devices.)



Figure 3-13 Console and Auxiliary Port Connections



Before connecting a terminal to the console port, configure the terminal to match the Cisco uBR7200 series router console port as follows:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit (9600 8N1)

You need an EIA/TIA-232 DCE console cable to connect the terminal to the console port. After you establish normal universal broadband router operation, you can disconnect the terminal.

You must supply your own interface cable between the auxiliary port and the equipment you are connecting. For console and auxiliary port pinouts, refer to the [“Console Port Signals”](#) section on page 3-17 and the [“Auxiliary Port Signals”](#) section on page 3-18.

## Console Port Signals

Both Data Set Ready (DSR) and Data Carrier Detect (DCD) signals are active when the system is running. The Request To Send (RTS) signal tracks the state of the Clear To Send (CTS) input. The console port does not support modem control or hardware flow control. [Table 3-2](#) lists the signals used on the console port. The console port requires a straight-through EIA/TIA-232 cable.

**Table 3-2 Console Port Signal**

Pin	Signal	Direction	Description
1	GND	–	Ground
2	TxD	<—	Transmit Data
3	RxD	—>	Receive Data
6	DSR	—>	Data Set Ready (always on)
7	GND	–	Ground
8	DCD	—>	Data Carrier Detect (always on)

## Auxiliary Port Signals

Table 3-3 lists the signals used on the auxiliary port. The auxiliary port supports hardware flow control and modem control.

**Table 3-3 Auxiliary Port Signals**

Pin	Signal	Direction	Description
2	TxD	—>	Transmit Data
3	RxD	<—	Receive Data
4	RTS	—>	Request To Send (used for hardware flow control)
5	CTS	<—	Clear To Send (used for hardware flow control)
6	DSR	<—	Data Set Ready
7	Signal Ground	–	Signal Ground
8	CD	<—	Carrier Detect (used for modem control)
20	DTR	—>	Data Terminal Ready (used for modem control only)

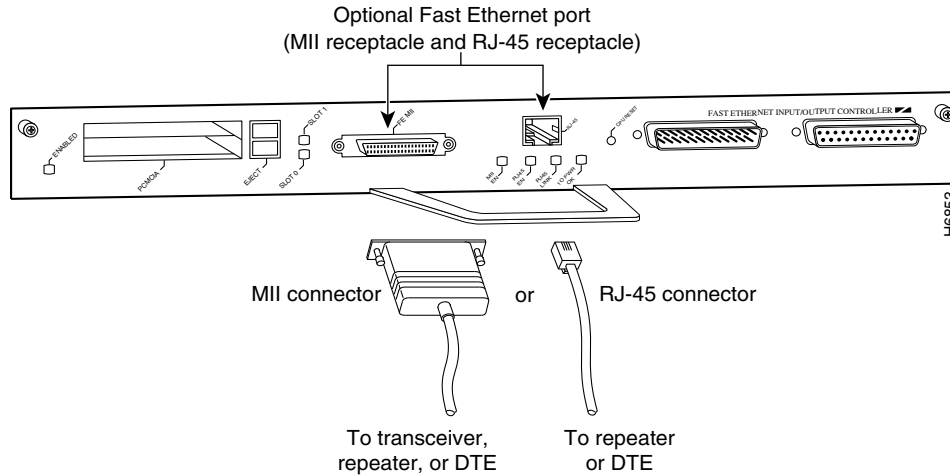
## Fast Ethernet MII Connection Equipment

The Fast Ethernet port on the I/O controller has a single MII, 40-pin, D-shell-type connector that is configurable for 100 megabits per second (Mbps). The MII connector supports IEEE 802.3u interfaces compliant with the 100BASE-X and 100BASE-T standards. The single MII connection requires an external transceiver that permits connection to multimode fiber for 100BASE-FX or 100BASE-T physical media. (See [Figure 3-14 on page 3-19](#).)


**Note**

This port does not support 10-Mbps Ethernet connectivity, only 100-Mbps Fast Ethernet.

**Figure 3-14 Fast Ethernet Port Connection**



**Caution**

Make sure that input power to your Cisco uBR7200 series universal broadband router is turned off and that the router is completely powered down before connecting an external transceiver to the Fast Ethernet port on the I/O controller. If you connect an external transceiver to the Fast Ethernet port when the Cisco uBR7200 series router is powered on, the system resets and you could lose data. The I/O controller does not support online insertion and removal (OIR).

Depending on the type of media you use between the MII connection and your switch or hub, the network side of your 100BASE-T transceiver should be appropriately equipped with ST-type connectors (for optical fiber), BNC connectors, and so forth.

Figure 3-15 shows the pin orientation of the female MII receptacle on the Fast Ethernet port.

The MII receptacle uses two 56 screw-type locks, called jackscrews, to secure the cable or transceiver to the MII port. MII cables and transceivers have knurled thumbscrews that you fasten to the jackscrews on the MII connector and tighten with your fingers. Use the jackscrews to secure your MII cable to the MII receptacle.

**Figure 3-15 MII Receptacle**

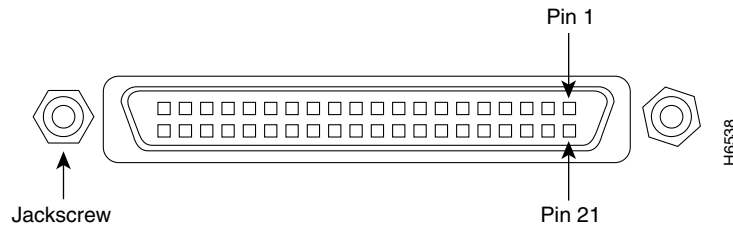


Table 3-4 lists the pinouts and signals for the I/O controller MII receptacle.

**Table 3-4 MII Connector Pinouts**

Pin <sup>1</sup>	In	Out	I/O	Description
14–17	–	Yes	–	Transmit Data (TxD)
12	Yes	–	–	Transmit Clock (Tx_CLK) <sup>2</sup>
11	–	Yes	–	Transmit Error (Tx_ER)

**Table 3-4** MII Connector Pinouts

Pin <sup>1</sup>	In	Out	I/O	Description
13	–	Yes	–	Transmit Enable (Tx_EN)
3	–	Yes	–	MII Data Clock (MDC)
4–7	Yes	–	–	Receive Data (RxD)
9	Yes	–	–	Receive Clock (Rx_CLK) <sup>3</sup>
10	Yes	–	–	Receive Error (Rx_ER)
8	Yes	–	–	Receive Data Valid (Rx_DV)
18	Yes	–	–	Collision (COL)
19	Yes	–	–	Carrier Sense (CRS)
2	–	–	Yes	MII Data Input/Output (MDIO)
22–39	–	–	–	Common (ground)
1, 20, 21, 40	–	–	–	+5.0 volts (V)

1. Any pins not indicated are not used.
2. Tx\_CLK is provided by the external transceiver.
3. Rx\_CLK is provided by the external transceiver.

# Connecting Power

Following are the procedures for connecting AC-input and DC-input power to your Cisco uBR7200 series universal broadband router.



**Warning**

**High leakage current - earth connection essential before connecting to system power supply.**

Statement 342



**Warning**

**Care must be given to connecting units to the supply circuit so that wiring is not overloaded.** Statement 1018



**Warning**

**Read the installation instructions before you connect the system to its power source.** Statement 1004



**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.** Statement 43



**Warning**

**This equipment is intended to be grounded to comply with emission and immunity requirements. Ensure that the switch functional ground lug is connected to earth ground during normal use.**

Statement 1064



**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



**Note**

Detailed instructions for handling and replacing the Cisco uBR7200 series router power supplies are contained in the *Cisco uBR7200 Series Universal Broadband Router AC-Input Power Supply Replacement Instructions* and *Cisco uBR7200 Series Universal Broadband Router 550-Watt DC-Input Power Supply Replacement Instructions* at the following URL:

[http://www.cisco.com/en/US/products/hw/cable/ps2217/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/cable/ps2217/tsd_products_support_series_home.html)

If you have an AC-input power supply installed, proceed to the following section, “[Connecting to the AC-Input Power Supply](#).” If you have a DC-input power supply installed, proceed to the “[Connecting to the DC-Input Power Supply](#)” section on page 3-23.

## Connecting to the AC-Input Power Supply

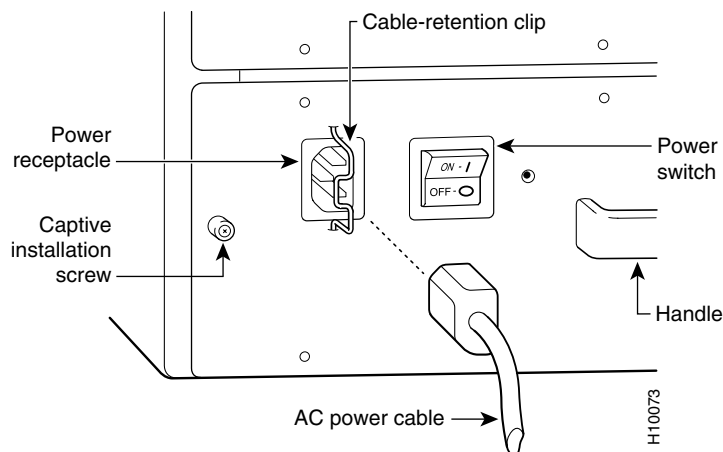


### Warning

The device is designed to work with TN power systems. Statement 19

- 
- Step 1** At the rear of the Cisco uBR7200 series universal broadband router, ensure that the power switch on the power supply is in the OFF (O) position.
- Step 2** Slide the cable-retention clip to the left, away from the AC receptacle, and plug in the power cable.
- Step 3** Secure the cable in the power supply AC receptacle by sliding the cable-retention clip to the right until it fits around the connector. The cable-retention clip provides strain relief for the AC power cable. For additional AC power cable strain relief, secure the cable to the power supply handle by inserting a nylon cable tie through the hole in the handle and around the cable. See [Figure 3-16](#).

**Figure 3-16** Connecting AC-Input Power



- Step 4** Plug the AC power supply cable into the AC power source.
- Step 5** Repeat Step 1 through Step 4 for the second power supply (if present).
- 

This completes the procedure for connecting AC-input power. Proceed to the [“Powering On the Cisco uBR7200 Series Router”](#) section on page 3-25.

## Connecting to the DC-Input Power Supply

The Cisco uBR7200 series universal broadband router is intended for installation in a Common Bonding Network (CBN).



**Before connecting or disconnecting ground or power wires to the chassis, 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. Use a voltmeter to test for 0 (zero) voltage at the power terminals on the chassis.** Statement 196



**When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046



**A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.** Statement 1022



**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

**Note**

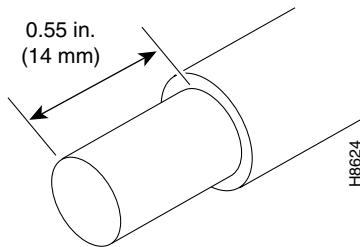
The color-coding of the DC-input power supply leads depends on the color-coding of the DC power source at your site. Typically, green or green/yellow is used for ground, black is used for +48V (return), and red or white is used for -48V. Make certain that the lead color-coding you choose for the DC-input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

- 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 two M5 nuts. Tighten the nuts using an 8-mm wrench or nut driver (or adjustable wrench). (See [Figure 3-18 on page 3-24](#).)

**Note**

[Figure 3-19 on page 3-25](#) shows the grounding lug connected to the two vertically aligned M5 grounding receptacles. You may also connect the grounding lug to the two horizontally aligned M5 grounding receptacles.

- Step 4** Using a wire stripper, strip approximately 0.55 inch (14 mm) from the -48V and +48V leads. See [Figure 3-17](#).

**Figure 3-17 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 a 3/16-inch flat-blade screwdriver. Repeat for the –48V lead.

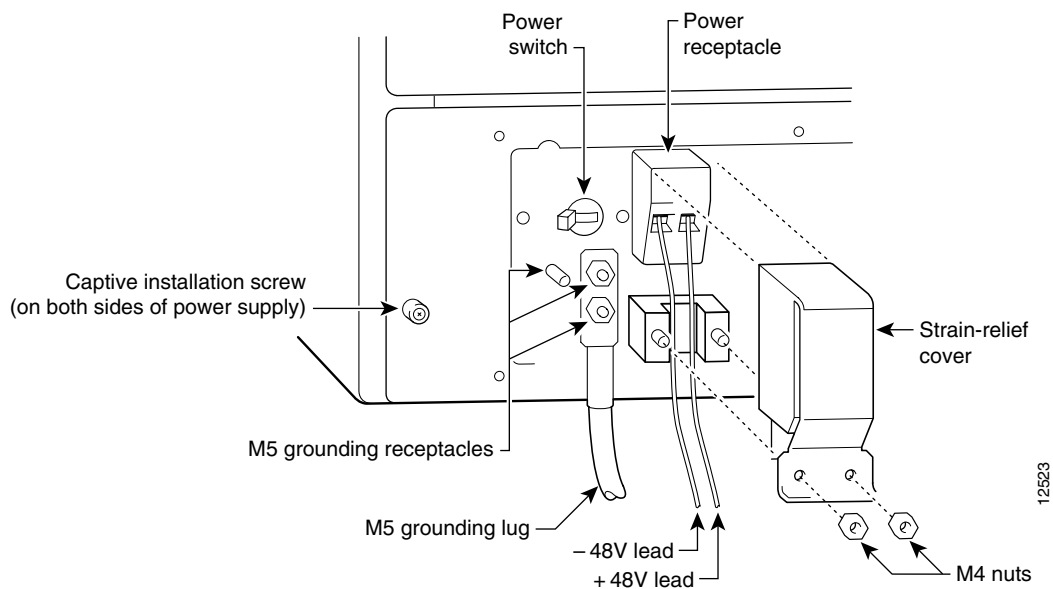
**Tip**

Make sure that 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 3-19](#) on page 3-25.)

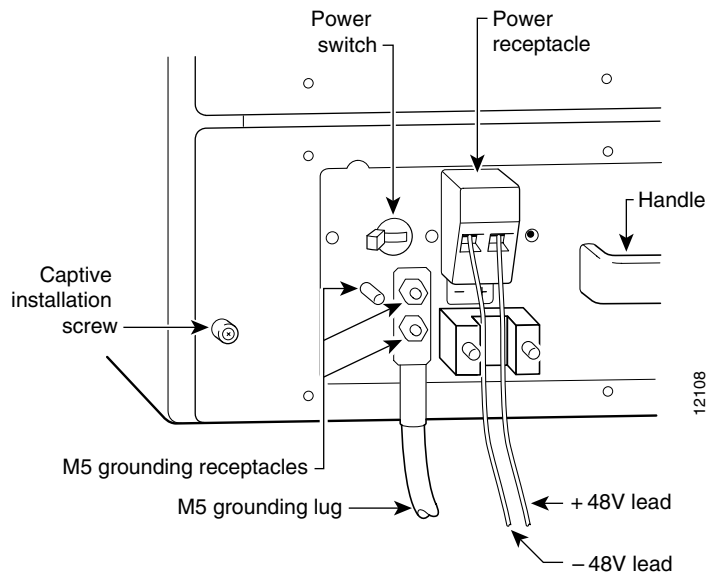
**Warning**

The illustration shows the DC power supply terminal block. Wire the DC power supply using the appropriate wire terminations at the wiring end, as illustrated. The proper wiring sequence is ground to ground, positive to positive (line to L), and negative to negative (neutral to N). Note that the ground wire should always be connected first and disconnected last. Statement 61

**Figure 3-18 Connecting DC-Input Power**

- Step 7** Install 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 3-19](#).



**Figure 3-19** Replacing the Strain-Relief Cover on a 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 mm<sup>2</sup>) 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 [“Powering On the Cisco uBR7200 Series Router”](#) section on page 3-25 to start the universal broadband router.

## Powering On the Cisco uBR7200 Series Router

After installing your Cisco uBR7200 series universal broadband router and connecting cables, power on the universal broadband router as follows:

- Step 1** Check for the following:
- Each port adapter is inserted in its slot and the port adapter lever or retention clip is in the locked position.
  - The Cisco cable clock card (Cisco uBR7246VXR) is inserted in its slot and its captive installation screws are tightened.
  - Each cable interface card is inserted in its slot and its captive installation screws are tightened.
  - The network processing engine and the I/O controller are inserted in their slots and their captive installation screws are tightened.

**Note**

If the port adapters, cable interface cards, network processing engine, or I/O controller are not properly seated or not fully locked into place, the Cisco uBR7200 series router might enter a continuous restart loop. Make sure that the boards are seated and locked into position.

- All network interface cables are connected to the port adapters.
- Primary and secondary DB-15 T1 interface cables are attached to the cable clock card (Cisco uBR7246VXR only).
- Hybrid fiber-coaxial (HFC) network coaxial cable is connected to the cable interface cards.
- A flash memory card is installed in its slot or a compact flash card is installed in a compact flash slot in the front panel of the NPE-G1 or NPE-G2. Use only authorized, Cisco provided compact flash cards.
- Each AC-input power cable is connected and secured with the cable-retention clip.
- Each DC-input lead is connected and the +48 and –48 DC leads are secured underneath the strain-relief cover on the power supply faceplate.
- Each DC lead is connected and secured to the power source.
- For installed DC-input power supplies, ensure 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.
- The console terminal is turned on.

**Step 2** At the rear of the Cisco uBR7200 series router, place the power switch on the power supply in the ON (I) position. Repeat this step if a second power supply is installed. The green OK LED on the power supply comes on.

**Step 3** Listen for the fans; you should immediately hear them operating. In a very noisy environment, also look for air movement around the chassis to verify that the fans are operating. If the Cisco uBR7200 series router was recently switched off, it might take up to 90 seconds for the power supply to restart and the fans to start operating.

**Note**

To facilitate headend installation, a Cisco uBR7200 series universal broadband router equipped with at least one cable interface card generates a downstream IF carrier when it starts running.

The downstream IF carrier will be present if a cable interface card is properly installed and passes diagnostics, the router has been powered on for more than two minutes, the IF downstream shutdown command (**no cable downstream if-output**) has not been configured, or the Cisco uBR7200 series router is not in ROMMON mode.

The amplitude and shape of the downstream IF carrier will not change after the Cisco uBR7200 series router is configured, unless a non-DOCSIS data rate is configured.

**Step 4** During the boot process, observe the system LEDs. The LEDs on most of the port adapters go on and off in an irregular sequence. 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 (a few seconds), the network processing engine begins to initialize the port adapter, cable interface cards, 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 and cable interface card goes on when initialization is complete, 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 12.0(5)T [smith 100]
Copyright (c) 1986-1999 by cisco Systems, Inc.
Compiled Mon 12-Jul-99 04:10 by smith
```

---

## Configuring the Interfaces

When you start up the Cisco uBR7200 series router for the first time, the system automatically enters the **setup** facility (also called the system configuration dialog), which determines which port adapters and cable interface cards are installed. The setup facility prompts you for configuration information.

On the console terminal, after the system displays the system banner and hardware configuration, the following System Configuration Dialog prompt appears:

```
--- System Configuration Dialog ---
```

```
At any point you may enter a questions mark '?' for help.
Use ctrl-c to abort configuration dialof at any prompt.
Default settings are in square brackets '['].
```

```
continue with configuration dialog? [yes]:
```

You can proceed with the setup facility or exit from the setup facility, using the command interface to configure global (system-wide) and interface-specific parameters.



### Caution

The setup facility currently excludes cable-specific configuration commands. Upstream ports, therefore, have a default state of “shutdown” after the setup facility is run. You must configure upstream parameters. For additional information, refer to the *Cisco uBR7200 Series Software Configuration Guide* at the following URL:

<http://www.cisco.com/en/US/docs/cable/cmts/ubr7200/configuration/guide/cr72scg.html>

You do not have to configure the interfaces immediately; however, you cannot enable the interfaces or connect them to any networks until you have configured them.

Many of the port adapter LEDs do not come on until you have configured the interfaces. To verify correct operation of each interface, complete the first-time startup procedures and configuration, then refer to the document for each port adapter for LED descriptions and to check the status of the interfaces.

Your Cisco uBR7200 series chassis installation is complete. To set up your cable network headend, proceed to [Chapter 4, “Connecting the Cisco uBR7200 Series Router to the Cable Headend.”](#) To begin configuring your Cisco uBR7200 series, see *Cisco uBR7200 Series Software Configuration Guide* at the following URL:

<http://www.cisco.com/en/US/docs/cable/cmts/ubr7200/configuration/guide/cr72scg.html>

