



Installing the Cisco uBR905 Router

This chapter contains the following sections that provide instructions on installing the router, initial power on, and verifying the installation:

- [Cisco uBR905 Router Installation Checklist, page 3-1](#)
- [Physical Placement, page 3-3](#)
- [Verifying Power Requirements, page 3-3](#)
- [Connecting to the Cable System, page 3-4](#)
- [Connecting the Ethernet Cables, page 3-5](#)
- [Connecting Power, page 3-6](#)
- [Router Power On and Initialization Sequence, page 3-8](#)
- [Verifying Installation, page 3-9](#)



Caution

Before proceeding with the installation, verify that you have fulfilled all of the requirements listed in [Chapter 2, “Preparing for Installation.”](#) Also read and follow the safety guidelines in the [“Safety” section on page 2-1](#), as well as those contained in this chapter.

Cisco uBR905 Router Installation Checklist

[Table 3-1](#) presents a checklist, identifying the installation tasks to complete at each subscriber site. Use this table as a guide while installing the Cisco uBR905 cable access router.

Table 3-1 Installation Checklist


Checked Off	Task	For More Information, See...
	Ensure that the selected location to install the router is free of dust and meets all requirements.	“Environmental” section on page 2-5
	Install the Cisco uBR905 router: <ul style="list-style-type: none"> • Close to the cable drop connection. • On a stable, flat surface or desktop close to the devices to be connected such that your cables reach all devices, but in a location where the bottom, sides, and rear of the router are clear of obstructions and away from the exhaust of other equipment. • Close to the power source—The power source must use a grounded power outlet, from 100 to 240 VAC, depending on the country of operation. 	“Physical Placement” section on page 3-3
	Check the power at the subscriber site before and after installation to ensure that you are receiving clean power. Ensure proper grounding.	“Verifying Power Requirements” section on page 3-3
	Verify that each PC to be connected to the router has an Ethernet NIC, and that TCP/IP networking with DHCP support is enabled. Ensure that all other PC prerequisites are met.	
	Connect the router’s F-connector to the cable TV coaxial drop cable. (If the subscriber also subscribes to cable TV services, install a cable splitter/directional coupler and high-pass filter as appropriate.)	“Connecting to the Cable System” section on page 3-4
	Use the Ethernet ports to connect the Cisco uBR905 router to CPE devices at the site: <ul style="list-style-type: none"> • To directly connect PCs to the Cisco uBR905 router, connect as many as four of the unit’s Ethernet hub ports directly to the 10BaseT Ethernet (RJ-45) ports of the PCs. Use 10BaseT Ethernet straight-through cables. • To connect additional PCs and CPE devices at the site or to connect to an existing network at the site, connect one of the unit’s Ethernet hub ports directly to the 10BaseT Ethernet port of an Ethernet hub. Use a 10BaseT Ethernet crossover cable. Then connect each computer/device to the hub, again using 10BaseT Ethernet crossover cables.  <p>Note If your hub has an uplink port, you might be able to use straight-through cables to connect the hub to the PC.</p>	“Connecting the Ethernet Cables” section on page 3-5
	Attach the 8-pin end of the power supply cord into the router’s power connector and connect the other end to the power supply. Plug the router’s power supply into the wall outlet. Watch the router power on and initialize.	“Connecting Power” section on page 3-6
	Power on all other devices at the subscriber site: PCs, Ethernet hub, and all other equipment as applicable.	“Router Power On and Initialization Sequence” section on page 3-8

Table 3-1 Installation Checklist (continued)

Checked Off	Task	For More Information, See...
	<p>Ensure that the data channel frequency has a sufficient RF signal level to meet your cable plant specifications and verify that the RF input levels relative to a nearby analog video level:</p> <ul style="list-style-type: none"> • Check the RF signal with an RF power meter at the Type F coax connector to verify the DOCSIS system signal. • Verify that the nearby analog video signal is within the correct range of -15 to +15 dBmV for most coaxial cable CATV systems. 	
	Test the installation by establishing an Internet connection, and request data from a PC connected to the router.	“Verifying Installation” section on page 3-9

Physical Placement

Place the cable access router on a stable, flat surface such as a desktop, close to the cable TV drop connection and all devices to be connected at the subscriber site. The bottom, sides, and rear of the router must remain unobstructed to ensure adequate airflow and to prevent the unit from overheating. The rubber feet on the bottom of the router provide enough clearance when the unit is placed on a flat, hard surface. Cisco recommends at least 3 inches of clearance at the rear of the router.



Caution

Do not place the router on an uneven or soft surface.

Install the router in compliance with all national and local electrical codes such as:

- US NFPA 70
- Canadian Electrical Code, part I, CC22.1
- IEC 364, part 1 through part 7

Verifying Power Requirements

The cable access router uses one external AC-input power supply. The OK (power) LED on the front of the unit indicates that the power supply is supplying power to the unit when it is connected and operational.

The AC-input power supply uses a power factor corrector that allows the Cisco uBR905 cable access router to operate in any country where the input voltage is between 100 and 240 VAC, and 50 or 60 Hz. Different power cords are available to suit the country of operation.

Refer to [Table A-1 on page A-1](#) for AC-input power supply specifications, including input voltage and operating frequency ranges. Cisco recommends that you follow these precautions:

- Check the power at the subscriber site before and after installation to ensure that you are receiving clean power. Install a power conditioner if necessary.
- If plugging the router into an Uninterruptible Power Supply (UPS), verify that the total power and current requirements used by all devices plugged into the UPS are within the maximum limits of the UPS.

- Install proper grounding to avoid damage from lightning and power surges. If using a North American (NEMA 5-15P) plug, you must plug the unit into a three-lead receptacle to ensure proper grounding.

**Warning**

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.

- Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A International) is used on the phase conductors (all current-carrying conductors providing power to the device).
- Do not work on the system or connect or disconnect any cables (Ethernet, cable, or power) during periods of lightning activity—the possibility of serious physical injury exists if lightning should strike and travel through those cables. In addition, the equipment could be damaged by the higher levels of static electricity present in the atmosphere.

**Note**

Adhere to the safety guidelines presented in the [“Safety” section on page 2-1](#) before following procedures in the remainder of this chapter. Be sure that all equipment to be connected to the cable access router is powered off.

**Caution**

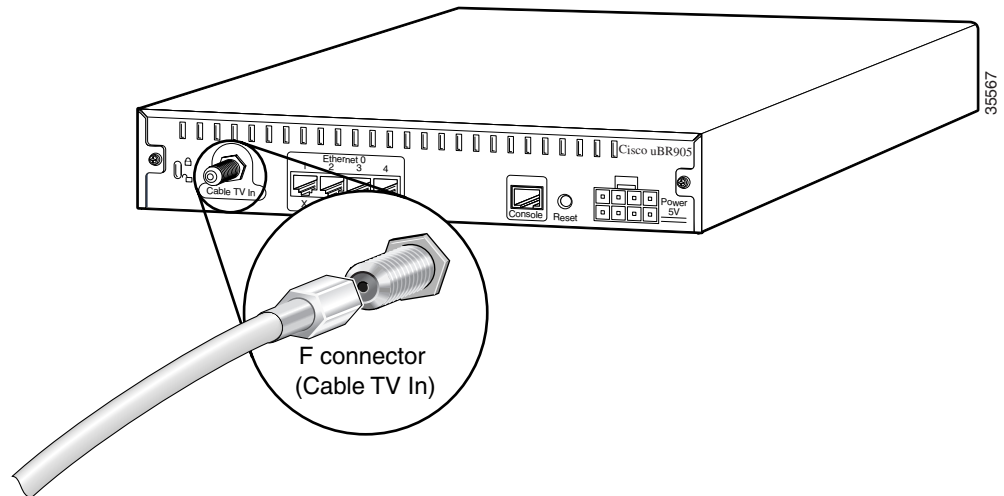
Do not connect the router to power at this point, because the router will begin its initial power on sequence and attempt to connect to the network. The unit should be powered on only after all other connections have been made, as described later in this chapter.

Connecting to the Cable System

To connect the Cisco uBR905 cable access router to the cable system:

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- Step 1** Verify that the router is not connected to power.
 - Step 2** Locate the RF coaxial cable coming from the coaxial cable CATV wall outlet.
 - Step 3** Install a cable splitter/directional coupler, if needed, to separate signals for TV and computer usage. If necessary, also install a high-pass filter to prevent interference between the TV and computer signals.
 - Step 4** Connect the RF coaxial cable to the router’s F-connector. Hand-tighten the connector, making sure that it is finger tight; then give it a 1/6 turn with a wrench. (See [Figure 3-1](#).)

Figure 3-1 Connecting the CATV Coaxial Cable to the Cisco uBR905 Router



To cable source

**Caution**

Do not overtighten the connector because this can break off the connector. Using a torque wrench is not recommended because of the danger of tightening the connector more than the recommended 1/6 turn after it is finger tight.

Step 5

Make sure that all other coaxial cable connectors—all intermediate splitters, couplers, or ground blocks—are securely tightened from the distribution tap to the Cisco uBR905 router, following instructions in [Step 4](#).

**Note**

Loose connectors inside the building or residence can cause intermittent router operation.

**Caution**

To ensure compliance with FCC limits, connection to the cable system must be made with a high-quality, shielded cable. If the quality or general condition of the coaxial cable at the subscriber site is in question, Cisco recommends that you replace the coaxial cable. For more information on the effects of substandard cabling on the cable access router installation, see the [“CATV Coaxial Cabling” section on page 2-5](#).

Connecting the Ethernet Cables

To connect the Cisco uBR905 router to computers and other CPE devices at the site:

Step 1

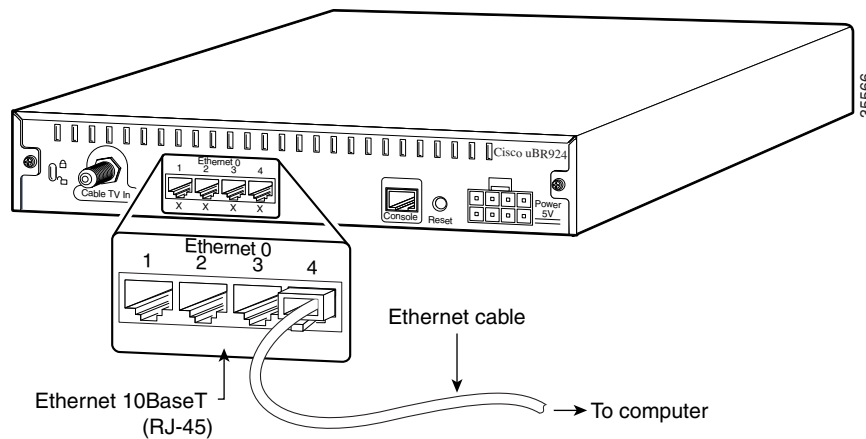
Locate all needed 10BaseT RJ-45 Ethernet cables:

- Use straight-through Ethernet cables to directly connect up to four PCs to the Cisco uBR905 cable access router's four Ethernet hub ports.

- Use a crossover Ethernet cable to connect the Cisco uBR905 cable access router to an Ethernet hub if more than four PCs or other LAN devices are to be connected at the site. Connect all devices to the hub using straight-through Ethernet cables. (If your hub has an uplink port, you might be able to use a straight-through cable to connect the hub directly to the computer.)

Step 2 Connect one end of the Ethernet cable to one of the router's Ethernet ports (labeled 1, 2, 3, or 4) at the rear of the unit. (See [Figure 3-2](#).)

Figure 3-2 Connecting the Ethernet Cable to the Cisco uBR905 Cable Access Router



Note

Do not connect the Ethernet cables into the RJ-45 console connector.

Step 3 Press the cable end firmly into the router's Ethernet receptacle and connect the other end to the computer or hub as applicable.

Step 4 Repeat [Step 2](#) and [Step 3](#) for each Ethernet connection from the Cisco uBR905 cable access router.

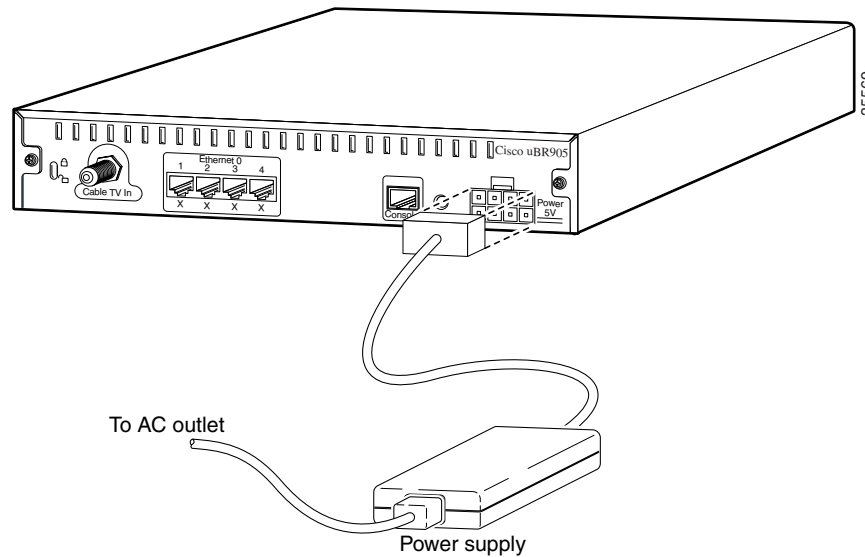
Connecting Power

To connect AC-input power to the Cisco uBR905 router:

Step 1 Locate the power receptacle at the rear of the cable access router. (Refer to the [“Verifying Power Requirements”](#) section on [page 3-3](#) to verify that this power source is adequate for the router.)

Step 2 Plug the 8-pin end of the AC power supply cord into the power connector at the rear of the router. (See [Figure 3-3](#).)

Figure 3-3 Connecting the Power Cord



- Step 3** Connect the AC power supply cord to the power supply.
- Step 4** Plug the 3-prong end of the power cord into a standard electrical power outlet at the site. Power is immediately supplied to the router. The router is meant to be left on at all times, and therefore, has no power switch.
- Step 5** Turn on the power for all other equipment, and wait for the devices to complete their startup processes.

**Caution**

To turn off the router when it is operational, disconnect the 3-prong end of the power cord from the power outlet. To prevent electrical shock, do not disconnect the AC power supply cord from the power supply while the router is operating.

**Warning**

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.

**Warning**

Unplug the power cord before you work on a system that does not have an on/off switch.

Router Power On and Initialization Sequence

When the Cisco uBR905 router is connected and powered on, it executes automatic self-diagnostic and installation procedures. The following procedure describes what you should see during this process.


Note

For the router to complete its power on sequence, a number of tasks must be completed at the CMTS. Refer to the [“Initial Power On and Provisioning” section on page 1-10](#) for an overview of the router’s initialization and provisioning processes.

While the Cisco uBR905 cable access router initializes:

Step 1 Watch the LEDs on the front of the router. When the cable access router first powers on, all LEDs (except for the four Ethernet LEDs and the ACT LED) briefly come on and then go off. As the self-test is executed, various LEDs light to reveal diagnostic progress and turn off when self-test is complete.

Step 2 The OK LED then blinks as the router completes self-test and boots a Cisco IOS image. When this is finished, the OK LED comes on again.


Note

The LEDs on the front panel display the power on self-test progress and status. Should the self-test fail, these six LEDs display error codes. Because the self-test failed, the OK LED remains off. Refer to the [“Initialization and Self-Test Problems” section on page 4-2](#) for a description of self-test LED error patterns.

Step 3 During the router’s initialization and download, the green OK and ACT LEDs both blink. After completing the download procedure (which could take up to 10 minutes if downloading a new Cisco IOS image as well as a configuration file), the green OK LED remains on.

Step 4 Check that the DS, US, LINK, and DSNR LEDs remain on to indicate that the router is operational and is receiving a healthy signal:

- The DS LED reveals that the router is locked to a downstream channel.
- The US LED reveals that the router has established connectivity with the CMTS and is operating within 6 dB of desired power level (generally within 3 dB).
- The LINK LED reveals that the cable interface is operational.
- The DSNR LED reveals that the router is receiving a quality downstream signal with a low signal-to-noise ratio that is 5 dB above the downstream lock threshold.

Step 5 Check the remaining LEDs for proper operation:

- The ACT LED blinks to indicate activity on the cable interface.
- The Ethernet 1, 2, 3, 4 LEDs blink to indicate activity from the PCs and other customer premises devices connected to the corresponding Ethernet ports.

Step 6 If all LEDs appear normal, proceed to the [“Verifying Installation” section on page 3-9](#) to test the router and its connection to each part of the network. If any problems occur, proceed to [Chapter 4, “Troubleshooting,”](#) to troubleshoot and solve the problem.

Step 7 After verifying operations, acquaint the subscriber with the router recommended ambient temperature requirement of 23° to 113°F (-5° to 45°C). Remind the subscriber to keep the area around the router as free from dust as is practical and review general safety standards.

- Step 8** Give the subscriber the Cisco-provided subscriber publications, along with any literature your company provides, including instructions on how to contact your customer service department.
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Verifying Installation

Use the following procedure to verify Internet connectivity between the PCs connected to the router's Ethernet ports and the Internet access provided by the CMTS. See [Chapter 4, "Troubleshooting,"](#) if any problems occur.

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- Step 1** From a PC connected to the Cisco uBR905 router, start the Internet browser program installed on the PC.
- Step 2** Enter a URL of your choice in your web browser. If a URL is not known, use <http://www.cisco.com> to connect to Cisco's CCO web site.
- Step 3** Watch the appropriate Ethernet LED on the front of the router blink as data is transmitted on the link. If the selected web page comes up in the Internet browser screen, the network connection is successfully established and this particular Ethernet port is operational.
- Step 4** Repeat [Step 1](#) through [Step 3](#) for each PC connected to the Cisco uBR905 router.
- Step 5** Disconnect the cable system input by unscrewing the cable F-connector at the back of the router.
- Step 6** Using an in-line attenuator, add 3 to 6 dB of attenuation between the router and the coaxial cable input.



Note The addition of 3 to 6 dB of attenuation simulates the variation found in a cable network over time and in relation to temperature. If you install a router at a time of year when the temperature is cooler, this step might not be necessary.

If you install a cable access router at a time of year when the temperature is warmer, this step might assist you in determining how the cable access router will function over time. If the router does not function properly with the addition of attenuation, you should replace and reconfigure the coaxial cables at the subscriber site.

- Step 7** Reconnect the cable system to the router and recheck the network connection at one of the PCs. Reload the previous web page or another URL to verify that you can still access the Internet.
- Step 8** Disconnect the cable system again by unscrewing the cable connector at the back of the router.
- Step 9** Remove the in-line attenuator from the back of the router.
- Step 10** Reconnect the cable system to the router and recheck the network connection at the PC as in [Step 7](#).
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