



CHAPTER 4

Power, Cable, and Antenna Connection Procedures

This chapter describes how to connect your Cisco 1800 series fixed-configuration router to a power source and to networks and external devices. It includes the following sections:

- [Power Connections, page 4-1](#)
- [Connecting WAN and LAN Cables, page 4-2](#)
- [Connecting to a Console Terminal or Modem, page 4-6](#)
- [Connecting the Radio Antennas to the Wireless Router, page 4-8](#)



Note

To see translations of the warnings that appear in this publication, see the [Regulatory Compliance and Safety Information for Cisco 1800 Integrated Services Routers \(Fixed\)](#) document and for wireless routers, the [Declarations of Conformity and Regulatory Information for Cisco Access Products with 802.11a/b/g and 802.11b/g Radios](#) document that accompany your router.



Warning

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



Warning

Do not work on the system or connect or disconnect cables during periods of lightning activity.
Statement 1001

Power Connections

This section explains how to connect AC power to a Cisco 1800 series fixed-configuration router. It covers the following topics:

- [Connecting Routers to AC Power, page 4-2](#)
- [Connecting WAN and LAN Cables, page 4-2](#)



Warning

Read the installation instructions before connecting the system to the power source. Statement 1004

**Note**

The installation must comply with all required electrical codes applicable at the installation site.

Connecting Routers to AC Power

Connect your router to a 15A, 120-VAC (10A, 240-VAC) circuit with overcurrent protection.

**Note**

The input voltage tolerance limits for AC power are 90 and 264 VAC.

**Warning**

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 15A, 120VAC (10A, 240VAC). Statement 1005

**Warning**

This equipment has been designed for connection to TN and IT power systems. Statement 1007

**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**

This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both. Statement 1043

**Warning**

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

Connecting WAN and LAN Cables

This section describes how to connect the WAN, LAN, and voice interface cables. It covers the following topics:

- [Preparing to Connect to a Network, page 4-4](#)
- [Ports and Cabling, page 4-5](#)
- [Connection Procedures and Precautions, page 4-5](#)

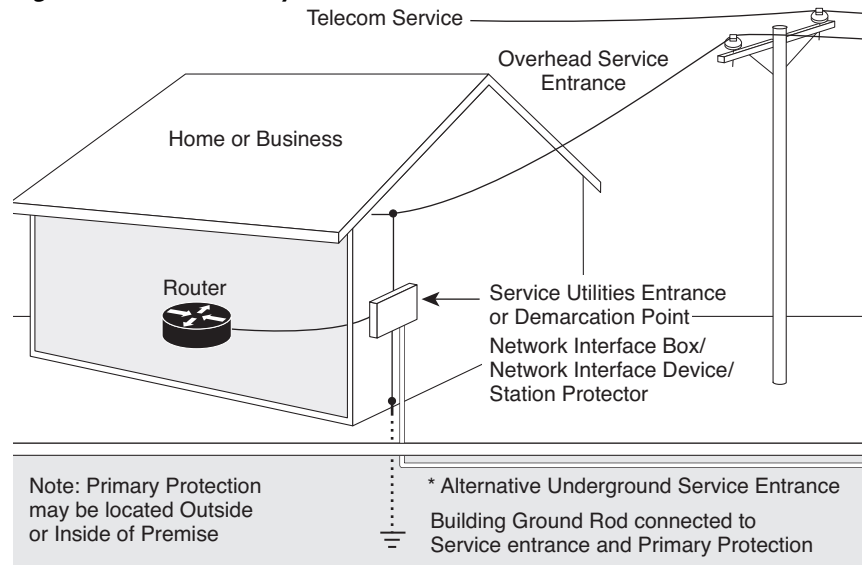
**Note**

Ethernet cables and transceivers can be ordered from Cisco Systems. For ordering information, contact customer service. For cable pinouts, refer to the [Cisco Modular Access Router Cable Specifications](#) document.

**Caution**

Cisco Systems DSL WAN Interfaces are tested for compliance with regulatory standards such as FCC Part 68, ITU-T K.21, IEC 61000-4-5, and CSA/EN/IEC/UL 60950-1. These standards assume Primary Protection devices protect the Customer Premise Equipment (CPE). These devices are normally installed by the service provider, local exchange carrier or qualified service person and are located at the telecom service provider entrance, network interface box, or demarcation point. See [Figure 4-1](#) for the likely location of the primary protection device. The primary protection device must be suitable for the xDSL interface employed.

Please contact your sales team or qualified service person for further information and installation.

Figure 4-1**Primary Protection Device Location****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

**Warning**

Hazardous network voltages are present in WAN ports regardless of whether power to the unit is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the unit first. Statement 1026

**Warning**

Do not use this product near water; for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool. Statement 1035

**Warning**

Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Statement 1036

**Warning**

Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Statement 1037

**Warning**

To report a gas leak, do not use a telephone in the vicinity of the leak. Statement 1039

**Warning**

Before opening the unit, disconnect the telephone-network cables to avoid contact with telephone-network voltages. Statement 1041

**Warning**

This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both. Statement 1043

Preparing to Connect to a Network

When setting up your router, consider distance limitations and potential electromagnetic interference (EMI) as defined by the applicable local and international regulations.

See the network connection considerations for the following network interfaces:

- [Ethernet Connections](#)
- [ISDN BRI Connections](#)

See the following online documents for more information about network connections and interfaces:

- [Cisco Interface Cards Hardware Installation Guide](#)
- [Cisco Modular Access Router Cable Specifications](#)

Ethernet Connections

The IEEE has established Ethernet as standard IEEE 802.3. The Cisco 1800 series fixed-configuration routers support the following Ethernet implementations:

- 100BASE-T—100-Mbps full-duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable. Supports the Ethernet maximum length of 328 feet (100 meters).
- 10BASE-T—10-Mbps full-duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable. Supports the Ethernet maximum length of 328 feet (100 meters).

See the [Cisco Modular Access Router Cable Specifications](#) online document for information about Ethernet cables, connectors, and pinouts.

ISDN BRI Connections

The ISDN BRI S/T interface on the Cisco 1801, Cisco 1802, Cisco 1803 and Cisco 1812 routers provides an ISDN BRI connection for dial-backup purposes. The BRI S/T interface requires an external Network Terminator 1 (NT1).

Use a BRI cable (not included) to connect the BRI S/T interface card directly to an ISDN NT1. [Table 4-1](#) lists the specifications for ISDN BRI cables. Also, see the [Cisco Modular Access Router Cable Specifications](#) online document for pinouts. This document is located on Cisco.com.

Table 4-1 ISDN BRI Cable Specifications

Specification	High-Capacitance Cable	Low-Capacitance Cable
Resistance (at 96 kHz)	160 ohm/km	160 ohm/km
Capacitance (at 1 kHz)	120 nF ¹ /km	30 nF/km
Impedance (at 96 kHz)	75 ohm	150 ohm
Wire diameter	0.024 in. (0.6 mm)	0.024 in. (0.6 mm)
Distance limitation	32.8 ft (10 m)	32.8 ft (10 m)

1. nF = nanofarad

Ports and Cabling

[Table 4-2](#) summarizes WAN and LAN connections for Cisco 1800 series fixed-configuration routers. The connections summarized in [Figure 4-1](#)[Table 4-2](#) are also described in detail in the following documents:

- [Cisco Modular Access Router Cable Specifications](#)
- [Cisco Network Modules Hardware Installation Guide](#)
- [Cisco Interface Cards Hardware Installation Guide](#)

Table 4-2 WAN and LAN Connections

Port or Connection	Port Type, Color ¹	Connection Device	Cable
Ethernet ²	RJ-45, yellow	Ethernet hub, Ethernet switch, or Ethernet network interface card (NIC)	Category 5 or higher Ethernet
ADSL	RJ-11C/CA11A, lavender	Network demarcation device for service provider DSL interface	RJ-11 straight-through
SHDSL	RJ-11C/CA11A, lavender, RJ-14	Network demarcation device for service provider DSL interface	RJ-11 straight-through for 2-wire RJ-14 straight-through for 4-wire
BRI S/T WAN (external NT1)	RJ-45/CB-1D, orange	NT1 device or private integrated services network exchange (PINX)	RJ-45 straight-through
Analog Modem	RJ-11	PSTN	RJ-11 straight-through

1. Cable color codes are specific to Cisco cables.

2. Ethernet connection information applies to both WAN ports and Ethernet LAN switch ports.

Connection Procedures and Precautions

Follow these steps to connect your router to the network:

-
- Step 1** Confirm that the router is powered off.

- Step 2** Connect each WAN or LAN cable to the appropriate connector on the chassis. For locations of the chassis WAN and LAN ports, see the “[Chassis Views](#)” section on page 1-7.
- Position the cables carefully, so that they do not put strain on the connectors.
 - Bundle the cables so that they do not intertwine.
 - Inspect the cables to make sure that the routing and bend radiuses are satisfactory. Reposition cables, if necessary.
 - Install cable ties in accordance with site requirements.
- Step 3** Connect the other end of each WAN or LAN cable to the appropriate network device. See [Table 4-2](#) for information about which network devices to connect each cable to.

**Note**

For cable pinouts, see the [Cisco Modular Access Router Cable Specifications](#) document.

Connecting to a Console Terminal or Modem

Your router has asynchronous serial console and auxiliary ports for system management. These ports provide administrative access to your router either locally (with a console terminal or PC) or remotely (with a modem).

Cisco Systems provides the following cables for connecting your router to a console terminal, PC, or modem:

- One console cable (RJ-45-to-DB-9, blue)
- One DB-9-to-DB-25 adapter

This section describes how to connect a console terminal or PC to the console port and how to connect a modem to the auxiliary port. [Table 4-3](#) summarizes the system management connections.

Table 4-3 **System Management Connections**

Port	Color	Connected Device	Cable
Console	Light blue	PC or ASCII terminal communication port (usually labeled COM)	RJ-45-to-DB-9 console cable
Auxiliary	Black	Modem for remote access	RJ-45-to-DB-9 console cable with a DB-9-to-DB25 adapter

For information about cable pinouts, see the [Cisco Modular Access Router Cable Specifications](#) document.

**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

**Warning**

Hazardous network voltages are present in WAN ports regardless of whether power to the unit is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the unit first. Statement 1026

**Warning**

Before opening the unit, disconnect the telephone-network cables to avoid contact with telephone-network voltages. Statement 1041

Console and Auxiliary Port Considerations

The router includes an asynchronous serial console port and an auxiliary port. The console and auxiliary ports provide access to the router either locally (using a console terminal connected to the console port) or remotely (using a modem connected to the auxiliary port). This section provides important information about cabling that you should consider before you connect the router to a console terminal or a modem.

The main difference between the console port and the auxiliary port is that the auxiliary port supports hardware flow control and the console port does not. Flow control paces the transmission of data between a sending device and a receiving device. Flow control ensures that the receiving device can absorb the data sent to it before the sending device sends more. When the buffers on the receiving device are full, a message is sent to the sending device to suspend transmission until the data in the buffers has been processed. Because the auxiliary port supports flow control, it is ideally suited for use with the high-speed transmissions of a modem. Because console terminals send data at slower speeds than modems, the console port is ideally suited for use with console terminals.

Console Port Connections

The router has an EIA/TIA-232 asynchronous serial console port (RJ-45). Depending on the cable and the adapter used, this port will appear as a DTE or DCE device at the end of the cable.

Your router is supplied with an RJ-45-to-DB-9 adapter cable for connecting to a PC that is running terminal emulation software.

To connect the router to an ASCII terminal, use the RJ-45-to-DB-9 cable and a DB-9-to-DB-25 adapter.

The default parameters for the console port are 9600 baud, 8 data bits, 1 stop bit, and no parity. The console port does not support hardware flow control. For detailed information about installing a console terminal, see the [“Connecting to a Console Terminal or Modem”](#) section on page 4-6.

For cable and port pinouts, see the online document [Cisco Modular Access Router Cable Specifications](#). This document is located on Cisco.com.

Connecting to the Console Port

If a console terminal or PC is connected to the console port, you can configure the router locally. Follow these steps to connect a console terminal or PC that is running HyperTerminal or similar terminal emulation software to the console port on the router:

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- Step 1** Use the blue RJ-45-to-DB-9 console cable to connect the router to a terminal.



Note On the Cisco 1800 series fixed-configuration routers, the console port is color-coded blue.

- Step 2** Configure your terminal or terminal emulation software for 9600 baud (default), 8 data bits, 1 stop bit, and no parity; set flow control to “none.”



Note Because hardware flow control is not supported on the console port, do not connect modems to the console port. Connect modems only to the auxiliary port.

Auxiliary Port Connections

The router has an EIA/TIA-232 asynchronous serial auxiliary port (RJ-45) that supports flow control. Depending on the cable and the adapter used, this port appears as a DTE or DCE device at the end of the cable.

Your router is supplied with a DB-9-to-DB-25 adapter for connecting to a modem.

For detailed information about connecting devices to the auxiliary port, see the [“Connecting to a Console Terminal or Modem”](#) section on page 4-6.

For cable and port pinouts, see the [Cisco Modular Access Router Cable Specifications](#) online document on Cisco.com.

Connecting to the Auxiliary Port

If a modem is connected to the auxiliary port, a remote user can dial in to the router and configure it. Follow these steps to connect a modem to the auxiliary port on the router:

- Step 1** Use the black RJ-45-to-DB-25 modem cable or the RJ-45-to-DB-9 console cable with a DB-9 to DB-25 adapter to connect the router to a modem.
- Step 2** Make sure that your modem and the router auxiliary port are configured for the same transmission speed (up to 115,200 bps is supported) and hardware flow control with data carrier detect (DCD) and data terminal ready (DTR) operations.

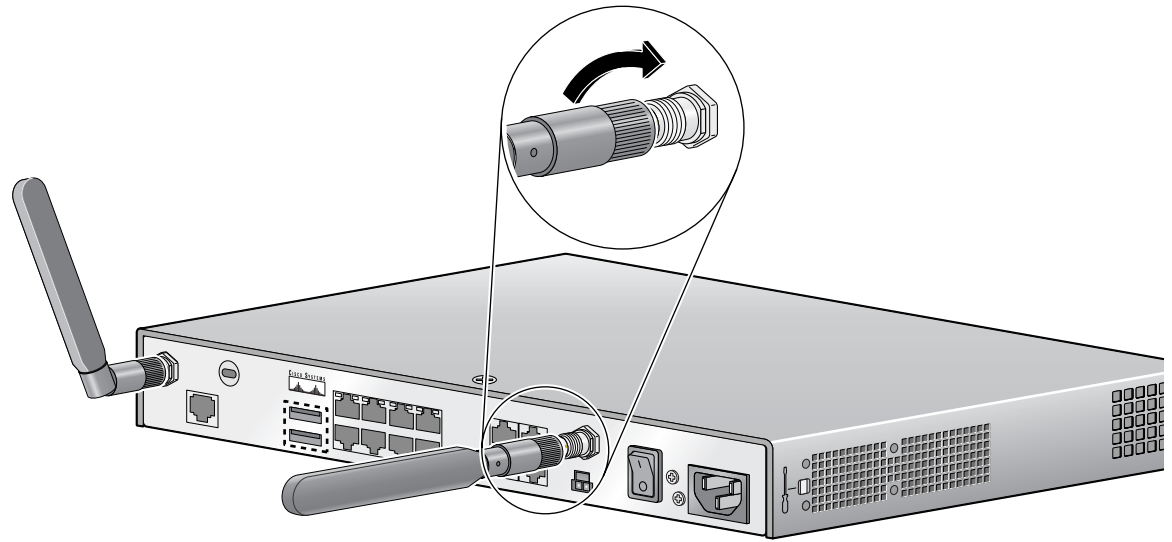
Connecting the Radio Antennas to the Wireless Router

If your router has the wireless LAN option, connect the antennas by screwing the antenna connectors in a clockwise direction onto the reverse-polarity threaded Neill-Concelman (RP-TNC) connectors on the back panel of the router. [Figure 4-2](#) shows an example of how to connect the swivel-mount dipole antennas to the router.



Note For more information about the antennas compatible with the Cisco 1800 series fixed-configuration routers, see the [“Supported Cisco Radio Antennas \(Wireless Models Only\)”](#) section.

Figure 4-2 Connecting Swivel-Mount Dipole Antennas to the Router RP-TNC Connectors



After you have attached the antennas, you must orient them. For best radio performance, the dipole antennas are usually oriented so that they are perpendicular to the ground. [Figure 4-3](#) shows this orientation for a router that is mounted in a rack or placed on a horizontal surface. A wall-mounted router would typically have the dipole antennas pointing straight up or straight down.

Figure 4-3 Dipole Antenna Orientation

