



Port and Cable Information for Cisco 2800 Series Routers

This document provides information about cables needed to install your Cisco 2800 series integrated services router. It includes the following sections:

- [Console and Auxiliary Port Considerations, page 1](#)
- [Preparing to Connect to a Network, page 2](#)

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 discusses important cabling information to consider before connecting the router to a console terminal or modem.

The main difference between the console and auxiliary ports 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. Console terminals send data at slower speeds than modems; therefore, 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 appears as a DTE or DCE device at the end of the cable.

For connection to a PC running terminal emulation software, your router is provided with an RJ-45 to DB-9 adapter cable.

To connect the router to an ASCII terminal, use the RJ-45-to-DB-9 cable and a DB-9-to-DB-25 adapter (provided with the Cisco 2801 router only).



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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 12](#).

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

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.

For connection to a modem, your router is provided with an RJ-45-to-DB-25 adapter cable. (A DB-9-to-DB-25 adapter is also included with the Cisco 2801 router.)

For detailed information about connecting devices to the auxiliary port, see the [“Connecting to a Console Terminal or Modem” section on page 12](#) of the [“Cable Connection Procedures for Cisco 2800 Series Routers”](#) online document.

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

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.

Network connection considerations are provided for several types of network interfaces and are described in the following sections:

- [Ethernet Connections, page 3](#)
- [Serial Connections, page 3](#)
- [ISDN BRI Connections, page 5](#)
- [CSU/DSU Connections, page 6](#)

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

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



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. Statement 1021

Ethernet Connections

The IEEE has established Ethernet as standard IEEE 802.3. Cisco 2800 series routers support the following Ethernet implementations:

- 1000BASE-T—1000 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).



Note The Cisco 2801 and Cisco 2811 routers do not support the 1000BASE-T Ethernet implementation.

- 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).

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

Serial Connections

Serial connections are provided by WAN interface cards and network modules. For more information on WAN interface cards, refer to the [Cisco Interface Cards Installation Guide](#). For more information on network modules, refer to the [Cisco Network Modules Hardware Installation Guide](#). These documents are accessible online at Cisco.com.

Before you connect a device to a serial port, you need to know the following:

- Type of device, data terminal equipment (DTE) or data communications equipment (DCE), you are connecting to the synchronous serial interface
- Type of connector, male or female, required to connect to the device
- Signaling standard required by the device

Configuring Serial Connections

The serial ports on the asynchronous/synchronous serial network modules and the serial WAN interface card use DB-60 connectors. Serial ports can be configured as DTE or DCE, depending on the serial cable used.

Serial DTE or DCE Devices

A device that communicates over a synchronous serial interface is either a DTE or DCE device. A DCE device provides a clock signal that paces the communications between the device and the router. A DTE device does not provide a clock signal. DTE devices usually connect to DCE devices. The documentation that accompanied the device should indicate whether it is a DTE or DCE device. (Some devices have a jumper to select either DTE or DCE mode.) [Table 1](#) lists typical DTE and DCE devices.

Table 1 Typical DTE and DCE Devices

Device Type	Gender	Typical Devices
DTE	Male ¹	Terminal PC
DCE	Female ²	Modem CSU/DSU Multiplexer

1. If pins protrude from the base of the connector, the connector is male.
2. If the connector has holes to accept pins, the connector is female.

Signaling Standards Supported

The synchronous serial ports available for the router support the following signaling standards: EIA/TIA-232, EIA/TIA-449, V.35, X.21, and EIA-530. You can order a Cisco DB-60 shielded serial transition cable that has the appropriate connector for the standard you specify. The documentation for the device you want to connect should indicate the standard used for that device. The router end of the shielded serial transition cable has a DB-60 connector, which connects to the DB-60 port on a serial WAN interface card. The other end of the serial transition cable is available with a connector appropriate for the standard you specify.

The synchronous serial port can be configured as DTE or DCE, depending on the attached cable (except EIA-530, which is DTE only). To order a shielded cable, contact customer service. See the “Obtaining Technical Assistance” section of the “” online document.



Note

All serial ports configured as DTE require external clocking from a CSU/DSU or other DCE device.

Although manufacturing your own serial cables is not recommended (because of the small size of the pins on the DB-60 serial connector), cable pinouts are provided in the [Cisco Modular Access Router Cable Specifications](#) document.

Distance Limitations

Serial signals can travel a limited distance at any given bit rate; generally, the slower the data rate, the greater the distance. All serial signals are subject to distance limits, beyond which a signal significantly degrades or is completely lost.



Note

Only the serial WAN interface card supports bit rates above 128 Kbps.

Table 2 lists the recommended maximum speeds and distances for each serial interface type; however, you might get good results at speeds and distances greater than those listed, if you understand the electrical problems that might arise and can compensate for them. For instance, the recommended maximum rate for V.35 is 2 Mbps, but 4 Mbps is commonly used.

Table 2 Serial Signal Transmission Speeds and Distances

Rate (bps)	EIA/TIA-232 Distance		EIA/TIA-449, X.21, V.35, EIA-530 Distance	
	Feet	Meters	Feet	Meters
2400	200	60	4100	1250
4800	100	30	2050	625
9600	50	15	1025	312
19200	25	7.6	513	156
38400	12	3.7	256	78
56000	8.6	2.6	102	31
1544000 (T1)	—	—	50	15

Balanced drivers allow EIA/TIA-449 signals to travel greater distances than EIA/TIA-232 signals. The recommended distance limits for EIA/TIA-449 shown in [Table 2](#) are also valid for V.35, X.21, and EIA-530. Typically, EIA/TIA-449 and EIA-530 can support 2-Mbps rates, and V.35 can support 4-Mbps rates.

Asynchronous/Synchronous Serial Module Baud Rates

The following baud-rate limitations apply to the slow-speed serial interfaces found in the asynchronous/synchronous serial modules:

- Asynchronous interface—Maximum baud rate is 115.2 kbps.
- Synchronous interface—Maximum baud rate is 128-kbps full duplex.

ISDN BRI Connections

The BRI WAN interface cards provide Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) connections. The BRI modules and BRI WAN interface cards are available with either an S/T interface that requires an external Network Terminator 1 (NT1), or a U interface that has a built-in NT1.

You can install the BRI modules in any available slot in the chassis.



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

Use a BRI cable (not included) to connect the BRI WAN interface card directly to an ISDN. [Table 3](#) lists the specifications for ISDN BRI cables. Also, refer to the [Cisco Modular Access Router Cable Specifications](#) online document for pinouts. This document is located on Cisco.com.

Table 3 ISDN BRI Cable Specifications

Specification	High-Capacitance Cable	Low-Capacitance Cable
Resistance (at 96 kHz)	160 ohms/km	160 ohms/km
Capacitance (at 1 kHz)	120 nF ¹ /km	30 nF/km
Impedance (at 96 kHz)	75 ohms	150 ohms
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

For more information on BRI WAN interface cards, refer to the [Cisco Interface Cards Installation Guide](#) online document on Cisco.com.

CSU/DSU Connections

CSU/DSU WAN interface cards (WICs) are available to provide switched-56-kbps connections or full or fractionalized T1 connections.

For more information on CSU/DSU WICs, refer to the [Cisco Interface Cards Installation Guide](#) online document on Cisco.com.

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