CHAPTER 5

Cable Information and Specifications for Cisco 1800 Series Routers (Modular)

This chapter gives cable information and specifications for the console port, auxiliary port, and network ports on your Cisco 1800 series integrated services router (modular). It contains the following sections:

- Console and Auxiliary Port Considerations, page 5-1
- Preparing to Connect to a Network, page 5-2

For cable connection procedures, see *"Cable Connection Procedures for Cisco 1800 Series Routers (Modular)"*.

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 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 flow control, whereas 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 will appear as a data terminal equipment (DTE) or data communications equipment (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 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).

The default parameters for the console port are 9600 baud, 8 data bits, no parity, and 1 stop bit. The console port does not support mode control.

For cable and port pinouts, see *Cisco Modular Access Router Cable Specifications*.

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 will appear 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-9 cable and a DB-9-to-DB-25 adapter.

For detailed information about connecting devices to the auxiliary port, see the "Connecting to the Auxiliary Port" section on page 6-4 of the "Cable Connection Procedures for Cisco 1800 Series Routers (Modular)" chapter.

For cable and port pinouts, see the *Cisco Modular Access Router Cable Specifications* document.

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.

The following sections describe network connection considerations for several types of network interfaces:

- Ethernet Connections, page 5-2
- Serial Connections, page 5-3
- ISDN BRI Connections, page 5-5
- CSU/DSU Connections, page 5-5

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

- *Cisco Interface Cards Installation Guide*
- *Cisco Modular Access Router Cable Specifications*

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

Ethernet Connections

The IEEE has established Ethernet as standard IEEE 802.3. The Cisco 1800 series Ethernet implementations are as follows:

- 100BASE-T—2-pair Category 5 or unshielded twisted-pair (UTP) straight-through RJ-45 cable. The maximum segment distance is 328 feet (100 meters).
- 10BASE-T—Ethernet on UTP cable. The maximum segment distance is 328 feet (100 meters). UTP cables look like the wiring used for ordinary telephones; however, UTP cables meet certain electrical standards that telephone cables might not meet.

See *Cisco Modular Access Router Cable Specifications* for information about Ethernet cables, connectors, and pinouts.

Serial Connections

Serial connections are provided by serial WAN interface cards (WICs). For more information on WICs, see *Installing Cisco Interface Cards in Cisco Access Routers*.

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)—that you are connecting to the synchronous serial interface
- Type of connector—male or female—that is required for connecting to the device
- Signaling standard that is required by the device

Configuring Serial Connections

The serial ports on the serial WICs use DB-60 connectors. Serial ports can be configured as DTEs or DCEs, 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 for the device should indicate whether it is a DTE or DCE device. (Some devices have a jumper that allows you to select either DTE mode or DCE mode.) Table 5-1 lists typical DTE and DCE devices.

Table 5-1 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 that 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 WIC. The other end of the serial transition cable is available with a connector appropriate for the standard that 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 Documentation and Submitting a Service Request" section on page 1-15.

Note All serial ports configured as DTE require external clocking from a channel service unit/data service unit (CSU/DSU) or other DCE device.

Although we do not recommend manufacturing your own serial cables (because of the small size of the pins on the DB-60 serial connector), cable pinouts are provided in *Cisco Modular Access Router Cable Specifications*.

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 is significantly degraded or completely lost.

Table 5-2 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 5-2 Serial Signal Transmission Speeds and Distances

	Distance for EIA/TIA-232		Distance for EIA/TIA-449, X.21, V.35, and EIA-530	
Rate (bps)	**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. Typically, EIA/TIA-449 and EIA-530 can support a 2-Mbps rate, and V.35 can support a 4-Mbps rate.

Asynchronous/Synchronous Serial Module Baud Rates

The following baud-rate limitations apply to the slow-speed serial interfaces 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 WICs provide ISDN and BRI connections. BRI WICs are available with either an S/T interface that requires an external Network Termination 1 (NT1), or a U interface that has a built-in NT1. You can install the BRI WICs in any available WIC slots in the chassis.

Warning **The ISDN connection is regarded as a source of voltage that should be inaccessible to user contact. Do not attempt to tamper with or open any public telephone operator (PTO)-provided equipment or connection hardware. Any hardwired connection (other than by a nonremovable, connect-one-time-only plug) must be made only by PTO staff or suitably trained engineers.** Statement 23

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 WIC directly to an ISDN. Table 5-3 lists the specifications for ISDN BRI cables. For information about pinouts, see *Cisco Modular Access Router Cable Specifications*.

Table 5-3 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 WICs, see *Installing Cisco Interface Cards in Cisco Access Routers*.

CSU/DSU Connections

CSU/DSU WICs are available that provide switched 56-kbps connections, or full or fractionalized T1 connections.

For more information on CSU/DSU WICs, see *Installing Cisco Interface Cards in Cisco Access Routers*.