Cable Specifications

This appendix contains cable and cable pinout information for the Cisco uBR7225VXR universal broadband router.

- Coaxial Cables, page C-1
- Console and Auxiliary Port Cables and Pinouts, page C-2
- Fast Ethernet Port Cables and Pinouts, page C-4
- Fiber-Optic Cables and Connectors, page C-6

Note
This appendix specifies pinouts only for the pins used. Pins not listed in the tables are not connected.

Coaxial Cables

The coaxial cable used to connect the Cisco uBR7200 series universal broadband routers at the headend should be very high-quality cable.

We recommend that you use a headend-grade coaxial cable or a quad-shield coaxial cable to connect the cable interface line cards to the hybrid fiber-coaxial (HFC) network. The center conductor must be straight and extend 1/8 inch (3.2 mm) beyond the end of the connector, and the connector should be securely crimped to the cable. The following headend cables are recommended:

- 59-series cable (preferred)—20 AWG (0.032 inch/0.81 mm diameter) silver plated, copper-clad, steel center conductor; bonded foil inner shield; 95 percent braid second shield; nonbonded foil third shield; 95 percent braid fourth shield.
- 59-series quad shield—20 AWG (0.032 inch/0.81 mm diameter) copper-clad steel center conductor; bonded foil inner shield; 53 percent braid second shield; nonbonded foil third shield; 34–35 percent braid fourth shield.
- 6-series quad shield—18 AWG (0.0359 inch/0.91 mm diameter) copper-clad steel center conductor; bonded foil inner shield; 60 percent braid second shield; nonbonded foil third shield; 40–42 percent braid fourth shield.

Note
Any of the three of the coaxial cables listed can be used to connect a Cisco cable interface line card to the HFC network; however, the consistent use of 59-series cable is preferred. If you connect a 59-series cable to a cable interface line card that was previously connected using 6-series cable, the difference in the center connector diameter might cause intermittent connectivity loss.
If you use different types of coaxial cable, the following problems can appear:

- Damage to Cisco uBR7225VXR cable interface line card connectors—Cable interface line card connectors are designed for 59-series or 6-series cable and connectors. Larger cables can damage the connectors.
- Poor return loss—High-quality cable and correct connectors help to ensure an optimal return loss of 16 dB or more.

**Caution**  
Poorly shielded coaxial cable may result in undesired signal leakage (egress), interference from over-the-air signals (ingress), or crosstalk between cables in close physical proximity.

## Console and Auxiliary Port Cables and Pinouts

The router arrives with a console and auxiliary cable kit, which contains the cable and adapters you need to connect a console (an ASCII terminal or PC running terminal emulation software) or modem to the router. The console and auxiliary cable kit includes:

- RJ-45-to-RJ-45 rollover cable
- RJ-45-to-DB-9 female data terminal equipment (DTE) adapter labeled TERMINAL
- RJ-45-to-DB-25 male data communications equipment (DCE) adapter labeled MODEM

Figure C-1 shows the RJ-45 cable connector.

![Figure C-1 RJ-45 Plug and Receptacle](image)

### Identifying an RJ-45 Rollover Cable

You can identify a rollover cable by holding the two ends of the cable next to each other with the tab at the back. The wire connected to the pin on the outside of the left hand plug should be the same color as the wire connected to the pin on the outside of the right hand plug, as shown in Figure C-2.
The colored wires at one connector are in the reverse order at the other connector (reverses pins 1 and 8, 2 and 7, 3 and 6, 4 and 5, 5 and 4, 6 and 3, 7 and 2, 8 and 1).

The wires of the straight-through cable are in the same sequence at both ends of the cable.

Note

If your cable was purchased from Cisco, pin 8 is white.

Console Port Cables and Pinouts

Use the RJ-45-to-RJ-45 rollover cable and RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL) to connect the console port to a PC running terminal emulation software. Table C-1 lists the signals and pinouts for the asynchronous serial console port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-9 female DTE adapter.

| Table C-1 Console Port Signaling and Cabling Using a DB-9 Adapter |
|------------------|------------------|------------------|------------------|------------------|
| **Console Port (DTE)** | **RJ-45-to-RJ-45 Rollover Cable** | **RJ-45-to-DB-9 Terminal Adapter** | **Console Device** |
| **Signal** | **RJ-45 Pin** | **RJ-45 Pin** | **DB-9 Pin** | **Signal** |
| RTS | 1 | 8 | 8 | CTS |
| DTR | 2 | 7 | 6 | DSR |
| TxD | 3 | 6 | 2 | RxD |
| GND | 4 | 5 | 5 | GND |
| GND | 5 | 4 | 5 | GND |
| RxD | 6 | 3 | 3 | TxD |
| DSR | 7 | 2 | 4 | DTR |
| CTS | 8<sup>1</sup> | 1 | 7 | RTS |

<sup>1</sup> Pin 1 is connected internally to pin 8.
Auxiliary Port Cables and Pinouts

Use the RJ-45-to-RJ-45 rollover cable and RJ-45-to-DB-25 male DCE adapter (labeled MODEM) to connect the auxiliary port to a modem. Table C-2 lists the signals and pinouts for the asynchronous serial auxiliary port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-25 male DCE adapter (labeled MODEM).

Table C-2  Auxiliary Port Signaling and Cabling Using a DB-25 Adapter

<table>
<thead>
<tr>
<th>AUX Port (DTE)</th>
<th>RJ-45-to-RJ-45 Rollover Cable</th>
<th>RJ-45-to-DB-25 Modem Adapter</th>
<th>Modem (DCE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal</td>
<td>RJ-45 Pin</td>
<td>RJ-45 Pin</td>
<td>DB-25 Pin</td>
</tr>
<tr>
<td>RTS</td>
<td>1</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>DTR</td>
<td>2</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>TxD</td>
<td>3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>GND</td>
<td>4</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>GND</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>RxD</td>
<td>6</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>DSR</td>
<td>7</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>CTS</td>
<td>8</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

Fast Ethernet Port Cables and Pinouts

The 10Base-T/100Base-TX Fast Ethernet ports support IEEE 802.3 and IEEE 802.3u specifications for 10-Mbps and 100-Mbps transmission over unshielded twisted-pair (UTP) cables. Each Fast Ethernet port on the NPE has an RJ-45 connector to attach to Category 3 or Category 5 UTP cables.

- Use a Category 3 UTP crossover cable when connecting 10Base-T port to a hub.
- Use a Category 3 UTP straight-through cable when connecting to a PC or other Ethernet device.
- Use a Category 5 UTP crossover cable when connecting 100Base-TX to a hub.
- Use a Category 5 UTP straight-through cable when connecting to a PC or other Ethernet device.

Note

Cisco does not supply Category 3 or Category 5 UTP RJ-45 cables; these cables are available commercially.

Identifying an RJ-45 Crossover Cable

You can identify a crossover cable by comparing the two modular ends of the cable. Hold the cables side-by-side with the tab at the back. The first (far left) colored wire (pin 1) at one end of the cable is the third colored wire (pin 3) at the other end of the cable. The second colored wire (pin 2) at one end of the cable is the sixth colored wire (pin 6) at the other end of the cable. Pin 1 wire is white. See Figure C-3.
Identifying an RJ-45 Straight-Through Cable

You can identify a straight-through cable by comparing the two modular ends of the cable. Hold the cables side-by-side with the tab at the back. The straight-through cable’s wires are in the same sequence at both ends of the cable. See Figure C-4.

Note

If your cable was purchased from Cisco, pin 1 is white. Pins 4, 5, 7, and 8 are not connected.

Table C-3 lists the pinouts for the two Fast Ethernet ports.

**Table C-3**  10BASE-T RJ-45 Connector Pinouts

<table>
<thead>
<tr>
<th>RJ-45 Pin</th>
<th>Description</th>
<th>RJ-45 Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tx+</td>
<td>3</td>
<td>Rx+</td>
</tr>
<tr>
<td>2</td>
<td>Tx−</td>
<td>6</td>
<td>Rx−</td>
</tr>
</tbody>
</table>
Fiber-Optic Cables and Connectors

⚠️ **Warning**  
Because invisible radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures. Statement 1056

⚠️ **Warning**  
Class 1 laser product. Statement 1008

Use a single-mode or multimode fiber-optic interface cable to connect your Cisco uBR7225VXR router to another router or switch. In general, multimode cables are gray or orange, and single-mode cables are yellow. For Ethernet and multimode fiber-optic connections, use one duplex SC-type connector (Figure C-5) or two simplex SC-type connectors. (See Figure C-6.)

**Figure C-5**  
Duplex SC Cable Connector

![Duplex SC Cable Connector](image)

**Figure C-6**  
Simplex SC Cable Connector

![Simplex SC Cable Connector](image)

Attach either one duplex fiber cable or two simplex fiber cables between the digital pulse terminator (DPT) port adapter and the device to which the DPT port adapter is connected. Observe the receive (RX) and transmit (TX) cable relationship shown in Figure C-7.

**Figure C-7**  
Attaching Simplex or Duplex Fiber-Optic Cables

![Attaching Simplex or Duplex Fiber-Optic Cables](image)