



APPENDIX **B**

Cable Specifications

This appendix provides the following cabling and pinout information for the Cisco uBR10012 routers.

- [Coaxial Cables, page B-1](#)
- [Console and Auxiliary Port Cables and Pinouts, page B-2](#)
- [Fast Ethernet Port Cables and Pinouts, page B-4](#)
- [Connecting a Cable to an RJ-45 Connector, page B-7](#)
- [Fiber-Optic Cables and Connectors, page B-8](#)



Note

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

For more information about cables and connectors, refer to the *Cabling Guide for Console and AUX Ports* at the following URL:

http://www.cisco.com/en/US/products/hw/routers/ps332/products_tech_note09186a0080094ce6.shtml

Coaxial Cables

The coaxial cable used to connect the Cisco uBR10012 universal broadband routers at the headend should be very high-quality cable.

Cisco recommends that you use a headend-grade coaxial cable or a quad-shield coaxial cable to connect the cable modem cards to the HFC network. The center conductor must be straight and extend 1/8 in. (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 in./0.81 mm diameter) silver plated, copper-clad, steel center conductor; bonded foil inner shield; 95% braid second shield; non-bonded foil third shield; 95% braid fourth shield.
- 59-series quad shield—20 AWG (0.032 in./0.81 mm diameter) copper-clad steel center conductor; bonded foil inner shield; 53% braid second shield; non-bonded foil third shield; 34%-35% braid fourth shield.
- 6-series quad shield—18 AWG (0.0359 in./0.91 mm diameter) copper-clad steel center conductor; bonded foil inner shield; 60% braid second shield; non-bonded foil third shield; 40%-42% braid fourth shield.

**Note**

Any of the three of the coaxial cables listed can be used to connect a Cisco cable interface card to the HFC network; however, the consistent use of 59-series cable is preferred. If you connect an 59-series cable to a cable interface 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 uBR10012 router cable interface card connectors—Cable interface 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.

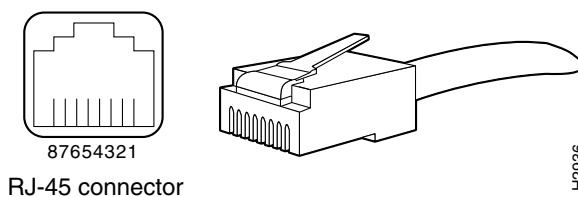
Console and Auxiliary Port Cables and Pinouts

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 B-1 shows the RJ-45 cable connector.

Figure B-1 RJ-45 Plug and Receptacle



How to Identify 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 as the wire connected to the pin on the right hand plug, as shown in Figure B-3.

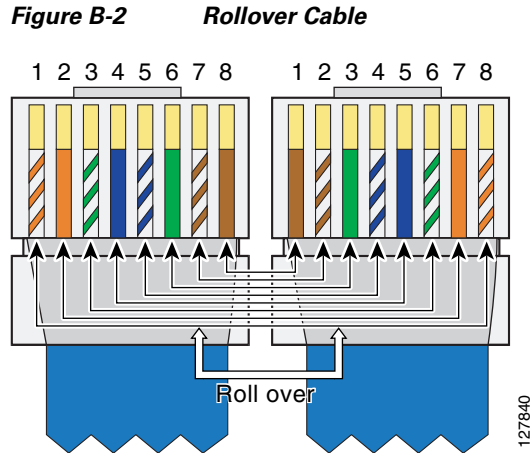
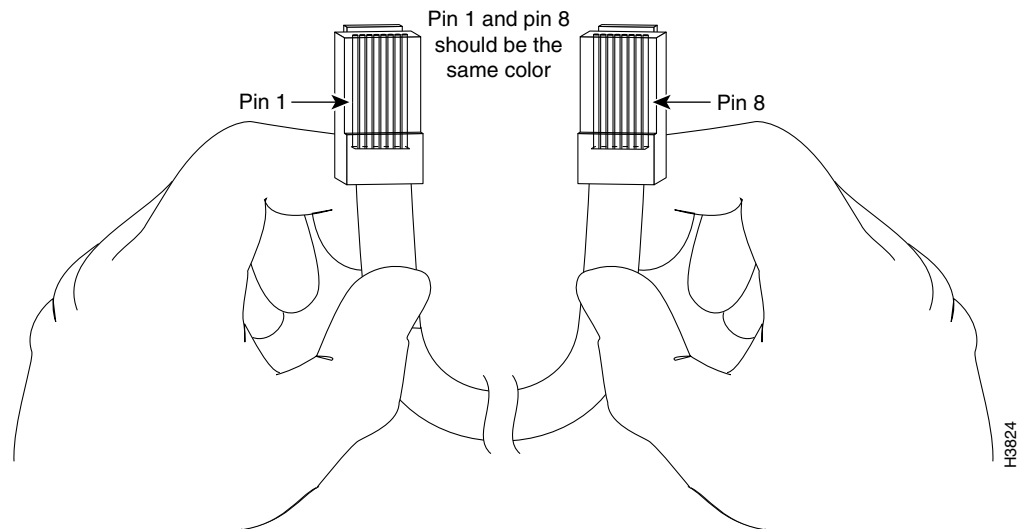


Figure B-3 RJ-45 Rollover Cable Identification



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).

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



Note

If your cable was purchased from Cisco Systems, 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 B-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 B-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
	RJ-45 Pin	RJ-45 Pin	DB-9 Pin	
Signal				Signal
RTS	1 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 ¹	1	7	RTS

1. 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 B-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 B-2 Auxiliary Port Signaling

AUX Port (DTE)	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-25 Modem Adapter	Modem (DCE)
	RJ-45 Pin	RJ-45 Pin	DB-25 Pin	
Signal				Signal
RTS	1	8	4	RTS
DTR	2	7	20	DTR
TxD	3	6	3	TxD
GND	4	5	7	GND
GND	5	4	7	GND
RxD	6	3	2	RxD
DSR	7	2	8	DCD
CTS	8	1	5	CTS

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

How to Identify 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. See [Figure B-4](#).

Figure B-4 Crossover Cable

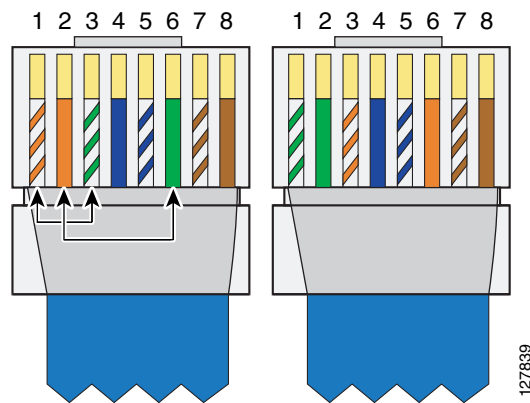
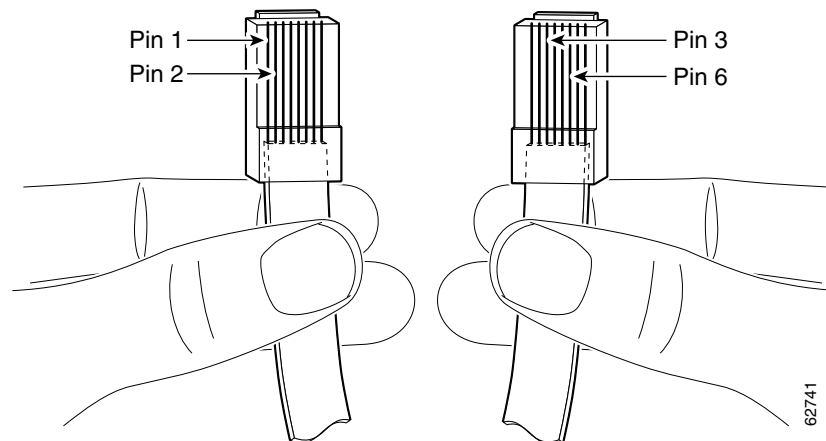


Figure B-5 RJ-45 Crossover Cable Identification



How to Identify 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. A straight-through cable wires are in the same sequence at both ends of the cable. See [Figure B-6](#).

Figure B-6 Straight-through Cable

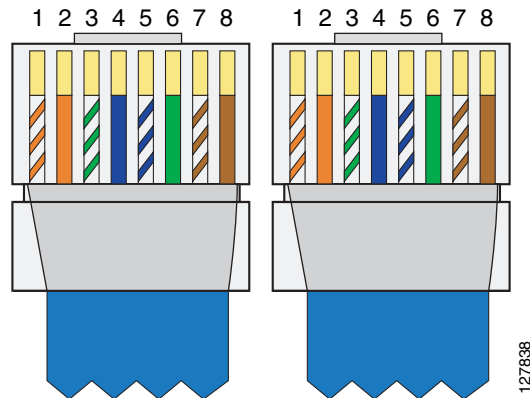
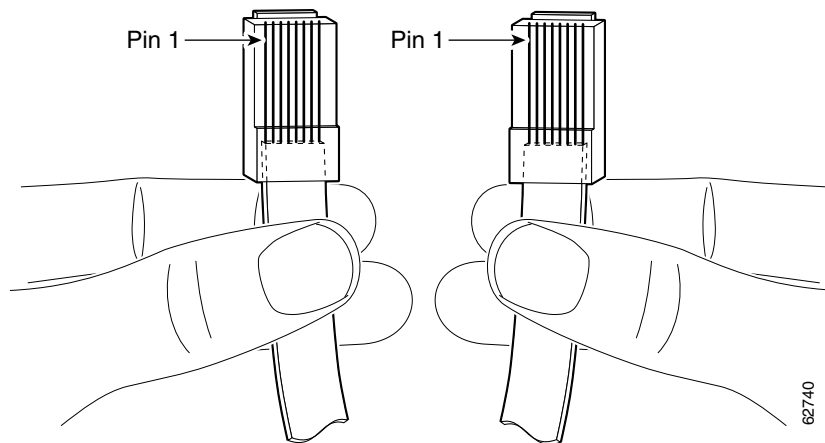


Figure B-7 RJ-45 Straight-Through Cable Identification



Note

If your cable was purchased from Cisco Systems, pin 1 is white.

[Table B-3](#) lists the pinouts for the two Fast Ethernet ports.

Table B-3 10Base-T RJ-45 Connector Pinouts

RJ-45 Pin	Description	RJ-45 Pin	Description
1	Tx+	3	Rx+
2	Tx-	6	Rx-

Connecting a Cable to an RJ-45 Connector

Use the following information to build your own cables with RJ45 connectors.

Tools

- Category 3 cable or Category 5 cable
- RJ45 connectors
- Wire stripping tool
- Crimping tool—for the RJ45 connector

Step 1 Use the wire stripper to cut the outer jacket of the wire about 1 inch to 1.5 inches from the end of the cable.

**Caution**

When cutting the cable jacket, make sure that you do not damage the wires in the jacket.

Step 2 Arrange the wires in the order that you want to install them into the RJ45 connector.

**Note**

The order of the wires is dependant on what type of connection you are making: crossover, rollover, or straight-through.

Step 3 After arranging the wires in the correct order, cut them back so there is about 1/2 inch available to install in the connector.

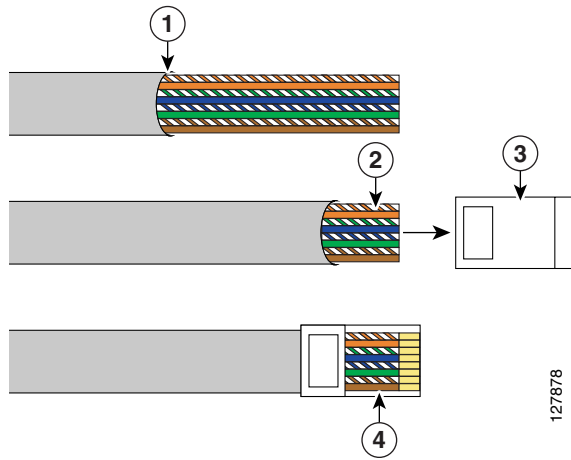
Step 4 Push the cable into the connector so that the jacket is past the plastic wedge at the rear of the connector and the wires are at the end of the connector underneath the gold crimping pins. Make sure each wire goes into the appropriate location.

Step 5 Use your crimping tool to crimp the cable. Check your connection by tugging slightly on the cable. Recrimp as necessary.

**Note**

When you use the crimping tool, the plastic wedge is pressed into the cable jacket to hold the cable in place and the crimping pins are pushed down into the wires in the connector channels.

Figure B-8 Installing Cable in an RJ45 Connector



1	Jacket cut here	3	RJ45 connector
2	Wire cut to one half inch in length	4	Cable installed in RJ45 connector

Fiber-Optic Cables and Connectors

The following warnings apply when you work with fiber-optic cables and ports.


Warning

Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. Statement 1051


Warning

Laser radiation is present when the system is open and interlocks are bypassed. Statement 1009


Warning

Class 1 laser product Statement 1008


Warning

Class 1 LED product Statement 1027

Use a single-mode or multimode fiber-optic interface cable to connect your Cisco uBR10012 router to another router or switch.

In general, multimode cables are gray or orange, and single-mode cables are yellow.

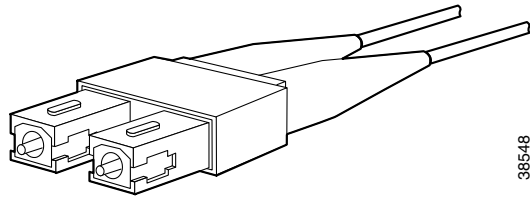


Note

Single-mode and multimode fiber-optic cables are not available from Cisco Systems, Inc.

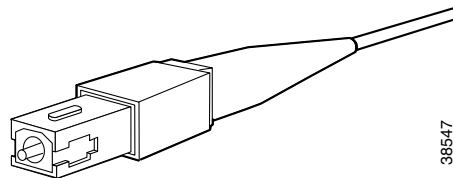
For SONET or SDH single-mode and multimode fiber-optic connections, use one duplex SC-type connector (Figure B-9) or two simplex SC-type connectors. (See Figure B-10.)

Figure B-9 Duplex SC Cable Connector



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Figure B-10 Simplex SC Cable Connector

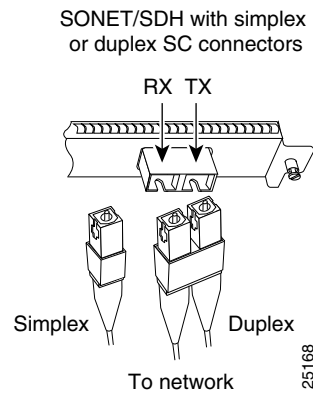


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Attach either one duplex fiber cable or two simplex fiber cables between the DPT port adapter and the device to which the DPT port adapter is connected.

Observe the receive (RX) and transmit (TX) cable relationship shown in Figure B-11.

Figure B-11 Attaching Simplex or Duplex Fiber-Optic Cables



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