Connector and Cable Specifications

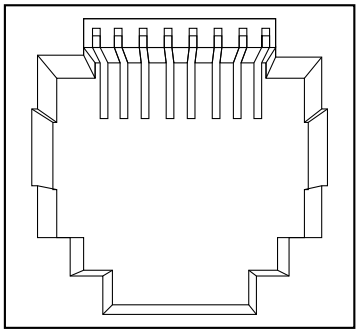
Connector Specifications

10/100

The 10/100 Ethernet ports use standard RJ-45 connectors and Ethernet pinouts with internal crossovers. These ports have the send (TD) and receive (RD) signals internally crossed so that a twisted-pair straight-through cable and adapter can be attached.

Figure 54 10/100 Port Pinouts

Pin	Label
1	RD+
2	RD-
3	TD+
4	NC
5	NC
6	TD-
7	NC
8	NC



When connecting 10/100 ports to devices such as servers, workstations, and routers, you can use a two or four twisted-pair straight-through cable wired for 10BASE-T and 100BASE-TX. Figure 59 on page 77 shows the two twisted-pair straight-through cable schematics. Figure 61 on page 77 shows the four twisted-pair straight-through cable schematics.

When connecting the ports to other devices, such as switches or repeaters, you can use a two or four twisted-pair crossover cable. Figure 60 on page 77 shows the two twisted-pair crossover cable schematics. Figure 62 on page 77 shows the four twisted-pair crossover cable schematics.

If auto-MDIX is disabled, use a straight-through cable to connect ports when only one port is labeled with an X. Use a crossover cable to connect ports when both ports are labeled with an X or when both ports are not labeled with an X.

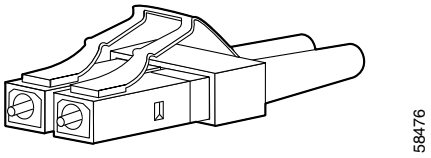
You can use Category 3, 4, or 5 cabling when connecting to 10BASE-T-compatible devices. You must use Category 5 (or higher) cabling when connecting to 100BASE-TX-compatible devices.

Note: You can use the **mdix auto** interface configuration command in the CLI to enable the automatic medium-dependent interface crossover (auto-MDIX) feature. When the auto-MDIX feature is enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 10/100, 10/100/1000, or 1000BASE-T SFP module port on the switch, regardless of the type of device on the other end of the connection.

SFP Module Connectors

Figure 55 on page 72 shows the MT-RJ SFP module fiber-optic connector.

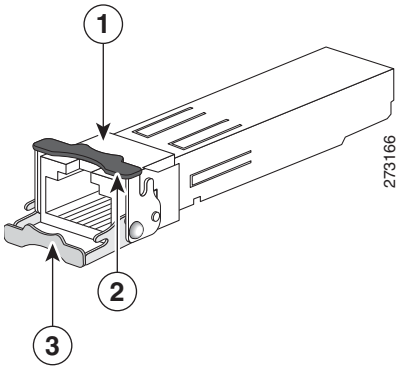
Figure 55 Fiber-Optic SFP Module LC Connector



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

Figure 56 on page 72 shows the 1000BASE-T SFP module RJ-45 connector.

Figure 56 1000BASE-T SFP Module Connector



1 RJ-45 connector

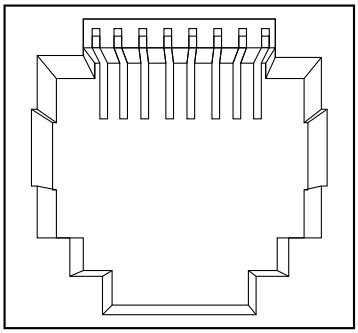
2 Bale-clasp latching mechanism in the closed (locked) position

3 Bale-clasp latching mechanism in the open (unlocked) position

Dual-Purpose Ports

The 10/100/1000 Ethernet ports on the dual-purpose ports use RJ-45 connectors.

Figure 57 10/100/1000 Port Pinouts

Pin	Label	1 2 3 4 5 6 7 8
1	TP0+	
2	TP0-	
3	TP1+	
4	TP2+	
5	TP2-	
6	TP1-	
7	TP3+	
8	TP3-	

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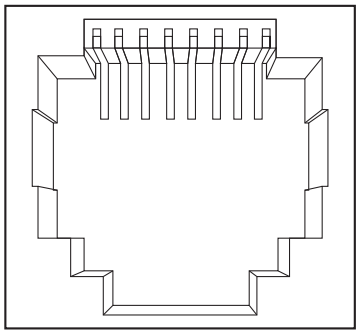
Alarm Port

The alarm port uses an RJ-45 connector. See the Alarm Ports, page 10 for more information. For information on alarm ratings, see the Alarm Ratings, page 69.

Figure 58 Alarm Port Pinouts

Pin	Alarm connection	1 2 3 4 5 6 7 8
1	Alarm 1 input	
2	Alarm 2 input	
3	Normally closed	
4	Alarm 3 input	
5	Alarm 4 input	
6	Normally open	
7	Alarm output common	
8	Alarm input common	

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Cables and Adapters

SFP Module Cables

Each port must match the wave-length specifications on each end of the cable, and for reliable communications, the cable must not exceed the allowable length. Copper 1000BASE-T SFP transceivers use standard four twisted-pair, CAT5 (or greater) cable at lengths up to 328 feet (100 meters).

Notes

- The maximum operating temperature of the switch varies depending on SFP module type. See Table 2 on page 8 for information on the supported temperature ranges.
- Modal bandwidth applies only to multimode fiber (MMF).
- A mode-field diameter/cladding diameter = 9 micrometers/125 micrometers.
- 1000BASE-LX/LH SFP modules connected with MMF over a short link distance require a mode-conditioning patch cord.

  Ordinary patch cords can cause transceiver saturation, resulting in an elevated bit error rate (BER). Using the 1000BASE-LX/LH SFP module with 62.5-micron diameter multimode fiber (MMF) requires a mode-conditioning patch cord between the single mode fiber (SMF) SFP module and the MMF cable on both the send and receive link ends.
- Link distances greater than 984 feet (300 m) require a mode-conditioning patch cord.
- 1000BASE-ZX SFP modules can send data up to 62 miles (100 km) by using dispersion-shifted SMF or low-attenuation SMF. The distance depends on fiber quality, the number of splices, and the connectors.
- When the fiber-optic cable span is less than 15.43 miles (25 km), insert a 5-decibel (dB) or 10-dB inline optical attenuator between the fiber-optic cable plant and the receiving port on the 1000BASE-ZX SFP module.

Table 20 Fiber-Optic SFP Module Port Cabling Specifications

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
Industrial and Rugged SFPs					
1000BASE-SX (GLC-SX-MM-RGD)	850	MMF	62.5/125 62.5/125 50/125 50/125	160 200 400 500	722 feet (220 m) 902 feet (275 m) 1640 feet (500 m) 1804 feet (550 m)
1000BASE-LX/LH (GLC-LX-MM-RGD)	1310	SMF	G.652	–	32,810 feet (10 km)
100BASE-LX (GLC-FE-100LX-RGD)	1310	SMF	G.652	–	32,810 feet (10 km)
100BASE-FX (GLC-FE-100FX-RGD)	1310	MMF	50/125 62.5/125	500 500	6,562 feet (2 km) 6,562 feet (2 km)
1000BASE-ZX (GLC-ZX-SM-RGD)	1550	SMF	G.652	–	43.4 to 62 miles (70 to 100 km)
1000BASE-BX-D (GLC-BX40-D-I GLC-BX40-DA-I GLC-BX80-D-I)	1550 1490 1570	SMF	G.652	–	24.9 miles (40 km) 24.9 miles (40 km) 49.8 miles (80 km)

Table 20 Fiber-Optic SFP Module Port Cabling Specifications (continued)

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
1000BASE-BX-U (GLC-BX40-U-I GLC-BX80-U-I)	1310 1490	SMF	G.652	–	24.9 miles (40 km) 49.8 miles (80 km)
Commercial SFPs					
1000BASE-BX10-D (GLC-BX-D)	1490 TX 1310 RX	SMF	G.652	–	32,810 feet (10 km)
100BASE-LX (GLC-FE-100LX)	1310	SMF	G.652	–	32,810 feet (10 km)
100BASE-BX (GLC-FE-100BX-D GLC-FE-100BX-U)	1310 TX 1550 RX	SMF	G.652	–	32,810 feet (10 km)
100BASE-FX (GLC-FE-100FX)	1310	MMF	50/125 62.5/125	500 500	6,562 feet (2 km) 6,562 feet (2 km)
100BASE-EX (GLC-FE-100EX)	1310	SMF	G.652	–	131,240 feet (40 km)
100BASE-ZX (GLC-FE-100ZX)	1550	SMF	G.652	–	262,480 feet (80 km)
CWDM	1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610	SMF	G.652	–	62 miles (100 km)
Extended temperature SFPs					
1000BASE LX/LH (SFP-GE-L)	1300	MMF or SMF	62.2 50 50 9/10	500 400 500 –	1804 feet (550 m) 1804 feet (550 m) 1804 feet (550 m) 6.2 miles (10 km)
1000BASE SX (SFP-GE-S)	850	MMF	62.5 62.5 50.0 50.0	160 200 400 500	722 feet (220 m) 902 feet (275 m) 1640 feet (500 m) 1804 feet (550 m)
1000BASE ZX (SFP-GE-Z)	1550	SMF SMF	9/10 8	–	43.5 miles (70 km) 62.1 miles (100 km)

Table 20 Fiber-Optic SFP Module Port Cabling Specifications (continued)

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
1000BASE LX/LH GLC-LH-SMD	1310	MMF	62.5	500	1804 feet (550 m)
			50.0	400	1804 feet (550 m)
			50.0	500	1804 feet (550 m)
		SMF	G.652	–	6.2 miles (10 km)
1000BASE EX (GLC-EX-SMD)	1310	SMF	G.652	–	24.9 miles (40 km)
1000BASE ZX (GLC-ZX-SMD)	1550	SMF	–	–	43.5 miles (70 km)
					62.1 miles (100 km)

Cable Pinouts

Figure 59 Two Twisted-Pair Straight-Through Cable Schematic for 10/100 Ports

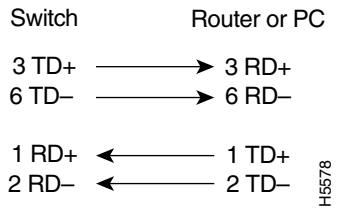


Figure 60 Two Twisted-Pair Crossover Cable Schematic for 10/100 Ports

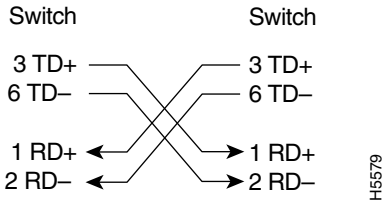


Figure 61 Four Twisted-Pair Straight-Through Cable Schematic for 1000BASE-T Ports

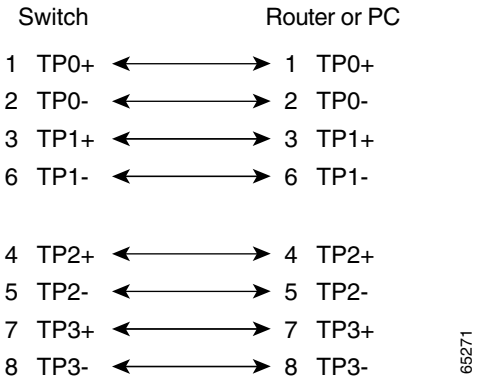
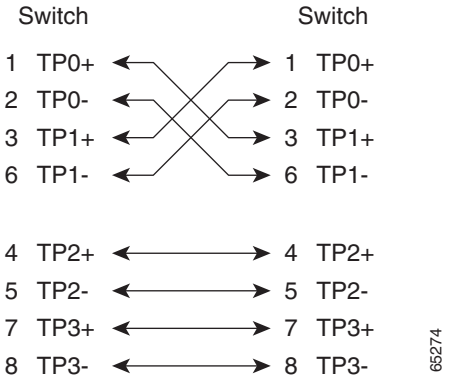
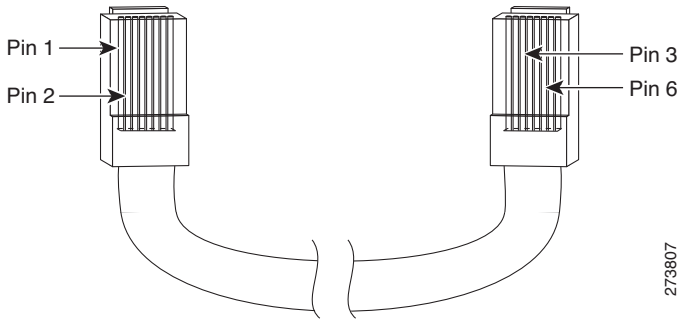


Figure 62 Four Twisted-Pair Crossover Cable Schematics for 1000BASE-T Ports



To identify a crossover cable, hold the cable ends side-by-side, with the tab at the back. The wire connected to pin 1 on the left end should be the same color as the wire connected to pin 3 on the right end. The wire connected to pin 2 on the left end should be the same color as the wire connected to pin 6 on the right end.

Figure 63 Identifying a Crossover Cable



Console Port Adapter Pinouts

The console port uses an 8-pin RJ-45 connector, which is described in Table 21 on page 78 and Table 22 on page 79. If you did not order a console cable, you need to provide an RJ-45-to-DB-9 adapter cable to connect the switch console port to a PC console port. You need to provide an RJ-45-to-DB-25 female DTE adapter if you want to connect the switch console port to a terminal. You can order an adapter (part number ACS-DSBUASYN=). For console port and adapter pinout information, see Table 21 on page 78 and Table 22 on page 79.

Table 21 on page 78 lists the pinouts for the console port, the RJ-45-to-DB-9 adapter cable, and the console device.

Table 21 Console Port Signaling Using a DB-9 Adapter

Switch Console Port (DTE)	RJ-45-to-DB-9 Terminal Adapter	Console Device
Signal	DB-9 Pin	Signal
RTS	8	CTS
DTR	6	DSR
TxD	2	RxD
GND	5	GND
RxD	3	TxD
DSR	4	DTR
CTS	7	RTS

Table 22 on page 79 lists the pinouts for the switch console port, RJ-45-to-DB-25 female DTE adapter, and the console device.

Note: The RJ-45-to-DB-25 female DTE adapter is not supplied with the switch. You can order this adapter from Cisco (part number ACS-DSBUASYN=).

Table 22 Console Port Signaling Using a DB-25 Adapter

Switch Console Port (DTE)	RJ-45-to-DB-25 Adapter	Console Device
Signal	DB-25 Pin	Signal
RTS	5	CTS
DTR	6	DSR
TxD	3	RxD
GND	7	GND
RxD	2	TxD
DSR	20	DTR
CTS	4	RTS