Cables and Connectors

This chapter contains the following sections:

Connector Specifications

This section contains the following:

10/100/1000 Ports

The 10/100/1000 Ethernet ports on the switches use RJ-45 connectors. The following figure shows the pinouts.

Figure 1: 10/100 Port Pinouts

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

Note: For the three models of IE 4000 switch that support PoE, connector pins 4 and 5 supply +48 VDC and pins 7 and 8 are the DC voltage return lines.

SFP Module Connectors

The following figure shows a MT-RJ style connector that is used with the SFP Module slots. It is a fiber-optic cable connector.

Figure 2: 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

Dual-Purpose Ports

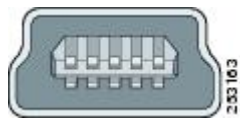The 10/100/1000 Ethernet ports on the dual-purpose ports use RJ-45 connectors. The following figure shows the pinouts.

Figure 3: 10/100/1000 Port Pinouts

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

Console Port

The switch has two console ports: a USB 5-pin mini-Type B port on the front panel and an RJ-45 console port on the rear panel.

Figure 4: USB Mini-Type B Port

The USB console port uses a USB Type A to 5-pin mini-Type B cable, shown in the following figure. The USB Type A-to-USB mini-Type B cable is not supplied. You can order an accessory kit (part number 800-33434) that contains this cable.

Note: When running Linux, access the USB Console using Minicom instead of Screen.

Figure 5: USB Type A-to-USB 5-Pin Mini-Type B Cable
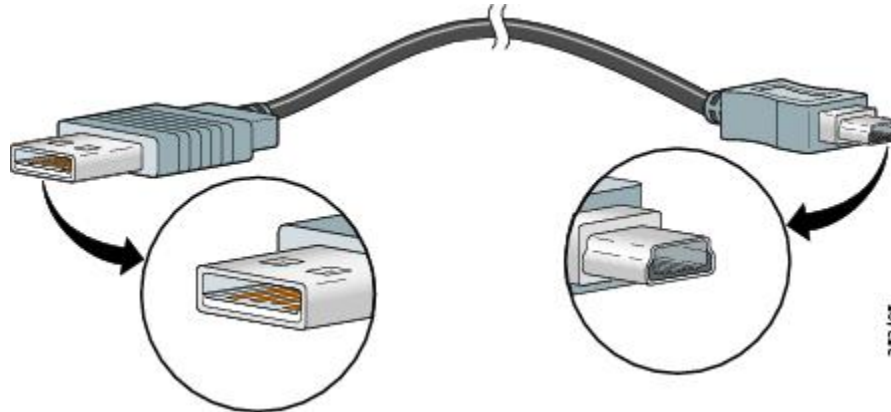
The RJ-45 console port uses an 8-pin RJ-45 connector The supplied RJ-45-to-DB-9 adapter cable is used to connect the console port of the switch to a console PC. You need to provide a RJ-45-to-DB-25 female DTE adapter if you want to connect the switch console port to a terminal. You can order a kit (part number ACS-DSBUASYN=) containing that adapter.

Alarm Port

The labels for the alarm connector pin-outs are on the switch panel and are displayed below.

Label	Connection
NO	Alarm Output Normally Open (NO) connection
COM	Alarm Output Common connection
NC	Alarm Output Normally Closed (NC) connection
IN2	Alarm Input 2
REF	Alarm Input Reference Ground connection
IN1	Alarm Input 1

Cables and Adapters

This section contains the following:

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.

Notes

- The maximum operating temperature of the switch varies depending on the type of SFP module that you use.

  Modal bandwidth applies only to multimode fiber.

- A mode-field diameter/cladding diameter = 9 micrometers/125 micrometers.

- A mode-conditioning patch cord is required when using 1000BASE-LX/LH SFP modules, MMF, and a short link distance . Using an ordinary patch cord can cause transceiver saturation, resulting in an elevated bit error rate (BER).

  When using the LX/LH SFP module with 62.5-micron diameter MMF, you must also install a mode-conditioning patch cord between the SFP module and the MMF cable on both the sending and receiving ends of the link. The mode-conditioning patch cord is required for link distances greater than 984 feet (300 m).

- 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 the 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 1: Table 2 Commercial SFPs—Fiber-Optic SFP Module Port Cabling Specifications

Type of SFP Module	Model	Wavelength (nanometers)	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
1000BASE-BX10-D	GLC-BX-D	1490 TX 1310 RX	SMF	G.652	—	6.2 miles (10 km)
1000BASE-BX10-U	GLC-BX-U	1490 TX 1310 RX	SMF	G.652	—	6.2 miles (10 km)
1000BASE-LX/LH	GLC-LH-SM	1310	MMF SMF	62.5/125 50/125 50/125 G.652	500 400 500 —	1804 feet (550 m) 1804 feet (550 m) 1804 feet (550 m) 6.2 miles (10 km)

Type of SFP Module	Model	Wavelength (nanometers)	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
1000BASE-SX	GLC-SX-MM	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-SX	GLC-SX-MMD	850	MMF	62.5/125 50/125 50/125 G.652	160 200 400 500	722 feet (220 m) 902 feet (275 m) 1640 feet (500 m) 1804 feet (550 m)
100BASE-BX10-D	GLC-FE-100BX-D	1310 TX 1550 RX	SMF	G.652	—	6.2 miles (10 km)
100BASE-EX	GLC-FE-100EX	1310	SMF	G.652	—	24.9 miles (40 km)
100BASE-FX SFP	GLC-FE-100FX	1310	MMF	50/125 62.5/125	500	6562 feet (2 km)
100BASE-LX10	GLC-FE-100LX	1310	SMF	G.652	—	6.2 miles (10 km)
100BASE-ZX	GLC-FE-100ZX	1550	SMF	G.652	—	49.7 miles (80 km)
100BASE-ZX	GLC-LH-SMD	1310	MMF SMF	62.5 50.0 50.0 G.652	500 400 500 —	1804 feet (550 m) 1804 feet (550 m) 1804 feet (550 m) 6.2 miles (10 km)

Type of SFP Module	Model	Wavelength (nanometers)	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
100BASE-ZX	SFP-GE-Z	1550	SMF	9/10	—	43.5 miles (70 km)
			SMF	8		62 miles (100 km)

Table 2: Table 3 Industrial & Rugged SFPs—Fiber-Optic SFP Module Port Cabling Specifications

Type of SFP Module	Model	Wavelength (nanometers)	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
1000BASE-LX/LH	GLC-LX-SM-RGD	1310	MMF	62.5	500	1804 feet (550 m)
			SMF	50.0	400	1804 feet (550 m)
				50.0	500	1804 feet (550 m)
				G.652	—	6.2 miles (10 km)
1000BASE-SX	GLC-SX-MM-RGD	850	MMF	62.5/125	160	722 feet (220 m)
				62.5/125	200	902 feet (275 m)
				50/125	400	1640 feet (500 m)
				50/125	500	1804 feet (550 m)
1000BASE-ZX	GLC-ZX-SM-RGD	1550	SMF	G.652	—	43.4 to 62 miles (70 to 100 km)
100BASE-FX	GLC-FE-100FX-RGD	1310	MMF	62.5/125	160	1.24 miles (2 km)
				62.5/125	200	
				50/125	400	
				50/125	500	
100BASE-LX10	GLC-FE-100LX-RGD	1310	SMF	G.652	—	6.2 miles (10 km)

Table 3: Table 4 Extended Temperature SFPs—Fiber-Optic SFP Module Port Cabling Specifications

Type of SFP Module	Model	Wavelength (nanometers)	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
100BASE-BX10-U	GLC-FE-100BX-U	1310 TX	SMF	G.652	—	6.2 miles (10 km)
100BASE-EX	GLC-EX-SMD	1310	SMF	G.652	—	24.9 miles (40 km)
100BASE-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)
100BASE-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)
100BASE-SX	GLC-SX-SMD	850	MMF	62.5 62.5 50.0 50.0 50.0	160 200 400 500 2000	722 feet (220 m) 902 feet (275 m) 1640 feet (500 m) 1804 feet (550 m) 3281 feet (1 km)

Type of SFP Module	Model	Wavelength (nanometers)	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
100BASE-SX	GLC-LH-SMD	1310	MMF SMF	62.5 50.0 50.0 G.652	500 400 500 —	1804 feet (550 m) 1804 feet (550 m) 1804 feet (550 m) 6.2 miles (10 km)
100BASE-SX	SFP-GE-Z	1550	SMF SMF	9/10 8	—	43.5 miles (70 km) 62 miles (100 km)

Cable Pinouts

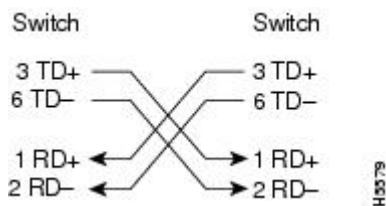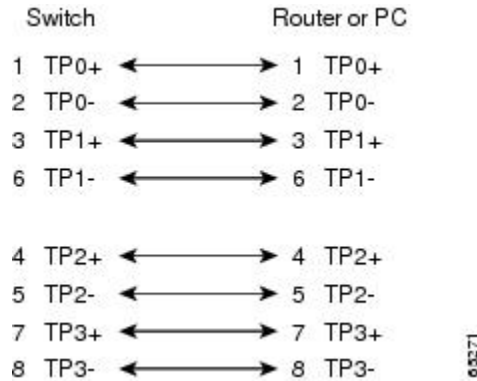*Figure 6: Two Twisted-Pair Straight-Through Cable Schematic for 10/100 Ports*
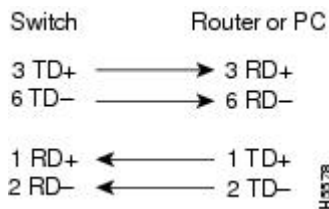
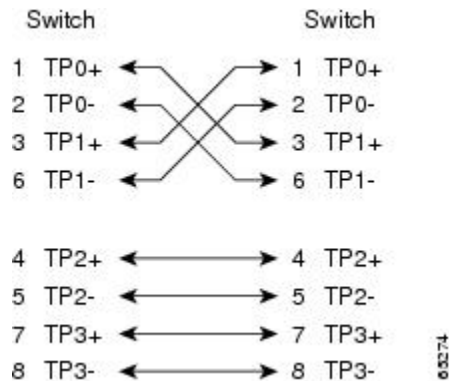*Figure 7: Two Twisted-Pair Crossover Cable Schematic for 10/100 Ports*

Figure 8: Four Twisted-Pair Straight-Through Cable Schematic for 1000BASE-T Ports


Figure 9: 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 10: Identifying a Crossover Cable
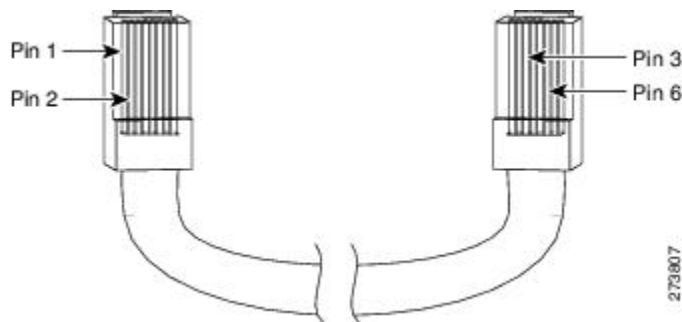
Console Port Adapter Pinouts

The console port uses an 8-pin RJ-45 connector. 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=).

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

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=).

Switch Console Port (DTE)	RJ-45-to-DB-9 Terminal 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