

HP A-Series Switches

Transceiver Modules User Guide

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Contents

Transceiver modules overview	1
HP A-Series Switches transceiver modules	1
Introduction to fiber transceiver modules	2
Data rate	2
Transmission distance	2
Central wavelength	2
Fiber types	3
Connector type	4
Connector index	4
Introduction to copper transceiver modules	5
Transmission distance	5
Connector types	5
SFP transceiver modules	7
Gigabit SFP fiber transceiver module	7
Appearance	7
Models and specifications	7
100 Mbps SFP fiber transceiver module	8
Appearance	8
Models and specifications	8
Gigabit BIDI transceiver module	9
Appearance	9
Models and specifications	10
100 Mbps BIDI transceiver module	10
Appearance	10
Models and specifications	10
Gigabit CWDM transceiver module	11
Appearance	11
Models and specifications	11
Gigabit SFP copper transceiver module	13
Appearance	13
Models and specifications	13
Gigabit SFP cable	13
Appearance	13
Models and specifications	14
SFP+ transceiver modules	15
10-Gigabit SFP+ fiber transceiver module	15
Appearance	15
Models and specifications	15
10-Gigabit SFP+ cable	16
Appearance	16
Models and specifications	16
XFP transceiver modules	17
Appearance	17
Models and specifications	17
CX4 cables	20
Appearance	20
Models and specifications	20

Transceiver modules overview

HP A-Series Switches transceiver modules

Table 1 Types of transceiver modules

Transceiver module type	Description	Connector type	
Small form-factor pluggable (SFP)	Gigabit SFP fiber transceiver module	Hot-swappable SFP fiber transceiver module	
	100 Mbps SFP fiber transceiver module		
	Gigabit bi-direction (BIDI) fiber transceiver module	BIDI fiber transceiver module	LC
	100 Mbps BIDI fiber transceiver module		
	Gigabit coarse wavelength division multiplexing (CWDM) fiber transceiver module	Gigabit CWDM fiber transceiver module	
	Gigabit SFP copper transceiver module	N/A	RJ-45
Gigabit SFP cable	Used for interconnecting devices, hot-swappable	N/A	
SFP+ transceiver module	10-Gigabit SFP+ fiber transceiver module	10-Gigabit SFP+ fiber transceiver module	LC
	10-Gigabit SFP+ cable	Used for interconnecting devices, hot-swappable.	N/A
10-Gigabit small form-factor pluggable (XFP)	Hot-swappable 10-Gigabit small form-factor transceiver module	LC	
CX4 cable	10-Gigabit CX4 cable, used for interconnecting devices, hot-swappable	N/A	

NOTE:

- Different models of the HP A-Series Switches may support different transceiver modules. For more information, see the corresponding installation guides.
- The transceiver modules available for the HP A-Series Switches are subject to change over time. For the most up-to-date list of transceiver modules, consult your HP sales representative or technical support engineer.

Introduction to fiber transceiver modules

Fiber modules transmit fiber signals over optical fibers. Optical transmission features low loss and is fit for long distance transmission.

The commonly used fiber modules include optical transmitters, optical receivers, transceivers, and transponders. The HP A-Series Switches mainly support transceiver modules.

The HP A-Series Switches support various fiber transceiver module models of different specifications. You can choose suitable fiber transceiver modules as needed for data transmission over optical fibers.

Transceiver modules are mainly used for fiber-to-copper and copper-to-fiber conversions and provide the following functions: optical power control, modulation transmission, signal probe, IV conversion, and limiting amplifier and decision regeneration. In addition, transceivers provide some other functions, such as counterfeit-prevention query and TX-disable. Common transceivers include SIP9, SFF, SFP, GBIC, XFP, and SFP+.

Data rate

Data rate is the number of bits transmitted per second. The unit of measure for data rate is Megabits per second (Mbps) or Gigabits per second (Gbps). The fiber transceiver modules available for the HP A-Series Switches mainly provide the following three levels of data rates: 100 Mbps, 1000 Mbps, and 10 Gbps.

Transmission distance

For fiber transceiver modules, the following types of transmission distances are available: short haul, middle reach, and long haul. Generally, a distance of 2 km (1.24 miles) is considered as short haul, 10 km (6.21 miles) to 20 km (12.43 miles) as middle reach, and 30 km (18.64 miles) and over as long haul.

Transmission distances provided by fiber transceiver modules are mainly limited by certain loss and dispersion suffered during the transmission of fiber signals over fibers.

- Loss is the optical energy loss due to the absorption, dispersion and leakage over the media when light travels through optical fibers. This loss increases in direct ratio to transmission distance.
- Dispersion happens mainly because electromagnetic waves of different wavelengths travel at different rates over the same medium, causing different wave components of optical signals to reach the receiving end early or late as the transmission distance increases, which in turn causes impulse broadening, making the signal values indistinguishable.

To meet different transmission distance requirements, choose suitable fiber transceiver modules according to actual networking conditions.

Central wavelength

Central wavelength represents the wave band used for optical signal transmission. The following central wavelengths are available for common fiber transceiver modules: 850 nm, 1310 nm, and 1550 nm, respectively representing three wavebands.

- The 850 nm wave band is mainly used for short-reach transmission.
- The 1310 nm and 1550 nm wave bands are mainly used for middle-reach and long-haul transmissions.

Fiber types

Fiber mode

Depending on the mode of light transmission in fibers, fibers fall into single-mode and multimode.

1. Multimode fibers

Multimode fibers (MMFs) have thicker fiber cores and can transport light in multiple modes. However, the intermodal dispersion is greater and worsens as the transmission distance increases.

Multimode fibers can be classified into multiple grades according to their diameters and modal bandwidth. For more information, see [Table 2](#). The modal bandwidth of a multimode fiber is determined by the expression *the modulation frequency of the maximum modulation frequency pulse that can pass a fiber × the fiber length*. The modal bandwidth is a comprehensive index reflecting the optical characteristics of a multimode fiber.

[Table 2 Multimode fiber grades](#)

Fiber mode	Fiber grade	Fiber diameter (μm)	Modal bandwidth at 850 nm (MHz*km)
Multimode fiber	FDDI-grade	62.5/125	160
	OM1	62.5/125	200
	OM2	50/125	500
	OM3	50/125	1500

Other factors that influence the transmission distance of multimode fibers include interface type, central wavelength, and fiber grade. For more information, see [Table 3](#).

[Table 3 Multimode fiber specifications](#)

Interface type	Central wavelength	Fiber grade	Transmission distance
1000BASE-SX	850nm	FDDI-grade	< 220 m (721.78 ft)
		OM1	< 275 m (902.23 ft)
		OM2	< 550 m (1804.46 ft)
		OM3	N/A
1000BASE-LX	1300nm	FDDI-grade	< 550 m (1804.46 ft)
		OM1	< 550 m (1804.46 ft)
		OM2	< 550 m (1804.46 ft)
		OM3	N/A
10GBASE-SR	850nm	FDDI-grade	< 26 m (85.30 ft)
		OM1	< 33 m (108.27 ft)
		OM2	< 82 m (269.03 ft)
		OM3	< 300 m (984.25 ft)
10GBASE-LRM	1300nm	FDDI-grade	< 220 m (721.78 ft)
		OM1	< 220 m (721.78 ft)

Interface type	Central wavelength	Fiber grade	Transmission distance
		OM2	< 220 m (721.78 ft)
		OM3	< 220 m (721.78 ft)

2. Single-mode fibers

Single-mode fibers (SMFs) have thinner fiber cores and can transmit light in only one mode. Single-mode fibers suffer little intermodal dispersion and are suitable for long-haul communication.

Fiber diameter

Fiber diameter is generally expressed as core diameter/cladding diameter, in μm . For example, 9/125 μm means the fiber core diameter is 9 μm and the fiber cladding diameter is 125 μm .

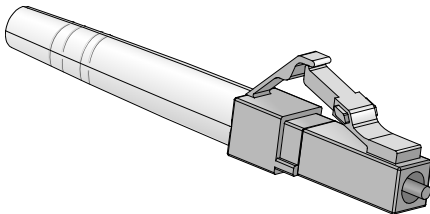
For the HP A-Series Switches, the following fiber diameters are recommended:

- G.652 common single-mode fiber: 9/125 μm
- G.655 single-mode fiber: 9/125 μm
- Common multimode fiber: 62.5/125 μm
- G.651 multimode fiber: 50/125 μm (for multimode VCSEL laser)

Connector type

Connectors connect transceiver modules to the corresponding transmission media. The transceiver modules available for the HP A-Series Switches use the Lucent connector or local connector (LC) connectors.

Figure 1 Appearance of an LC connector



⚠ CAUTION:

To keep the connector clean, make sure it is covered with a dust cap when it is not connected to any optical fiber.

Connector index

Output optical power

Output optical power is the output power of the optical transmitter of a fiber transceiver module, in dBm.

Receiving sensitivity

Receiving sensitivity is the minimum optical power that is needed at the receiving end for the fiber transceiver module to receive optical signals at a given data rate and bit error rate, in dBm. Generally, the higher the data rate is, the worse the receiving sensitivity is, that

is, the greater the minimum input optical power is; and a greater input optical power has higher requirements on the receiving components of the fiber transceiver module.

Optical saturation

Optical saturation (also known as saturated optical power) is the maximum input optical power at a given data rate and bit error rate range (10^{-10} to 10^{-12}), in dBm.

Saturated photocurrent occurs if a fiber probe is irradiated by intensive light. When this occurs, it takes the probe some time to recover. In this case, the receiving sensitivity worsens and the received signals may be decided incorrectly, causing bit errors. This will probably damage the receiving probe. When you perform operations, try to maintain a normal saturated optical power level.

CAUTION:

Generally, the average output optical power of a long-haul fiber transceiver module is greater than its maximum input optical power, namely, optical saturation. Be careful about the length of the optical fiber you use to ensure that the actual received optical power reaching the fiber transceiver module is less than its optical saturation; otherwise, the fiber transceiver module may be damaged.

Introduction to copper transceiver modules

Copper transceiver modules transmit copper signals over Category-5 unshielded twisted pair (UTP). UTP transmission cover shorter distances than fiber transmission and can be used in small-sized networks only.

The HP A-Series Switches support the HP X120 1G SFP RJ45 T Transceiver (JD089B) copper transceiver modules.

Transmission distance

Through UTP cables, copper signals can be transmitted over a distance of 100 m (328.08 ft.) only. This is because copper signals attenuate during transmission through the UTP cables.

Attenuation refers to the dissipation of the power of a transmitted signal as it travels over a cable. Attenuation occurs because signal transmission suffers certain resistance from the cable, which weakens the copper signals as they travel over the cable. When signals are transmitted over a very long distance, signal strength decreases significantly, causing the signal-to-noise ratio to drop below the accepted level. This makes it impossible to distinguish between signals and noise, resulting in decision errors.

When signals are to be transmitted over a short distance, use copper transceiver modules only.

Connector types

Registered Jack-45 (RJ-45) twisted pair connectors are used as connectors for copper transceiver modules.

Figure 2 Appearance of an RJ-45 connector

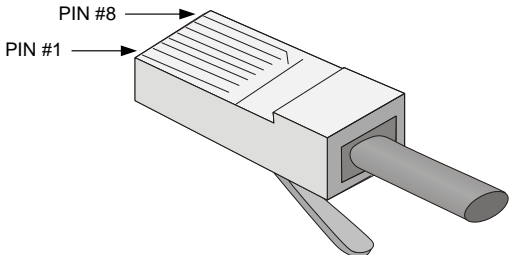


Table 4 RJ-45 GE connector pin assignment

Pin	Signal	Function
1	MX_0+	Data transmit/receive
2	MX_0-	Data transmit/receive
3	MX_1+	Data transmit/receive
4	MX_2+	Data transmit/receive
5	MX_2-	Data transmit/receive
6	MX_1-	Data transmit/receive
7	MX_3+	Data transmit/receive
8	MX_3-	Data transmit/receive

SFP transceiver modules

Gigabit SFP fiber transceiver module

Appearance

Figure 3 Appearance of a Gigabit/100 Mbps SFP fiber transceiver module



Models and specifications

Gigabit SFP fiber transceiver modules provide a transmission rate of 1250 Mbps and use LC connectors.

Table 5 Specifications of Gigabit SFP fiber transceiver modules (I)

Product code	Name	Central wavelength (nm)	Fiber mode	Fiber diameter (μm)	Modal bandwidth (MHz*km)	Transmission distance
JD118B	HP X120 1G SFP LC SX Transceiver	850	MMF	50/125	500	550 m (1804.46 ft)
					400	500 m (1640.42 ft)
			MMF	62.5/125	200	275 m (902.23 ft)
					160	220 m (721.78 ft)
JD119B	HP X120 1G SFP LC LX Transceiver	1310	SMF	9/125	N/A	10 km (6.21 miles)
			MMF	50/125	500 or 400	550 m (1804.46 ft)
			MMF	62.5/125	500	550 m (1804.46 ft)
JF832A	HP X120 100M/1G SFP LC LX Transceiver	1310	SMF	9/125	N/A	10 km (6.21 miles)
JD061A	HP X125 1G SFP LC LH40 1310nm Transceiver	1310	SMF	9/125	N/A	40 km (24.86 miles)
JD062A	HP X120 1G SFP LC LH40 1550nm Transceiver	1550	SMF	9/125	N/A	40 km (24.86 miles)
JD063B	HP X125 1G SFP LC LH70 Transceiver	1550	SMF	9/125	N/A	70 km (43.5 miles)

Product code	Name	Central wavelength (nm)	Fiber mode	Fiber diameter (μm)	Modal bandwidth (MHz*km)	Transmission distance
JD103A	HP X120 1G SFP LC LH100 Transceiver	1550	SMF	9/125	N/A	100 km (62.14 miles)

Table 6 Specifications of Gigabit SFP fiber transceiver modules (II)

Product code	Name	Connector index (dBm)		
		Output optical power	Receiving sensitivity	Optical saturation
JD118B	HP X120 1G SFP LC SX Transceiver	-9.5 to 0	≤-17	≤-3
JD119B	HP X120 1G SFP LC LX Transceiver	-9.5 to -3	≤-19	≤-3
JF832A	HP X120 100M/1G SFP LC LX Transceiver	-9.5 to -3	≤-22	≤-3
JD061A	HP X125 1G SFP LC LH40 1310nm Transceiver	-2 to +5	≤-22	≤-3
JD062A	HP X120 1G SFP LC LH40 1550nm Transceiver	-4 to +1	≤-21	≤-3
JD063B	HP X125 1G SFP LC LH70 Transceiver	-4 to +2	≤-22	≤-3
JD103A	HP X120 1G SFP LC LH100 Transceiver	0 to +5	≤-30	≤-9

100 Mbps SFP fiber transceiver module

Appearance

See Figure 3.

Models and specifications

100 Mbps SFP fiber transceiver modules use LC connectors.

Table 7 Specifications of 100 Mbps SFP fiber transceiver modules (I)

Product code	Name	Central wavelength (nm)	Data rate (Mbps)	Fiber mode	Fiber diameter (μm)	Transmission distance
JD102B	HP X110 100M SFP LC FX Transceiver	1310	155	MMF	50/125 62.5/125	2 km (1.24 miles)
JF833A	HP X110 100M SFP LC FX Transceiver	1310	125	MMF	50/125 62.5/125	2 km (1.24 miles)

Product code	Name	Central wavelength (nm)	Data rate (Mbps)	Fiber mode	Fiber diameter (μm)	Transmission distance
JF832A	HP X120 100M/1G SFP LC LX Transceiver	1310	125	SMF	9/125	10 km (6.21 miles)
JD120B	HP X110 100M SFP LC LX Transceiver	1310	155	SMF	9/125	15 km (9.32 miles)
JD090A	HP X110 100M SFP LC LH40 Transceiver	1310	155	SMF	9/125	40 km (24.86 miles)
JD091A	HP X110 100M SFP LC LH80 Transceiver	1550	155	SMF	9/125	80 km (49.71 miles)

Table 8 Specifications of 100 Mbps SFP fiber transceiver modules (II)

Product code	Name	Connector index (dBm)		
		Output optical power	Output optical power	Output optical power
JD102B	HP X110 100M SFP LC FX Transceiver	-19 to -14	≤-30	≤-14
JF833A	HP X110 100M SFP LC FX Transceiver	-20 to -14	≤-31.5	≤-8
JF832A	HP X120 100M/1G SFP LC LX Transceiver	-15 to -8	≤-28	≤-8
JD120B	HP X110 100M SFP LC LX Transceiver	-15 to -8	≤-28	≤-7
JD090A	HP X110 100M SFP LC LH40 Transceiver	-5 to 0	≤-34	≤-9
JD091A	HP X110 100M SFP LC LH80 Transceiver	-5 to 0	≤-34	≤-10

Gigabit BIDI transceiver module

Appearance

Figure 4 Appearance of a Gigabit/100 Mbps BIDI transceiver module



Models and specifications

Gigabit BIDI transceiver modules provide a transmission rate of 1250 Mbps and use LC connectors.

Table 9 Specifications of Gigabit BIDI transceiver modules (I)

Product code	Name	Central wavelength (nm)		Fiber mode	Fiber diameter (μm)	Transmission distance
		Transmitting end (TX)	Receiving end (RX)			
JD098B	HP X120 1G SFP LC BX 10-U Transceiver	1310	1490	SMF	9/125	10 km (6.21 miles)
JD099B	HP X120 1G SFP LC BX 10-D Transceiver	1490	1310			

Table 10 Specifications of Gigabit BIDI transceiver modules (II)

Product code	Name	Connector index (dBm)		
		Output optical power	Receiving sensitivity	Optical saturation
JD098B	HP X120 1G SFP LC BX 10-U Transceiver	-9 to -3	≤-18.7	≤-3
JD099B	HP X120 1G SFP LC BX 10-D Transceiver			

NOTE:

- BIDI transceiver modules use different central wavelengths in transmit and receive directions, in order to implement bidirectional transmission of fiber signals over the same fiber.
- BIDI transceiver modules must be used in pair. For example, if an HP X120 1G SFP LC BX 10-U Transceiver (JD098B) is used at one end, another HP X120 1G SFP LC BX 10-D Transceiver (JD099B) must also be used at the other end.

100 Mbps BIDI transceiver module

Appearance

See Figure 4.

Models and specifications

100 Mbps BIDI transceiver modules provide a transmission rate of 155 Mbps and use LC connectors.

Table 11 Specifications of 100 Mbps BIDI transceiver modules (I)

Product code	Name	Central wavelength (nm)		Fiber mode	Fiber diameter (μm)	Transmission distance
		Transmitting end (TX)	Receiving end (RX)			
JD100A	HP X115 100M SFP LC BX 10-U Transceiver	1310	1550	SMF	9/125	15 km (9.32 miles)
JD101A	HP X115 100M SFP LC BX 10-D Transceiver	1550	1310			

Table 12 Specifications of 100 Mbps BIDI transceiver modules (II)

Product code	Name	Connector index (dBm)		
		Output optical power	Receiving sensitivity	Optical saturation
JD100A	HP X115 100M SFP LC BX 10-U Transceiver	-15 to -8	≤-31	≤-3
JD101A	HP X115 100M SFP LC BX 10-D Transceiver			

NOTE:

- BIDI transceiver modules use different central wavelengths in transmit and receive directions to implement bidirectional transmission of fiber signals over the same fiber.
- BIDI transceiver modules must be used in pairs. For example, if an HP X115 100M SFP LC BX 10-U Transceiver (JD100A) is used at one end, another HP X115 100M SFP LC BX 10-D Transceiver (JD101A) must also be used at the other end.

Gigabit CWDM transceiver module

Appearance

Figure 5 Appearance of a Gigabit CWDM transceiver module



Models and specifications

Gigabit CWDM transceiver modules provide a transmission rate of 1250 Mbps and use LC connectors.

Table 13 Specifications of Gigabit CWDM transceiver modules (I)

Product code	Name	Central wavelength (nm)	Fiber mode	Fiber diameter (μm)	Transmission distance
JD113A	HP X170 1G SFP LC LH70 1470 Transceiver	1470	SMF	9/125	70 km (43.5 miles)
JD114A	HP X170 1G SFP LC LH70 1490 Transceiver	1490			
JD115A	HP X170 1G SFP LC LH70 1510 Transceiver	1510			
JD116A	HP X170 1G SFP LC LH70 1530 Transceiver	1530			
JD109A	HP X170 1G SFP LC LH70 1550 Transceiver	1550			
JD110A	HP X170 1G SFP LC LH70 1570 Transceiver	1570			
JD111A	HP X170 1G SFP LC LH70 1590 Transceiver	1590			
JD112A	HP X170 1G SFP LC LH70 1610 Transceiver	1610			

Table 14 Specifications of Gigabit CWDM transceiver modules (II)

Product code	Name	Connector index (dBm)		
		Output optical power	Output optical power	Output optical power
JD113A	HP X170 1G SFP LC LH70 1470 Transceiver	0 to +5	≤-23	≤-3
JD114A	HP X170 1G SFP LC LH70 1490 Transceiver			
JD115A	HP X170 1G SFP LC LH70 1510 Transceiver			
JD116A	HP X170 1G SFP LC LH70 1530 Transceiver			
JD109A	HP X170 1G SFP LC LH70 1550 Transceiver			
JD110A	HP X170 1G SFP LC LH70 1570 Transceiver			
JD111A	HP X170 1G SFP LC LH70 1590 Transceiver			
JD112A	HP X170 1G SFP LC LH70 1610 Transceiver			

NOTE:

Gigabit CWDM transceiver modules adopt the CWDM technology that uses wavelength division multiplexers to multiplex optical signals with different wavelengths for transmission over a single optical fiber, thereby saving optical fiber resources. The receiving end uses a wavelength division demultiplexer to demultiplex the multiplexed optical signals.

Gigabit SFP copper transceiver module

Appearance

Figure 6 Appearance of a Gigabit SFP copper transceiver module



Models and specifications

Table 15 Specifications of SFP copper transceiver modules

Product code	Name	Transmission distance	Data rate	Cable type	Connector type
JD089B	HP X120 1G SFP RJ45 T Transceiver	100 m (328.08 ft)	1250 Mbps	UTP/STP	RJ-45

Gigabit SFP cable

Appearance

Figure 7 Appearance of a Gigabit SFP cable



Models and specifications

Table 16 Specifications of Gigabit SFP cables

Product code	Name	Cable length	Data rate	Cable type	Description
JD324A	HP A3600 Switch SFP Stacking Kit	1.5 m (4.92 ft)	1250 Mbps	UTP/STP	Used for interconnecting devices, and supports IRF

SFP+ transceiver modules

10-Gigabit SFP+ fiber transceiver module

Appearance

Figure 8 Appearance of a 10-Gigabit SFP+ fiber transceiver module



Models and specifications

10-Gigabit SFP+ fiber transceiver modules provide a transmission rate of 10.31 Gbps and use LC connectors.

Table 17 Specifications of 10-Gigabit SFP+ fiber transceiver modules (I)

Product code	Name	Central wavelength (nm)	Fiber mode	Fiber diameter (μm)	Mode bandwidth (MHz*km)	Transmission distance
JD092B	HP X130 10G SFP+ LC SR Transceiver	850	MMF	50/125	2000	300 m (984.25 ft)
					500	82 m (269.03 ft)
				62.5/125	400	66 m (216.54 ft)
					200	33 m (108.27 ft)
JD093B	HP X130 10G SFP+ LC LRM Transceiver	1310	MMF	50/125	160	26 m (85.30 ft)
					1500	220 m (721.78 ft)
				62.5/125	500	220 m (721.78 ft)
					400	100 m (328.08 ft)
JD094B	HP X130 10G SFP+ LC LR Transceiver	1310	SMF	9/125	200	220 m (721.78 ft)
					160	220 m (721.78 ft)
JD094B	HP X130 10G SFP+ LC LR Transceiver	1310	SMF	9/125	N/A	10 km (6.21 miles)
		1550	SMF	9/125	N/A	40 km (24.86 miles)
JG234A	HP X130 10G SFP+ LC LH 40km Transceiver	1550	SMF	9/125	N/A	40 km (24.86 miles)

Table 18 Specifications of 10-Gigabit SFP+ fiber transceiver modules (II)

Product code	Name	Connector index		
		Output optical power	Receiving sensitivity	Optical saturation
JD092B	HP X130 10G SFP+ LC SR Transceiver	-7.3 to -1	≤-7.5	+0.5
JD093B	HP X130 10G SFP+ LC LRM Transceiver	-6.5 to +0.5	≤-6.5	+1.5
JD094B	HP X130 10G SFP+ LC LR Transceiver	-8.2 to +0.5	≤-10.3	+0.5
JG234A	HP X130 10G SFP+ LC LH 40km Transceiver	-4.7 to +4	≤-11.3	-1

10-Gigabit SFP+ cable

Appearance

Figure 9 Appearance of a 10-Gigabit SFP+ cable



Models and specifications

Table 19 Specifications of 10-Gigabit SFP+ cables

Product code	Name	Cable length	Data rate	Description
JD095B	HP X240 10G SFP+ SFP+ 0.65m DA Cable	0.65 m (2.13 ft)	10.31 Gbps	Used for interconnecting devices, and supports IRF
JD096B	HP X240 10G SFP+ SFP+ 1.2m DA Cable	1.2 m (3.94 ft)		
JD097B	HP X240 10G SFP+ SFP+ 3m DA Cable	3 m (9.84 ft)		
JG081B	HP X240 10G SFP+ SFP+ 5m DA Cable	5 m (16.40 ft)		

XFP transceiver modules

Appearance

Figure 10 Appearance of an XFP transceiver module



Models and specifications

10-Gigabit XFP fiber transceiver modules use LC connectors.

Table 20 Specifications of XFP transceiver modules (I)

Product code	Name	Central wavelength (nm)	Data rate (Gbps)	Fiber mode	Fiber diameter (μm)	Modal bandwidth (MHz*km)	Maximum transmission distance
JD117B	HP X130 10G XFP LC SR Transceiver	850	10.31	MMF	50/125	2000	300 m (984.25 ft)
						500	82 m (269.03 ft)
						400	66 m (216.54 ft)
						220	33 m (108.27 ft)
JD107A	HP X130 10G XFP LC ZR Transceiver	1550	9.95 to 10.31	SMF	9/125	160	26 m (85.30 ft)
						N/A	80 km (49.71 miles)
JD108B	HP X130 10G XFP LC LR Transceiver	1310	10.31	SMF	9/125	N/A	10 km (6.21 miles)
JD121A	HP X135 10G XFP LC ER Transceiver	1550	9.95 to 10.7	SMF	9/125	N/A	40 km (24.86 miles)
JG226A	HP X180 10G XFP LC LH 80km 1538.98nm DWDM Transceiver	1538.98	9.95 to 10.31	SMF	9/125	N/A	80 km (49.71 miles)

Product code	Name	Central wavelength (nm)	Data rate (Gbps)	Fiber mode	Fiber diameter (μm)	Modal bandwidth (MHz*km)	Maximum transmission distance
JG227A	HP X180 10G XFP LC LH 80km 1539.77nm DWDM Transceiver	1539.77	9.95 to 10.31	SMF	9/125	N/A	80 km (49.71 miles)
JG228A	HP X180 10G XFP LC LH 80km 1540.56nm DWDM Transceiver	1540.56	9.95 to 10.31	SMF	9/125	N/A	80 km (49.71 miles)
JG229A	HP X180 10G XFP LC LH 80km 1542.14nm DWDM Transceiver	1542.14	9.95 to 10.31	SMF	9/125	N/A	80 km (49.71 miles)
JG230A	HP X180 10G XFP LC LH 80km 1542.94nm DWDM Transceiver	1542.94	9.95 to 10.31	SMF	9/125	N/A	80 km (49.71 miles)
JG231A	HP X180 10G XFP LC LH 80km 1558.98nm DWDM Transceiver	1558.98	9.95 to 10.31	SMF	9/125	N/A	80 km (49.71 miles)
JG232A	HP X180 10G XFP LC LH 80km 1559.79nm DWDM Transceiver	1559.79	9.95 to 10.31	SMF	9/125	N/A	80 km (49.71 miles)
JG233A	HP X180 10G XFP LC LH 80km 1560.61nm DWDM Transceiver	1560.61	9.95 to 10.31	SMF	9/125	N/A	80 km (49.71 miles)

Table 21 Specifications of XFP transceiver modules (II)

Product code	Name	Connector index		
		Output optical power	Output optical power	Output optical power
JD117B	HP X130 10G XFP LC SR Transceiver	-7.3 to -1.08	≤-11.1	≤-1
JD108B	HP X130 10G XFP LC LR Transceiver	-8.2 to +0.5	≤-12.6	≤0.5
JD121A	HP X135 10G XFP LC ER Transceiver	-1.0 to +2	≤-14.1	≤-1

Product code	Name	Connector index		
		Output optical power	Output optical power	Output optical power
JD107A	HP X130 10G XFP LC ZR Transceiver	-1.0 to +3	≤-24	≤-7
JG226A	HP X180 10G XFP LC LH 80km 1538.98nm DWDM Transceiver	-1.0 to +3	≤-24	≤-7
JG227A	HP X180 10G XFP LC LH 80km 1539.77nm DWDM Transceiver	-1.0 to +3	≤-24	-7
JG228A	HP X180 10G XFP LC LH 80km 1540.56nm DWDM Transceiver	-1.0 to +3	≤-24	≤-7
JG229A	HP X180 10G XFP LC LH 80km 1542.14nm DWDM Transceiver	-1.0 to +3	≤-24	≤-7
JG230A	HP X180 10G XFP LC LH 80km 1542.94nm DWDM Transceiver	-1.0 to +3	≤-24	≤-7
JG231A	HP X180 10G XFP LC LH 80km 1558.98nm DWDM Transceiver	-1.0 to +3	≤-24	≤-7
JG232A	HP X180 10G XFP LC LH 80km 1559.79nm DWDM Transceiver	-1.0 to +3	≤-24	≤-7
JG233A	HP X180 10G XFP LC LH 80km 1560.61nm DWDM Transceiver	-1.0 to +3	≤-24	≤-7

NOTE:

The 9/125μm single-mode fibers used by transceiver modules JG226A through JG233A should conform to ITU-T G.655, and those used by other transceiver modules should conform to ITU-T G.652.

CX4 cables

Appearance

Figure 11 Appearance of a CX4 cable



Models and specifications

Table 22 Specifications of CX4 cables

Product code	Name	Cable length	Data rate	Description
JD363B	HP X230 Local Connect 50cm CX4 Cable	0.5 m (1.64 ft)		
JD364B	HP X230 Local Connect 100cm CX4 Cable	1 m (3.28 ft)	10.31 Gbps	Used for interconnecting devices, and supports IRF
JD365A	HP X230 Local Connect CX4 300cm Cable	3 m (9.84 ft)		

The information in this document is subject to change without notice.