



Hewlett Packard
Enterprise

HPE Comware-Based Devices Transceiver Modules

User Guide (25G)

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Overview

This document describes 25-Gigabit transceiver modules and cables available for HPE Comware-based devices.

List of 25-Gigabit transceiver modules and network cables

Transceiver module type	Connector type
SFP28 transceiver modules	
SFP28 optical transceiver module	LC
SFP28 copper cable (for interconnecting devices)	N/A
SFP28 active optical cable (for interconnecting devices)	

NOTE:

- HPE 25-Gigabit transceiver modules and cables are subject to change over time. For the most recent list of HPE 25-Gigabit transceiver modules and cables, contact HPE technical support or marketing staff.
- The available transceiver modules and cables vary by HPE devices. For the transceiver modules and cables available for a device, see the installation guide for the device. For the 25-Gigabit transceiver modules and cables for a switch, see "[25-Gigabit Ethernet transceiver modules compatibility matrix](#)".

About optical transceiver modules

Optical transceiver modules (also called fiber transceiver modules) transmit signals over optical fibers and are suitable for long distance transmission.

The following information explains the major specifications of a fiber transceiver module.

Data rate

Data rate is the number of bits transmitted per second. Data rate is typically measured in Gigabits per second (Gbps).

Transmission distance

The transmission distance of optical transceiver modules is divided into short and long-range types. Typically, a distance of 2 km (1.24 miles) or below is short-range type and a distance of 10 km (6.21 miles) is long-range type.

Transmission distances supported by optical transceiver modules are mainly limited by signal attenuation and dispersion suffered during the transmission of fiber signals over fibers.

- Signal attenuation occurs because of absorption, dispersion, and leakage over the media as light travels through optical fibers. This attenuation increases in direct ratio to transmission distance.

- Dispersion occurs because a fiber transmits light with different wavelengths at different speeds. Light with different wavelengths reaches the receiving end at different time. This results in spread and blurred pulses.

Central wavelength

Central wavelength represents the wave band used for optical signal transmission. The following central wavelengths (wave bands) are available for common optical transceiver modules: 850 nm, 1310 nm, and 1550 nm.

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

Fiber

Fiber types

Fibers are classified into multimode fibers and single-mode fibers.

- Multimode fibers

Multimode fibers (MMFs) have thicker fiber cores than single-mode fibers 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, as shown in [Table 1](#). The modal bandwidth is a comprehensive index that reflects the optical characteristics of a multimode fiber. The modal bandwidth of a multimode fiber is equal to *the modulation frequency of the maximum modulation frequency pulse that can pass a fiber × the fiber length*.

International Telecommunication Union (ITU) defines multimode fiber types in its G series standards. The most commonly used multimode fiber is defined in the ITU G.651 standard. The G.651-compliant fiber transmits light in the wavelength range of 800 nm to 900 nm or 1200 nm to 1350 nm.

Table 1 Multimode fiber grades

Fiber grade	Fiber diameter (µm)	Modal bandwidth at 850 nm (MHz*km)
OM3	50/125	2000
OM4	50/125	4700

- Single-mode fibers

Single-mode fibers (SMFs) have a small core size (typically 9 µm or 10 µm) and can transmit light in only one mode. Single-mode fibers suffer little intermodal dispersion and are suitable for long-haul communication. Single-mode fibers transmit light at the central wavelength of 1310 nm or 1550 nm.

Telecommunication Industries Alliance (TIA)/Electronic Industries Alliance (EIA) defines that single-mode fibers use yellow outer jackets with an "SM" mark.

ITU defines single-mode fiber types in its G series standards. The most commonly used single-mode fibers are defined in ITU G.652 and G.655 standards. [Table 2](#) describes features of the G.652 and G.655-compliant fibers.

Table 2 Features of G.652 and G.655-compliant fibers

Single-mode fiber type	Wavelength (nm)	Features	Applications
G.652-compliant fiber (standard single-mode fiber)	<ul style="list-style-type: none">• 1260 to 1360• 1530 to 1565	Zero dispersion at 1310 nm.	Connecting transceiver modules with a central wavelength of 1310 nm or 1550 nm.
G.655-compliant fiber (non-zero dispersion shifted fiber)	1530 to 1565	Near-zero dispersion around 1550 nm.	1550-nm wavelength-division multiplexing (WDM) transmissions.

Fiber diameter

Fiber diameter is expressed as core diameter/cladding diameter, in μm . For example, 9/125 μm represents a fiber core diameter of 9 μm and a fiber cladding diameter of 125 μm .

As a best practice, use the following fiber diameters for the HPE Comware-based devices:

- **G.652 standard single-mode fiber**—9/125 μm .
- **G.655 single-mode fiber**—9/125 μm .
- **G.651 standard multimode fiber**—50/125 μm .

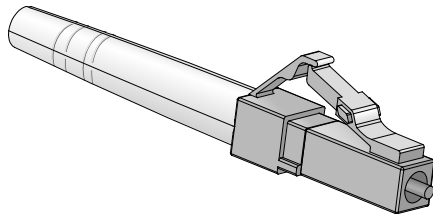
LC connector

△ CAUTION:

Cover the connector with a dust cap when it is not connected to optical fibers.

Connectors connect transceiver modules to the transmission media.

Figure 1 LC connector



Optical parameters

The following are the major optical parameters:

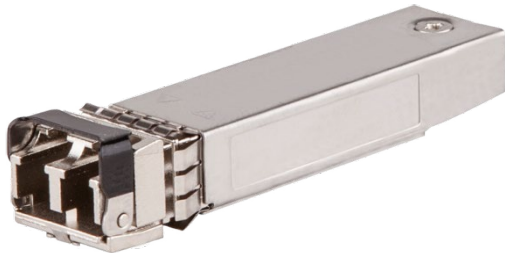
- **Transmit power**—Transmit power is the power at which the transmitter of an optical transceiver module transmits optical signals, in dBm.
- **Receive power**—Receive power is the power at which the receiver of a optical transceiver module receives optical signals, in dBm.

The transceiver module specifications in this guide provide the average transmit and receive power ranges.

SFP28 transceiver modules

SFP28 optical transceiver modules

Figure 2 SFP28 optical transceiver module



Models and specifications

SFP28 optical transceiver modules provide a transmission rate of 25 Gbps and use LC connectors.

Table 3 Specifications for SFP28 optical transceiver modules (1)

Product code	HPE description	Central wavelength (nm)	Fiber mode	Fiber diameter (μm)	Modal bandwidth (MHz*km)	Transmission distance
JL293A	HPE X190 25G SFP28 LC SR 100m MM Transceiver	850	MMF	50/125	2000	70 m (229.66 ft)
					4700	100 m (328.08 ft)

Table 4 Specifications for SFP28 optical transceiver modules (2)

Product code	HPE description	Optical parameters (dBm)	
		Transmit power	Receive power
JL293A	HPE X190 25G SFP28 LC SR 100m MM Transceiver	-8.4 to +2.4	-10.3 to +2.4

SFP28 copper cables

Figure 3 SFP28 copper cable



Models and specifications

Table 5 Specifications for SFP28 copper cables

Product code	HPE description	Cable length	Data rate
JL294A	HPE X240 25G SFP28 to SFP28 1m Direct Attach Copper Cable	1 m (3.28 ft)	25 Gbps
JL295A	HPE X240 25G SFP28 to SFP28 3m Direct Attach Copper Cable	3 m (9.84 ft)	
JL296A	HPE X240 25G SFP28 to SFP28 5m Direct Attach Copper Cable	5 m (16.40 ft)	

25-Gigabit Ethernet transceiver modules compatibility matrix

25-Gigabit Ethernet transceiver modules

Before you install, configure, or upgrade a device with HPE 25-Gigabit Ethernet transceiver modules, always see the device's release notes for latest information. This compatibility matrix does not replace or supersede the release notes.

Table 6 25 Gigabit Ethernet transceiver modules

Product code	Transceiver module	Description
SFP28		
JL293A	HPE X190 25G SFP28 LC SR 100m MM Transceiver	LSWM2SFP28,25G SFP28 Optical Transceiver Module,(850nm,100m,SR,LC)
JL294A	HPE X240 25G SFP28 to SFP28 1m Direct Attach Copper Cable	LSWM2SFP28A,25G SFP28 to SFP28 1m Passive Cable,1m
JL295A	HPE X240 25G SFP28 to SFP28 3m Direct Attach Copper Cable	LSWM2SFP28B,25G SFP28 to SFP28 3m Passive Cable,3m
JL296A	HPE X240 25G SFP28 to SFP28 5m Direct Attach Copper Cable	LSWM2SFP28C,25G SFP28 to SFP28 5m Passive Cable,5m

Switching minimum software release requirements

HPE FlexFabric 5950 switch series minimum software version requirements

Switch or module	Transceiver module (Product code)	Minimum software release	
		DDM support	Release version
HPE FlexFabric 5950 48SFP28 8QSFP28 Switch (JH402A)	HPE X190 25G SFP28 LC SR 100m MM Xcvr (JL293A)	YES	R6123
	HPE X240 25G SFP28 to SFP28 1m Direct Attach Copper Cable (JL294A)	NO	R6123
	HPE X240 25G SFP28 to SFP28 3m Direct Attach Copper Cable (JL295A)	NO	R6123
	HPE X2A0 25G SFP28 to SFP28 5m Active Optical Cable (JH956A)	NO	R6123
HPE FlexFabric 5950 24-port SFP28 and 2-port QSFP28 Module (JH450A)	HPE X190 25G SFP28 LC SR 100m MM Xcvr (JL293A)	YES	R6123
	HPE X240 25G SFP28 to SFP28 1m Direct Attach Copper Cable (JL294A)	NO	R6123
	HPE X240 25G SFP28 to SFP28 3m Direct Attach Copper Cable (JL295A)	NO	R6123
	HPE X2A0 25G SFP28 to SFP28 5m Active Optical Cable (JH956A)	NO	R6123

HPE FlexFabric 5945 switch series minimum software version requirements

Switch or module	Transceiver module (Product code)	Minimum software release	
		DDM support	Release version
HPE FlexFabric 5945 48SFP28 8QSFP28 Switch (JQ074A)	HPE X190 25G SFP28 LC SR 100m MM Xcvr (JL293A)	YES	R6508
	HPE X240 25G SFP28 to SFP28 1m Direct Attach Copper Cable (JL294A)	NO	R6508
	HPE X240 25G SFP28 to SFP28 3m Direct Attach Copper Cable (JL295A)	NO	R6508
	HPE X240 25G SFP28 to SFP28 5m Direct Attach Copper Cable (JL296A)	NO	R6508

Document conventions and icons

Conventions

This section describes the conventions used in the documentation.





Command conventions

Convention	Description
Boldface	Bold text represents commands and keywords that you enter literally as shown.
<i>Italic</i>	<i>Italic</i> text represents arguments that you replace with actual values.
[]	Square brackets enclose syntax choices (keywords or arguments) that are optional.
{ x y ... }	Braces enclose a set of required syntax choices separated by vertical bars, from which you select one.
[x y ...]	Square brackets enclose a set of optional syntax choices separated by vertical bars, from which you select one or none.
{ x y ... }*	Asterisk marked braces enclose a set of required syntax choices separated by vertical bars, from which you select at least one.
[x y ...]*	Asterisk marked square brackets enclose optional syntax choices separated by vertical bars, from which you select one choice, multiple choices, or none.
&<1-n>	The argument or keyword and argument combination before the ampersand (&) sign can be entered 1 to n times.
#	A line that starts with a pound (#) sign is comments.













GUI conventions

Convention	Description
Boldface	Window names, button names, field names, and menu items are in Boldface. For example, the New User window opens; click OK .
>	Multi-level menus are separated by angle brackets. For example, File > Create > Folder .

Symbols

Convention	Description
 WARNING!	An alert that calls attention to important information that if not understood or followed can result in personal injury.
 CAUTION:	An alert that calls attention to important information that if not understood or followed can result in data loss, data corruption, or damage to hardware or software.
 IMPORTANT:	An alert that calls attention to essential information.
NOTE:	An alert that contains additional or supplementary information.
 TIP:	An alert that provides helpful information.

Network topology icons

Convention	Description
	Represents a generic network device, such as a router, switch, or firewall.
	Represents a routing-capable device, such as a router or Layer 3 switch.
	Represents a generic switch, such as a Layer 2 or Layer 3 switch, or a router that supports Layer 2 forwarding and other Layer 2 features.
	Represents an access controller, a unified wired-WLAN module, or the access controller engine on a unified wired-WLAN switch.
	Represents an access point.
	Represents a wireless terminator unit.
	Represents a wireless terminator.
	Represents a mesh access point.
	Represents omnidirectional signals.
	Represents directional signals.
	Represents a security product, such as a firewall, UTM, multiservice security gateway, or load balancing device.
	Represents a security module, such as a firewall, load balancing, NetStream, SSL VPN, IPS, or ACG module.

Examples provided in this document

Examples in this document might use devices that differ from your device in hardware model, configuration, or software version. It is normal that the port numbers, sample output, screenshots, and other information in the examples differ from what you have on your device.

Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:
www.hpe.com/assistance
- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:
www.hpe.com/support/hpesc

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates, go to either of the following:
 - Hewlett Packard Enterprise Support Center **Get connected with updates** page:
www.hpe.com/support/e-updates
 - Software Depot website:
www.hpe.com/support/softwaredepot
- To view and update your entitlements, and to link your contracts, Care Packs, and warranties with your profile, go to the Hewlett Packard Enterprise Support Center **More Information on Access to Support Materials** page:
www.hpe.com/support/AccessToSupportMaterials

ⓘ **IMPORTANT:**

Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HP Passport set up with relevant entitlements.

Websites

Website	Link
Networking websites	
Hewlett Packard Enterprise Information Library for Networking	www.hpe.com/networking/resourcefinder
Hewlett Packard Enterprise Networking website	www.hpe.com/info/networking
Hewlett Packard Enterprise My Networking website	www.hpe.com/networking/support
Hewlett Packard Enterprise My Networking Portal	www.hpe.com/networking/mynetworking
Hewlett Packard Enterprise Networking Warranty	www.hpe.com/networking/warranty
General websites	
Hewlett Packard Enterprise Information Library	www.hpe.com/info/enterprise/docs
Hewlett Packard Enterprise Support Center	www.hpe.com/support/hpesc
Hewlett Packard Enterprise Support Services Central	ssc.hpe.com/portal/site/ssc/
Contact Hewlett Packard Enterprise Worldwide	www.hpe.com/assistance
Subscription Service/Support Alerts	www.hpe.com/support/e-updates
Software Depot	www.hpe.com/support/softwaredepot
Customer Self Repair (not applicable to all devices)	www.hpe.com/support/selfrepair
Insight Remote Support (not applicable to all devices)	www.hpe.com/info/insightremotesupport/docs

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website:

www.hpe.com/support/selfrepair

Remote support

Remote support is available with supported devices as part of your warranty, Care Pack Service, or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

For more information and device support details, go to the following website:

www.hpe.com/info/insightremotesupport/docs

Documentation feedback

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