CISCO SYSTEMS

DATA SHEET

CISCO 10GBASE XENPAK MODULES

Figure 1
Cisco 10GBASE XENPAK Modules

OVERVIEW

The range of Cisco® 10GBASE XENPAK modules offers customers a wide variety of 10 Gigabit Ethernet connectivity options for data center, enterprise wiring closet, and service provider transport applications.

Main features of Cisco 10GBASE XENPAK modules include:

- Supports 10GBASE Ethernet
- Hot-swappable input/output device plugs into an Ethernet XENPAK port of a Cisco switch or router to link the port with the network
- Provides flexibility of interface choice
- Supports "pay-as-you-populate" model
- Supports the Cisco quality identification (ID) feature that enables a Cisco switch or router to identify whether the module is a Cisco certified and tested XENPAK module

CISCO XENPAK-10GB-CX4

The Cisco 10GBASE-CX4 Module supports link lengths of up to 15 meters on CX4 cable.

CISCO XENPAK-10GB-LX4

The Cisco 10GBASE-LX4 Module supports link lengths of 300 meters on standard Fiber Distributed Data Interface (FDDI) grade multimode fiber (MMF). To ensure that the specifications reported in Table 1 are met, the transmitter output should be coupled through a mode conditioning patch cord.

CISCO XENPAK-10GB-SR

The Cisco 10GBASE-SR Module supports a link length of 26 meters on standard FDDI grade MMF. Up to 300-meter link lengths are possible when using 2000 MHz/km MMF (OM3).

CISCO XENPAK-10GB-LR

The Cisco 10GBASE-LR Module supports a link length of 10 kilometers on standard single-mode fiber (SMF) (G.652).

CISCO XENPAK-10GB-ER

The Cisco 10GBASE-ER Module supports a link length of up to 40 kilometers on SMF (G.652).

CISCO XENPAK-10GB-ZR

The Cisco 10GBASE-ZR Module supports link lengths of up to about 80 kilometers on SMF. This interface is not part of the 10 GbE standard but is built according to Cisco optical specifications reported in Table 3.

CISCO XENPAK-10GB-LW (WAN PHY)

The Cisco 10GBASE-LW Module supports a link length of 10 kilometers on standard single-mode fiber (SMF) (G.652).
WAN-PHY is intended to allow the transport of 10 Gigabit Ethernet over a traditional SONET/SDH infrastructure. The purpose of WAN-PHY is to render 10 Gigabit Ethernet compatible with SONET STS-192c format and data rate, as defined by ANSI, as well as the SDH VC-4-64c container specified by ITU.

TECHNICAL SPECIFICATIONS

Platform Support

Cisco XENPAK modules are supported on Cisco switches and routers. For more details, refer to the document, *"Cisco XENPAK Compatibility Matrix"* found at: http://www.cisco.com/univercd/cc/td/doc/product/gbic_sfp/10gbxcvr/ol_6974.pdf

Connectors and Cabling

Connectors:

- XENPAK-10GB-CX4: Infiniband 4x connector
- All others: Dual SC/PC connector

Note: Only connections with patch cords with PC or UPC connectors are supported. Patch cords with APC connectors are not supported.

Table 1 provides cabling specifications for the Cisco XENPAK modules.

Table 1. XENPAK Port Cabling Specifications

Cisco XENPAK	Wavelength (nm)	Cable Type	Core Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance*
Cisco XENPAK-10GB-CX4	–	CX4 (copper)	–	–	15 meters
Cisco XENPAK-10GB-LX4	1310	MMF	62.5	500	300 meters
			50.0	400	240 meters
			50.0	500	300 meters
Cisco XENPAK-10GB-SR	850	MMF	62.5	160	26 meters
			62.5	200	33 meters
			50.0	400	66 meters
			50.0	500	82 meters
			50.0	2000	300 meters
Cisco XENPAK-10GB-LR Cisco XENPAK-10GB-LW	1310	SMF	G.652**	–	10 km

Cisco XENPAK-10GB-ER***	1550	SMF	G.652**	–	40 km****
Cisco XENPAK-10GB-ZR	1550	SMF	Operates on any SMF type	-	80 km

*   Minimum cabling distance for optical XENPAK modules (-LX4, -SR, -LR, -ER) is two meters, according to the IEEE 802.3ae standard.
**   Data based on standard G.652 SMF. Even though dispersion-shifted fiber enables reducing signal dispersion to travel longer distances, the signal attenuation still limits its distance.
***   Requires 5 dB 1550 nm fixed loss attenuator for < 20 kms. Attenuator is available as a spare. The part number is WS-X6K-5DB-ATT=.
**** Links longer than 30 km are considered engineered links.

Standards

- IEEE 802.3ae (-LX4, -SR, -LR, -LW, -ER)
- IEEE 802.3ak (-CX4)

Table 2 shows the main optical characteristics for the Cisco XENPAK modules. The Cisco XENPAK-10GB-CX4 is not an optical module and therefore is not listed in the table.

Table 2.   Optical Transmit and Receive Specifications for IEEE 802.3 standard compliant modules

Product	Type	Transmit Power (dBm)		Receive Power (dBm)		Transmit and Receive Wavelength (nm)
		Maximum	Minimum	Maximum	Minimum	
Cisco XENPAK-10GB-LX4	10GBASE-LX4 WWDM 1300 nm MMF	−0.5 per lane	–	−0.5 per lane	−14.4 per lane*	Four lanes; overall range: 1269 to 1356
Cisco XENPAK-10GB-SR	10GBASE-SR 850 nm MMF	−1.0**	−7.3	−1.0	−9.9	840 to 860
Cisco XENPAK-10GB-LR* Cisco XENPAK-10GB-LW**	10GBASE-LR 1310 nm SMF	0.5	−8.2	0.5	−14.4	1260 to 1355
Cisco XENPAK-10GB-ER**	10GBASE-ER 1550 nm SMF	4	−4.7	−1.0	−15.8	1530 to 1565

*   OMA sensitivity.
**   The launch power shall be the lesser of the class 1 safety limit or the maximum receive power. Class 1 laser requirements are defined by IEC 60825-1: 2001.
***   WS-G6488 has the same optical parameters as XENPAK-10GB-LR.
**** WS-G6483 has the same optical parameters as XENPAK-10GB-ER.

Table 3. XENPAK-10GB-ZR Optical Parameters

Parameter	Symbol	Minimum	Typical	Maximum	Units	Notes and Conditions
Transmitter						
Transmitter Wavelength		1530		1565	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Transmitter Extinction Ratio	OMI	9			dB	
Transmitter Optical Output Power	P_{out}	0		4.0	dBm	Average power coupled into single-mode fiber
Receiver						
Receiver Optical Input Wavelength	in	1530		1565	nm	
Receiver Damage Threshold				-1	dBm	
Dispersion Tolerance		0		1600	ps/nm	
Optical Input Power	P_{in}	–24.0		–7.0	dBm	See footnote*
Dispersion Power Penalty @ 1600 ps/nm				3	dB	See footnote*

* At Bit error rate (BER) = $10e^{-12}$ with IEEE802.3 test pattern

Note:

1. Parameters are specified over temperature and at end of life unless otherwise noted.
2. When shorter distances of single-mode fiber are used, an inline optical attenuator must be used to avoid overloading and damaging the receiver.

Dimensions

Dimensions (DxWxH): 4.76"x1.42"x0.47" (121x36x18 mm)

Environmental Conditions and Power Requirements

- The operating temperature range is between 0℃ and 40℃ (32°F to 104°F); storage temperature range is –40℃ to 75℃ (–40°F to 167°F).
- The maximum power consumption per Cisco XENPAK module is 8W.

Warranty

- Standard warranty: 90 days
- Extended warranty (optional): Cisco XENPAK modules can be covered in a Cisco SMARTnet® support contract for the Cisco switch or router chassis

Table 3 provides the Ordering Information for Cisco Xenpak modules and related cables.

ORDERING INFORMATION

Table 4.   Ordering Cisco XENPAKs and Respective Cables

Description	Product Number
XENPAK Modules	
Cisco 10GBASE-CX4 XENPAK Module for CX4 cable	XENPAK-10GB-CX4
Cisco 10GBASE-LX4 XENPAK Module for MMF	XENPAK-10GB-LX4
Cisco 10GBASE-SR XENPAK Module for MMF	XENPAK-10GB-SR
Cisco 10GBASE-LR XENPAK Module for SMF	XENPAK-10GB-LR
Cisco 10GBASE-LR XENPAK Module for SMF for the CRS-1	CRS-XENPAK10GB-LR
Cisco 10GBASE-LR XENPAK Module for SMF for the 3750	C3-XENPAK10GB-LR
Cisco 10GBASE-ER XENPAK Module for SMF	XENPAK-10GB-ER
Cisco 10GBASE-ZR XENPAK Module for SMF	XENPAK-10GB-ZR
Cisco 10GBASE-LW XENPAK Module for SMF	XENPAK-10GB-LW
Cables	
Mode conditioning patch cable 62.5u, dual SC connectors	CAB-GELX-625=
1 m cable for 10GBase-CX4 module	CAB-INF-28G-1=
5 m cable for 10GBase-CX4 module	CAB-INF-28G-5=
10 m cable for 10GBase-CX4 module	CAB-INF-28G-10=
15 m cable for 10GBase-CX4 module	CAB-INF-26G-15=

REGULATORY AND STANDARDS COMPLIANCE

Safety

- Laser Class 1 21CFR-1040

ADDITIONAL INFORMATION

For more information about Cisco 10GBASE-XENPAK modules, contact:

- United States and Canada: 800 553-6387
- Europe: 32 2 778 4242
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