Cisco 10GBASE X2 Modules

Product Overview

The Cisco[®] 10GBASE X2 modules (Figure 1) offer customers a wide variety of 10 Gigabit Ethernet connectivity options for data center, enterprise wiring closet, and service provider transport applications.

Figure 1.   Cisco 10GBASE X2 and Xenpak Modules

Main features of Cisco 10GBASE X2 modules include:

- Support 10GBASE Ethernet.
- Hot-swappable input/output device plugs into an Ethernet X2 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 certified and tested by Cisco.
- Has optical interoperability with respective 10GBASE Xenpak and 10GBASE XFP modules on the same link.

Cisco X2-10GB-CX4

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

Cisco X2-10GB-LRM

The Cisco 10GBASE-LRM Module supports link lengths of 220m on standard Fiber Distributed Data Interface (FDDI) grade multimode fiber (MMF). To ensure that specifications are met over FDDI-grade, OM1 and OM2 fibers, the transmitter should be coupled through a mode conditioning patch cord. No mode conditioning patch cord is required for applications over OM3.

Cisco X2-10GB-LX4

The Cisco 10GBASE-LX4 Module supports link lengths of 300m on standard FDDI grade MMF. To ensure that specifications are met, the transmitter output should be coupled through a mode conditioning patch cord.

Cisco X2-10GB-SR

The Cisco 10GBASE-SR Module supports a link length of 26m on standard FDDI grade MMF. Using 2000 MHz*km MMF (OM3), up to 300m link lengths are possible.

Cisco X2-10GB-LR

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

Cisco X2-10GB-ER

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

Technical Specifications

Platform Support

Cisco X2 modules are supported on Cisco switches and routers. For more details, refer to the document Cisco Xenpak/X2 Compatibility Matrix.

Connectors and Cabling

Connectors: Dual SC/PC connector (-SR, -LR, -LX4, -ER); InfiniBand 4x connector (-CX4)

Note: Only connections with patch cords with PC or UPC connectors are supported. Patch cords with APC connectors are not supported. All cables and cable assemblies used must be compliant with the standards specified in the standards section.

Table 1 provides cabling specifications for the Cisco X2 modules.

Table 1.   X2 Port Cabling Specifications

Cisco X2	Wavelength (nm)	Cable Type	Core Size (microns)	Modal Bandwidth (MHz*km)	Cable Distance*
Cisco X2-10GB-CX4	–	CX4 (copper)	–	–	15m
Cisco X2-10GB-SR	850	MMF	62.5	160	26m
			62.5	200	33m
			50.0	400	66m
			50.0	500	82m
			50.0	2000	300m
Cisco X2-10GB-LRM	1310	MMF	62.5	500	220m
			50.0	400	100m
			50.0	500	220m
Cisco X2-10GB-LX4	1310	MMF	62.5	500	300m
			50.0	400	240m
			50.0	500	300m
Cisco X2-10GB-LR	1310	SMF	G.652	–	10 km
Cisco X2-10GB-ER**	1550	SMF	G.652	–	40 km***

*Minimum cabling distance for -LR, -SR, -LX4, -ER modules is 2m, according to the IEEE 802.3ae standard, and minimum cabling distance for –LRM modules is 0.5m, according to IEEE 802.3aq standard.

**Requires 5 dB 1550 nm fixed loss attenuator for < 20 km. 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 (-LR, -SR, -LX4, -ER)
- IEEE 802.3ak (-CX4)
- IEEE 802.3aq (-LRM)

Table 2 shows the main optical characteristics for the Cisco X2 module. The Cisco X2-10GB-CX4 is not an optical module and therefore is not listed in Table 2.

Table 2.   Optical Transmit and Receive Specifications

Product	Type	Transmit Power (dBm)*		Receive Power (dBm)*		Transmit and Receive Wavelength (nm)
		Maximum	Minimum	Maximum	Minimum	
Cisco X2-10GB-SR	10GBASE-SR 850 nm MMF	−1.2**	−7.3	−1.0	−9.9	840 to 860
Cisco X2-10GB-LRM	10GBASE-LRM 1310 nm MMF	0.5	-6.5	0.5	-8.4 (in average) and -6.4 (in OMA)***	1260 to 1355
Cisco X2-10GB-LX4	10GBASE-LX4 WWDM 1300 nm MMF	−0.5 per lane	-6.75 per lane in OMA	−0.5 per lane	-14.25 per lane in OMA	Four lanes; overall range: 1269 to 1356
Cisco X2-10GB-LR	10GBASE-LR 1310 nm SMF	0.5	−8.2	0.5	−14.4	1260 to 1355
Cisco X2-10GB-ER	10GBASE-ER 1550 nm SMF	4.0	-4.7	-1.0	-15.8	1530 to 1565

*Transmitter and receiver power is in average, unless specified.

**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.

***Both average and OMA specifications must be met simultaneously.

Dimensions

- Dimensions (D x W x H): 91mm x 36mm x 13.46mm. Cisco X2s typically weigh under 300 grams.
- Environmental Conditions and Power Requirements
- The operating temperature range is between 0 and 40°C (32 to 104°F); storage temperature range is –40 to 75°C (–40 to 167°F).
- The maximum power consumption per Cisco X2 module is 4W.

Warranty

- Standard warranty: 90 days.
- Extended warranty (optional): Cisco X2 modules can be covered in a Cisco SMARTnet® support contract for the Cisco switch or router chassis.

Ordering Information

Table 3 provides the ordering information for Cisco X2 modules and related cables.

Table 3. Ordering Cisco X2 and Respective Cables

Description	Product Number
X2 Modules	
Cisco 10GBASE-LR X2 Module for SMF	X2-10GB-LR
Cisco 10GBASE-CX4 X2 Module for CX4 (copper) cable	X2-10GB-CX4
Cisco 10GBASE-SR X2 Module for MMF	X2-10GB-SR
Cisco 10GBASE-LRM X2 Module for MMF	X2-10GB-LRM
Cisco 10GBASE-LX4 X2 Module for MMF	X2-10GB-LX4
Cisco 10GBASE-ER X2 Module for SMF	X2-10GB-ER
Cables	
Mode conditioning patch cable 62.5u, dual SC connectors	CAB-GELX-625=
Mode conditioning patch cable 50u, dual SC connectors	CAB-MCP50-SC=
1m cable for 10GBase-CX4 module	CAB-INF-28G-1=
5m cable for 10GBase-CX4 module	CAB-INF-28G-5=
10m cable for 10GBase-CX4 module	CAB-INF-28G-10=
15m cable for 10GBase-CX4 module	CAB-INF-26G-15=

Regulatory and Standards Compliance

Standards:

- GR-20-CORE: Generic Requirements for Optical Fiber and Optical Fiber Cable
- GR-326-CORE: Generic Requirements for Single-Mode Optical Connectors and Jumper Assemblies
- GR-1435-CORE: Generic Requirements for Multifiber Optical Connectors

Safety

- Laser Class 1 21CFR-1040 LN#50 7/2001
- Laser Class 1 IEC60825-1

Additional Information

For more information about Cisco 10GBASE-X2 modules, contact your sales representative or visit: http://www.cisco.com.

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

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