XENPAK

The XENPAK pluggable interface is an industry standard or Multisource Agreement (MSA) for pluggable 10 Gigabit Ethernet Optics.

The IEEE 802.3ae committee ratified the 10 Gigabit Ethernet standard and along with the general specification, defined a number of fiber optic interfaces. These standard interfaces attempted to satisfy a number of different objectives including support for MMF and SMF compatibility.

XENPAK (www.xenpak.org) is the most mature and widely deployed of the various 10 Gigabit Ethernet MSAs. It is the only MSA that can support all Gigabit Ethernet standard interfaces and hence is the MSA of choice for Ethernet switch vendors.

Features

LR XENPAK

- 10GBASE-LR transceivers support a link length of up to 10 kilometers on standard 1310 nm single-mode fiber (SMF)

ER XENPAK

- ER XENPAK module supports distances of up to 40 km on 1550 nm SMF

SR XENPAK

- SR XENPAK module supports distances of up to 300 m on 850 nm multimode fiber (MMF)

ZR XENPAK

- ZR XENPAK provides convenient long haul 10 Gigabit Ethernet connectivity for distances up to 80 km on 1550 nm SMF

LX4 XENPAK

- LX4 XENPAK is a single-mode, 1310 nm, 10 Gigabit Ethernet WWDM XENPAK transceiver provides convenient 10 Gigabit Ethernet connectivity for distances up to 300 m on MMF and up to 10 km on SMF

Target Applications

LR XENPAK

- Most commonly deployed in inter-building single mode connections.

ER XENPAK

- 10GBASE-ER transceivers are used by Ethernet service providers for inter-PoP connectivity.

SR XENPAK

- 10GBASE-SR transceivers are used in a data center to interconnect two Ethernet switches or to link an end-device (e.g. 10 Gigabit Ethernet servers or NAS device) to an Ethernet switch.

ZR XENPAK

- For long-reach service provider interconnect and metro Ethernet rings.

LX4 XENPAK

- Provides network administrators the flexibility to use the same XENPAK for intra-building multimode (including FDDI grade MMF) and inter-building single-mode connections.

Technical Specifications

	SR XENPAK	LR XENPAK	ER XENPAK	ZR XENPAK
Fiber type	Multimode (MMF)	Single-mode (SMF)	Single-mode (SMF)	Single-mode (SMF)
Connector type	SC	SC	SC	SC
Launch power min (avg.)	-7.3 dBm[1]	-8.2 dBm[1]	-4.7 dBm[1]	0 dBm
Receiver power range	—	—	—	-7 dBm to -22 dBm
Optical link budget	Depends on fiber type[2]	6.2 dB	10.9 dB	22 dB
Wavelength range	840 to 860 nm	1260 to 1355 nm	1530 to 1565 nm	1530 to 1565 nm
Distance range	2 m to 300 m[3]	2 m to 10 km	2 m to 40 km[4]	40 km to 80 km[5]
Chromatic dispersion tolerance max				1600 ps/nm
Mean Time Between Failure (MTBF)	667,000 hours	900,000 hours	3,000,000 hours	

Note: All Extreme Networks qualified XENPAK plugables meet or exceed the IEEE 802.3ae 10 Gigabit Ethernet specification. The table above shows some XENPAK parameters that may be useful for 10 Gigabit Ethernet deployments.

[1] This information is provided as a reference value and not a pass/fail criteria. The launch power (measured using the average power method used by power meters) is measured at the factory. This data is provided with each module shipped.

[2] 62.5 µm (160/200 MHz*km) = 1.6 dB (typically 26 meters)
62.5 µm (200 MHz*km) = 1.6 dB) (typically 33 meters)
50 µm (400 MHz*km) = 1.7 dB) (typically 66 meters)
50 µm (500 MHz*km) = 1.8 dB (typically 82 meters)
50 µm (2000 MHz*km) = 2.6 dB (typically 300 meters)

[3] Depends on type (e.g 62.5 µm or 50 µm) and modal bandwidth (e.g. 160 Mhz*km, 500 Mhz*km, 2000 Mhz*km, etc.)

[4] 5 dBm minimum attenuation required. At 0.3 dB/km, this is approximately 16.7 km

[5] Typical reference values for distance. Optical specifications guaranteed: Tx power>0 dBm, Rx sensitivity < -22 dBm with no path dispersion penalty. Dispersion tolerance up to 1600 ps/nm

LX4 XENPAK

Fiber type	62.5 µm MMF	50 µm MMF	50 µm MMF	10 µm SMF
Modal bandwidth 1300 nm (MHz*km)	500	400	500	n/a
Range (meters)	2 to 300	2 to 240	2 to 300	2 to 10000
Link power budget (dB)	7.5	7.5	7.5	8.2
Channel insertion loss (dB)	2	1.9	2	6.2

Connector type	SC
Lane wavelengths (range)	1269.0 nm - 1282.4 nm 1293.5 nm - 1306.9 nm 1318.0 nm - 1331.4 nm 1342.5 nm - 1355.9 nm
Average launch power, four lanes (max)	5.5 dbm
Average launch power, per lane (max)	-0.5 dbm

Optical Modulation Amplitude (OMA), per lane (max)	-1.25 dbm
OMA, per lane (min)	-6.75 dbm/-6.25 dbm (MMF/SMF)
Extinction ratio (min)	3.5 db
Receive sensitivity (OMA), per lane	-14.25/-14.45 (MMF/SMF)
Stressed receive sensitivity (OMA), per lane	-10.5/-13.4 (MMF/SMF)

Technical Specifications

XENPAK Optics are Supported on:

- BlackDiamond® 10808 (10G6X, 10G2X, 10G2H modules)
- BlackDiamond 8800 (10G4X module)
- BlackDiamond 6800 (10GX3 module)
- Summit® 400 series and
- Summit X450 series (XGM-2xn module)

Physical Specifications

- Inserts into a XENPAK slot on a 10 Gigabit Ethernet I/O module
- Dimensions (H x W x D): 0.9 x 1.7 x 5.3 in. (2.3 x 4.3 x 13.5 cm)
- Weight: 0.25 lb (0.11 kg) unpackaged, 0.5 lb (0.23 kg) packaged
- Shipping box dimensions (H x W x D): 1.9 x 5.3 x 8.0 in (4.8 x 13.5 x 20.3 cm)

Environmental Conditions

- Operating Temperature: 0°C to 40°C
- Storage Temperature: -40°C to 70°C
- Operating Humidity: 10% to 95% relative humidity, non-condensing
- EN/ETSI 300 019-2 v2.1.2 - Operational, storage and transportation conditions for telecommunication equipment.

Safety Compliance

North American Safety of ITE
- UL60950 3rd Edition, Registered Component (U.S.A. Safety of ITE)

European Safety of ITE
- EN60950:2000+All Available Country Deviations
- Low Voltage Directive (LVD) International
- Safety of ITE

Laser Safety
- EN60825-1:1994, A11:1996, A2:2001
- 21 CFR Subpart J, Class 1 Laser
- CDRH Letter of Approval

EMI/EMC Compliance

North America EMC for ITE
- FCC CFR 47 Part 15 Class A (U.S.A.)

European EMC Standards
- EN 55022:1998 Class A
- EN 55024:1998 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11
- ETSI EN 300 386: v1.3.1 2001-09
- (EMC Telecommunications)
- 89/336/EEC EMC Directive

International EMC Certifications
- CISPR 22:1997 Class A (International Emissions)
- CISPR 24:1997 Class A (International Immunity)

Note: All XENPAK modules meet the above standards when installed in Extreme Networks equipment.

Ordering Information

Part Number	Name	Description
10110	SR XENPAK	10 Gigabit Ethernet XENPAK Transceiver, 850 nm, up to 300 m on multimode fiber, SC connector
10111	LR XENPAK	10 Gigabit Ethernet XENPAK Transceiver, 1310 nm, up to 10 km on single-mode fiber, SC connector
10112	ER XENPAK	10 Gigabit Ethernet XENPAK Transceiver, 1550 nm, up to 40 km on single-mode fiber, SC connector
10113	ZR XENPAK	10 Gigabit Ethernet XENPAK Transceiver, 1550 nm, up to 80 km on single-mode fiber, SC connector
10114	LX4 XENPAK	10 Gigabit Ethernet WWDM XENPAK Transceiver, 1310 nm, up to 300 m on multi-mode fiber and up to 10 km on single-mode fiber, SC connector

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