ETU-LINK®
Optical Communication System

XFP Series

XFP

EXDxxX-3LCD40

10Gbps DWDM 1534.64~1561.83nm 40KM XFP Transceiver

- Wavelength selectable to C-band ITU-T grid wavelengths
- Suitable for use in 100GHz channel spacing DWDM systems
- XFP MSA Rev 4.5 Compliant
- Data rate from 9.95Gbps to 11.3Gbps
- No Reference Clock required
- Cooled EML and PIN receiver
- link length up to 40km
- Low Power Dissipation 3.5W Maximum
- XFI and lineside loopback Mode Supported
- -5ºC to 70ºC Operating Case Temperature
- Diagnostic Performance Monitoring of module temperature,
- Supply Voltages, laser bias current, transmit optical power, and receive optical power
- RoHS6 compliant (lead free)

Applications

- SONET OC-192 & SDH STM 64
- 10GBASE ER/EW
- 40km 10G Fiber Channel
- DWDM Networks

Description

ETU-Link EXDxxX-3LCD40 Transceiver exhibits excellent wavelength stability, supporting operation at 100 GHz channel, cost effective module. It is designed for 10G DWDM SDH, 10GBASE-ER/EW and 10G Fiber- Channel applications.

The transceiver consists of two sections: The transmitter section incorporates a cooled EML laser. And the receiver section consists of a PIN photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. ETU-Link DWDM XFP transceiver provides an enhanced monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, and received optical power and transceiver supply voltage.

Product Selection

EXDxxX-3LCD40

Product part Number	Channel number	Range of channel(THZ)	Range of wavelength(nm)
EXDxxX-3LCD40	82	191.95~196.00	1529.55~1561.83
EXDxxX-3LCD40	88	191.75~196.10	1528.77~1563.45

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Maximum Supply Voltage 1	Vcc3	-0.5		4.0	V	
Maximum Supply Voltage 2	Vcc5	-0.5		6.0	V	
Storage Temperature	TS	-40		85	°C	
Case Operating Temperature	Tcase	0		70	°C	

Wavelength Guide Pin Descriptions

EXDxxX-3LCD40

Channel	Wavelength (nm)	Frequency(THZ)	Channel	Wavelength(nm)	Frequency (THZ)
C17	1563.86	191.70	**C39**	1546.12	193.90
C18	1563.05	191.80	**C40**	1545.32	194.00
C19	1562.23	191.90	**C41**	1544.53	194.10
C20	1561.42	192.00	**C42**	1543.73	194.20
C21	1560.61	192.10	**C43**	1542.94	194.30
C22	1559.79	192.20	**C44**	1542.14	194.40
C23	1558.98	192.30	**C45**	1541.35	194.50
C24	1558.17	192.40	**C46**	1540.56	194.60
C25	1557.36	192.50	**C47**	1539.77	194.70
C26	1556.55	192.60	**C48**	1538.98	194.80
C27	1555.75	192.70	**C49**	1538.19	194.90
C28	1554.94	192.80	**C50**	1537.40	195.00

C29	1554.13	192.90	**C51**	1536.61	195.10
C30	1553.33	193.00	**C52**	1535.82	195.20
C31	1552.52	193.10	**C53**	1535.04	195.30
C32	1551.72	193.20	**C54**	1534.25	195.40
C33	1550.92	193.30	**C55**	1533.47	195.50
C34	1550.12	193.40	**C56**	1532.68	195.60
C35	1549.32	193.50	**C57**	1531.90	195.70
C36	1548.51	193.60	**C58**	1531.12	195.80
C37	1547.72	193.70	**C59**	1530.33	195.90
C38	1546.92	193.80	**C60**	1529.55	196.00
Non-ITU	**Peak wavelength between 1528.77nm-1563.86**		**C61**	1528.77	196.10

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Main Supply Voltage	Vcc5	4.75		5.25	V	
Supply Voltage #2	Vcc3	3.13		3.45	V	
Supply Current – Vcc5 supply	Icc5			350	mA	
Supply Current – Vcc3 supply	Icc3			450	mA	
Module total power	P			3.5	W	1
Transmitter						
Input differential impedance	Rin		100		Ω	2
Differential data input swing	Vin,pp	120		820	mV	
Transmit Disable Voltage	VD	2.0		Vcc	V	
Transmit Enable Voltage	VEN	GND		GND+ 0.8	V	
Receiver						
Differential data output swing	Vout,pp	340	650	850	mV	3
LOS Fault	VLOS fault	Vcc – 0.5		VccHOST	V	4
LOS Normal	VLOS norm	GND		GND+0.5	V	4

Notes:

1) Maximum total power value is specified across the full temperature and voltage range.
2) After internal AC coupling.
3) Into 100 ohms differential termination.
4) Loss of Signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Transmitter						
Average Optical Power	Pf	-1		3	dBm	
Wavelength range		1529.55		1561.83	nm	EXDXX92-3LCD40
		1528.77		1563.45	nm	EXDXX92-3LCD402
Optical Wavelength	λc	λc -0.05		λc +0.05	nm	
Center Wavelength Spacing			50		GHz	1
Frequency stability (BOL)		-1.5		1.5	GHz	
Frequency stability (EOL)		-2.5		2.5	GHz	
Side mode Suppression ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	9			dB	
Transmitter and Dispersion Penalty	TDP			3	dB	
Average Launch power of OFF transmitter	POFF			-30	dBm	
Receiver						
Rx Sensitivity	RSENS			-16.4	dBm	Back to back ,2
				-14.4		Fiber(-300 to 1450ps/nm)
Input Saturation Power (Overload)	Psat	-7			dBm	
Wavelength Range	λ_C	1260		1600	nm	
Receiver Reflectance	Rrx			-27	dB	
LOS De-Assert	LOSD			-27	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1) Corresponds to approximately 0.4 nm.

2) Measured with worst ER; BER<10^{-12} with 10.3Gbps, 2^{31} – 1 PRBS.

Pin Assignment

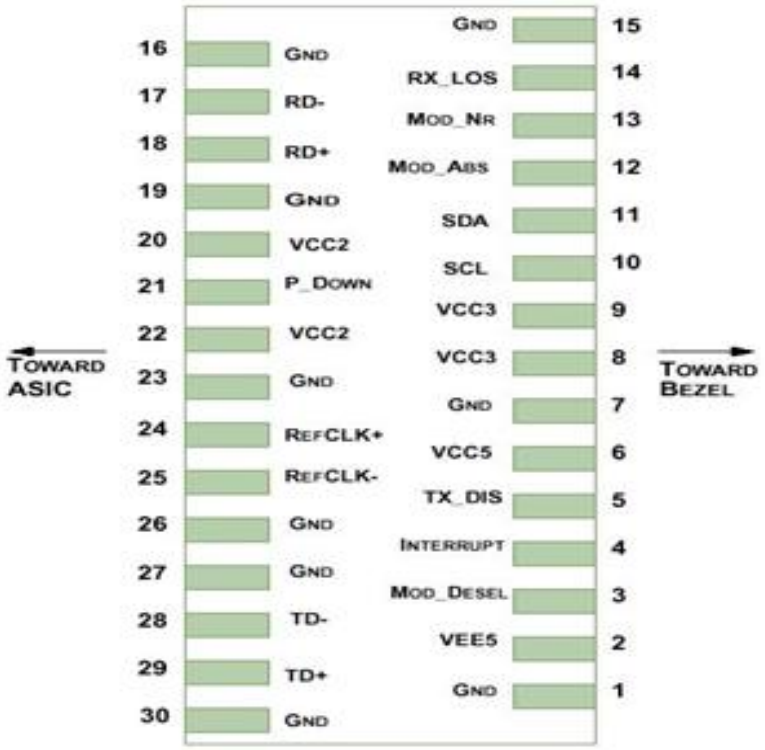


Diagram of Host Board Connector Block Pin Numbers and Name

Pin	Logic	Symbol	Name/Description	NOTE
1		GND	Module Ground	1
2		VEE5	Optional –5.2 Power Supply – Not required	
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	LVTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off	
6		VCC5	+5 Power Supply	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I	SCL	Serial 2-wire interface clock	2
11	LVTTLI/O	SDA	Serial 2-wire interface data line	2
12	LVTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	LVTTL-O	Mod_NR	Module Not Ready; ETU-LINK defines it as a logical OR between RX_LOS and Loss of Lock in TX/RX.	2
14	LVTTL-O	RX_LOS	Receiver Loss of Signal indicator	2
15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RD-	Receiver inverted data output	

18	CML-O	RD+	Receiver non-inverted data output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply – Not required	
21	LVTTL-I	P_Down/RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset	
			Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.	
22		VCC2	+1.8V Power Supply – Not required	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	3
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board – Not required	3
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TD-	Transmitter inverted data input	
29	CML-I	TD+	Transmitter non-inverted data input	
30		GND	Module Ground	1

Notes:

1) Module circuit ground is isolated from module chassis ground within the module.

2) 2 Open collector; should be pulled up with 4.7k – 10kohms on host board to a voltage between 3.15V and 3.6V.

A Reference Clock input is not required by the XFP 40KM tunable. If present, it will be ignored.

General Specifications

Parameter	Symbol	Min	Typ	Max	Units	NOTE
Bit Rate	BR	9.95		11.3	Gb/s	1
Bit Error Ratio	BER			10^{-12}		2
Max. Supported Link Length	LMAX			80	km	1

Notes:

1. 10GBASE-ER/EW
2. Tested with 2^{31} – 1 PRBS

Digital Diagnostic Functions

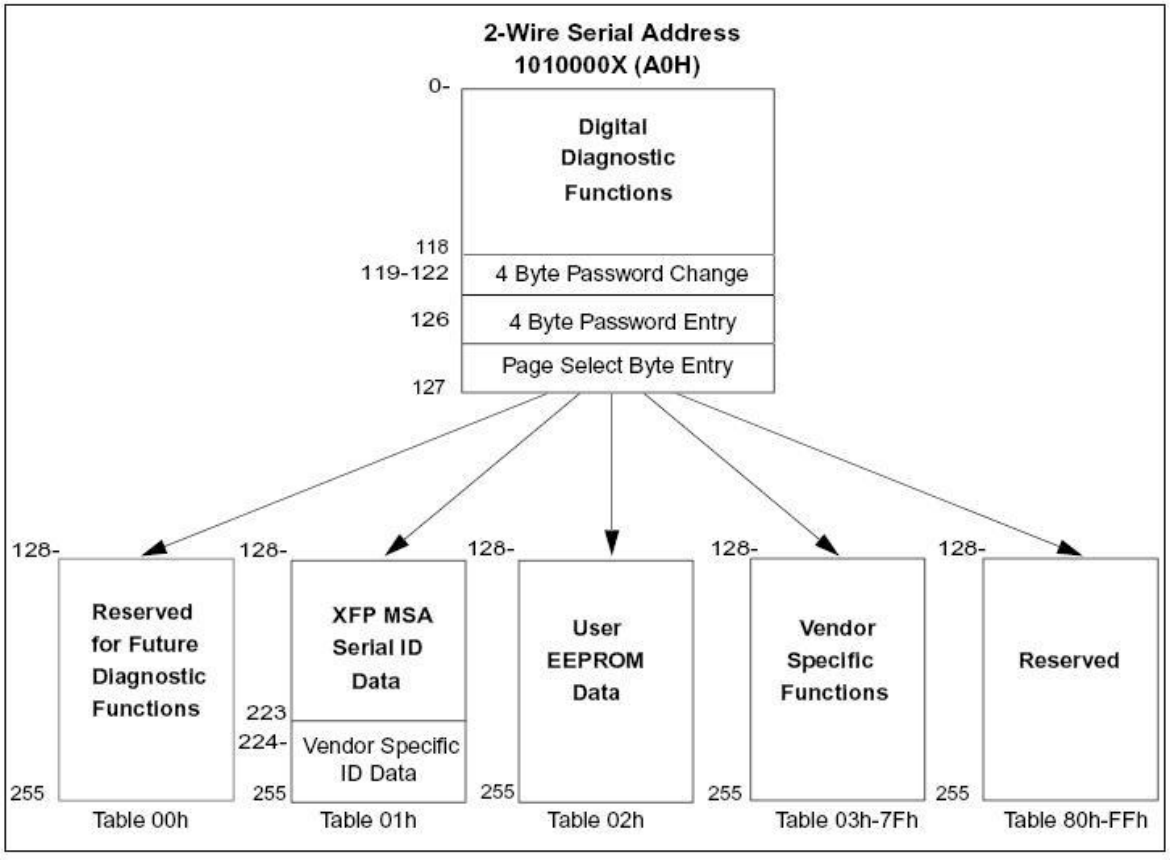
As defined by the XFP MSA, ETU-LINK XFP 40KM tunable transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the XFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the XFP transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 000h to the maximum address of the memory.

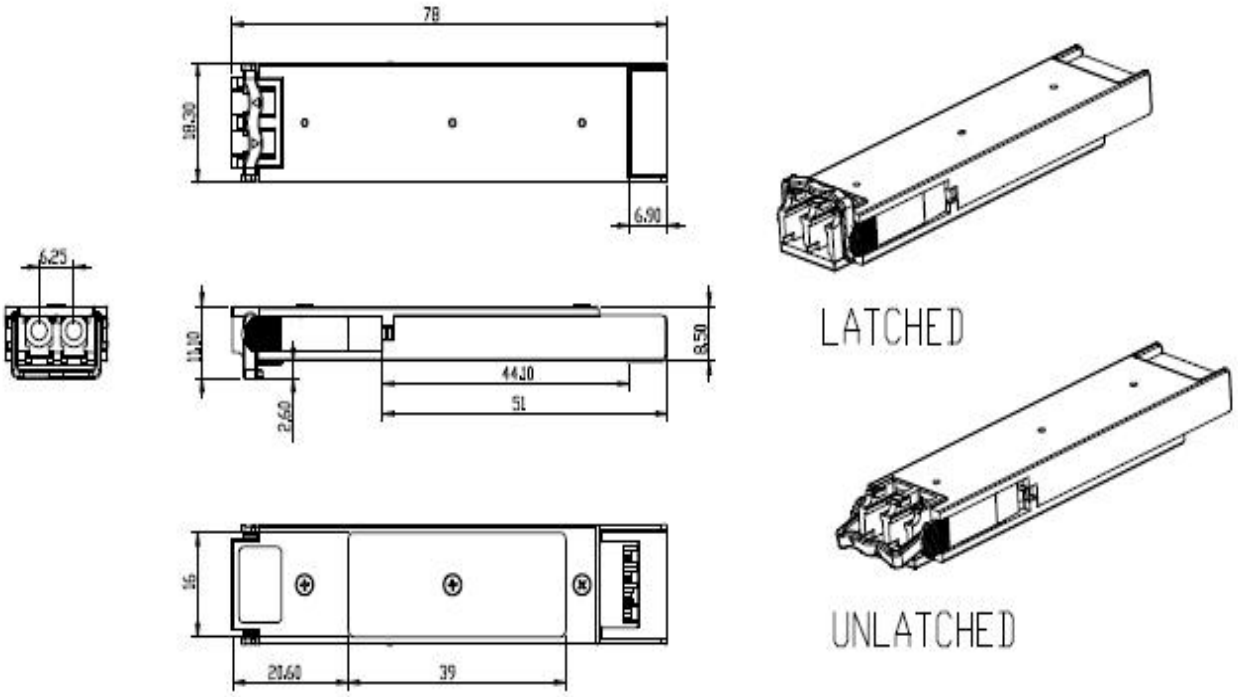
For more detailed information including memory map definitions, please see the XFP MSA Specification.



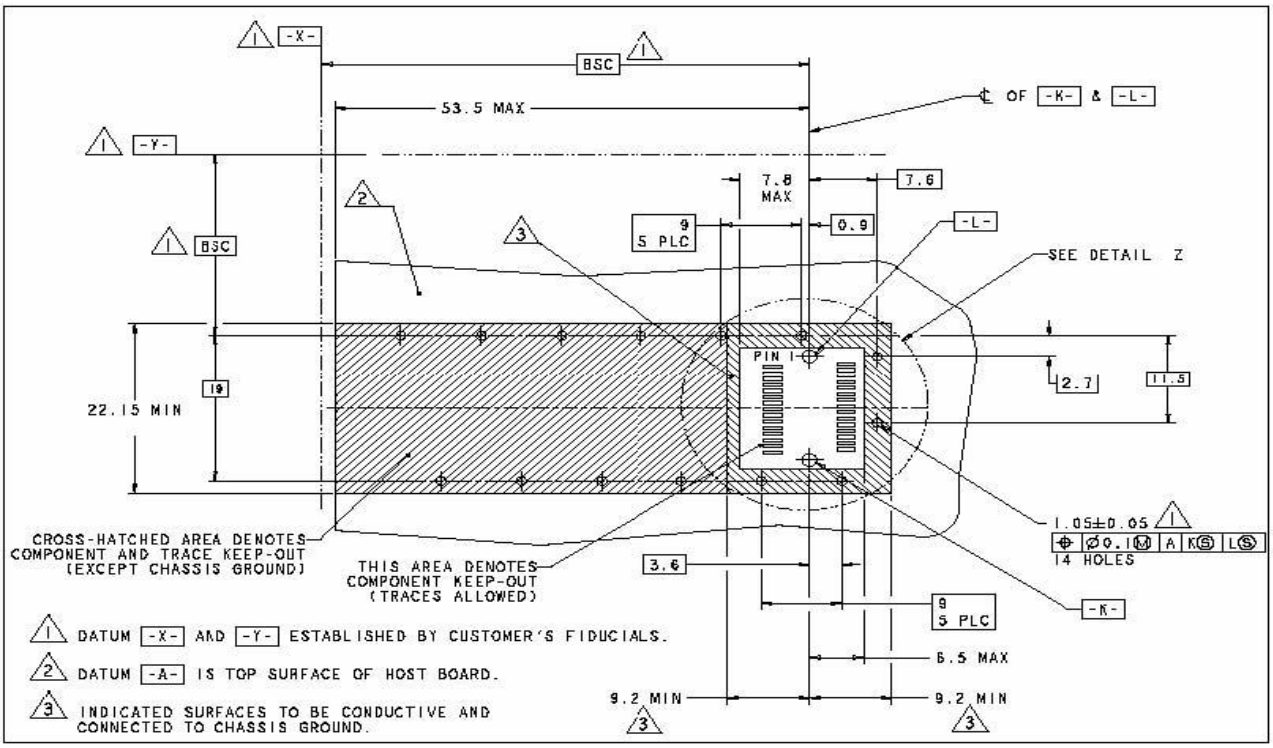
Mechanical Specifications

ETU-LINK's XFP transceivers are compliant with the dimensions defined by the XFP Multi-Sourcing Agreement (MSA).

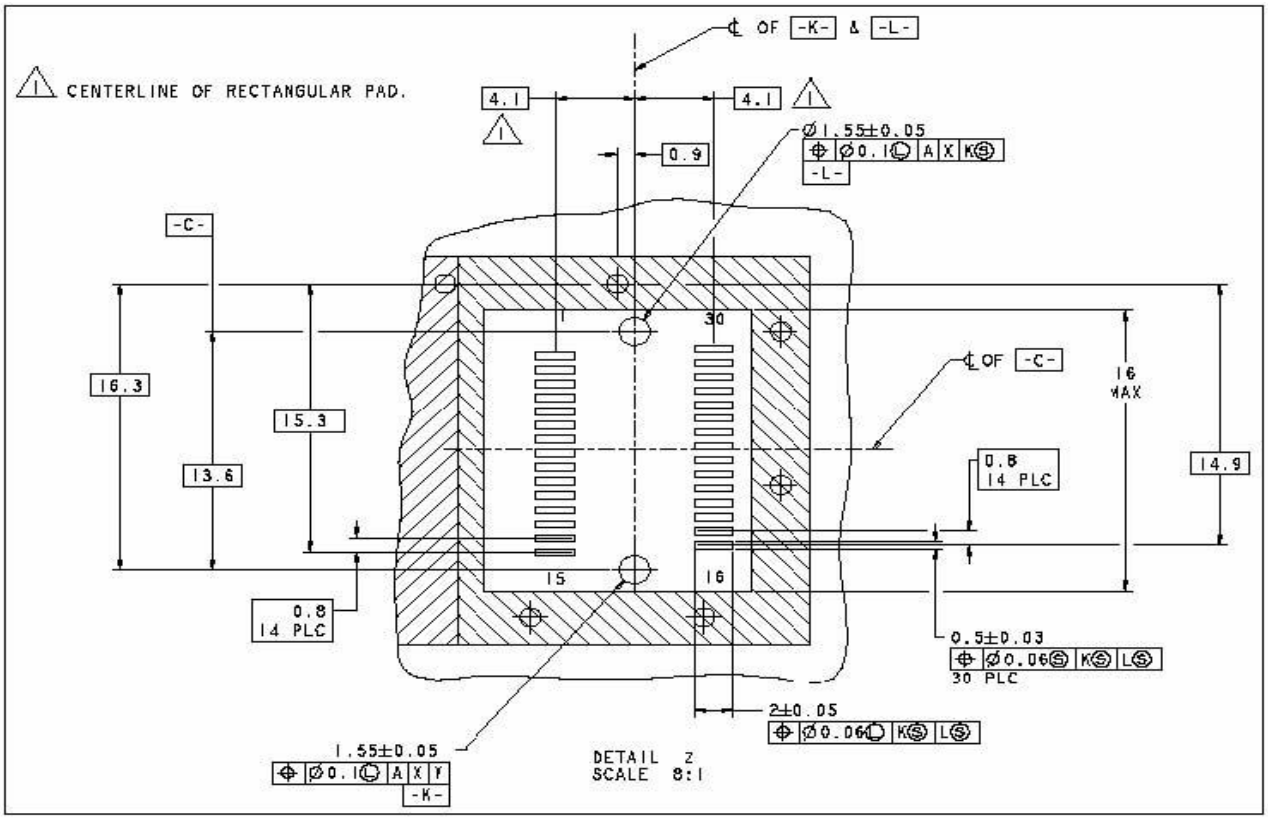
XFP Transceiver (dimensions are in mm)



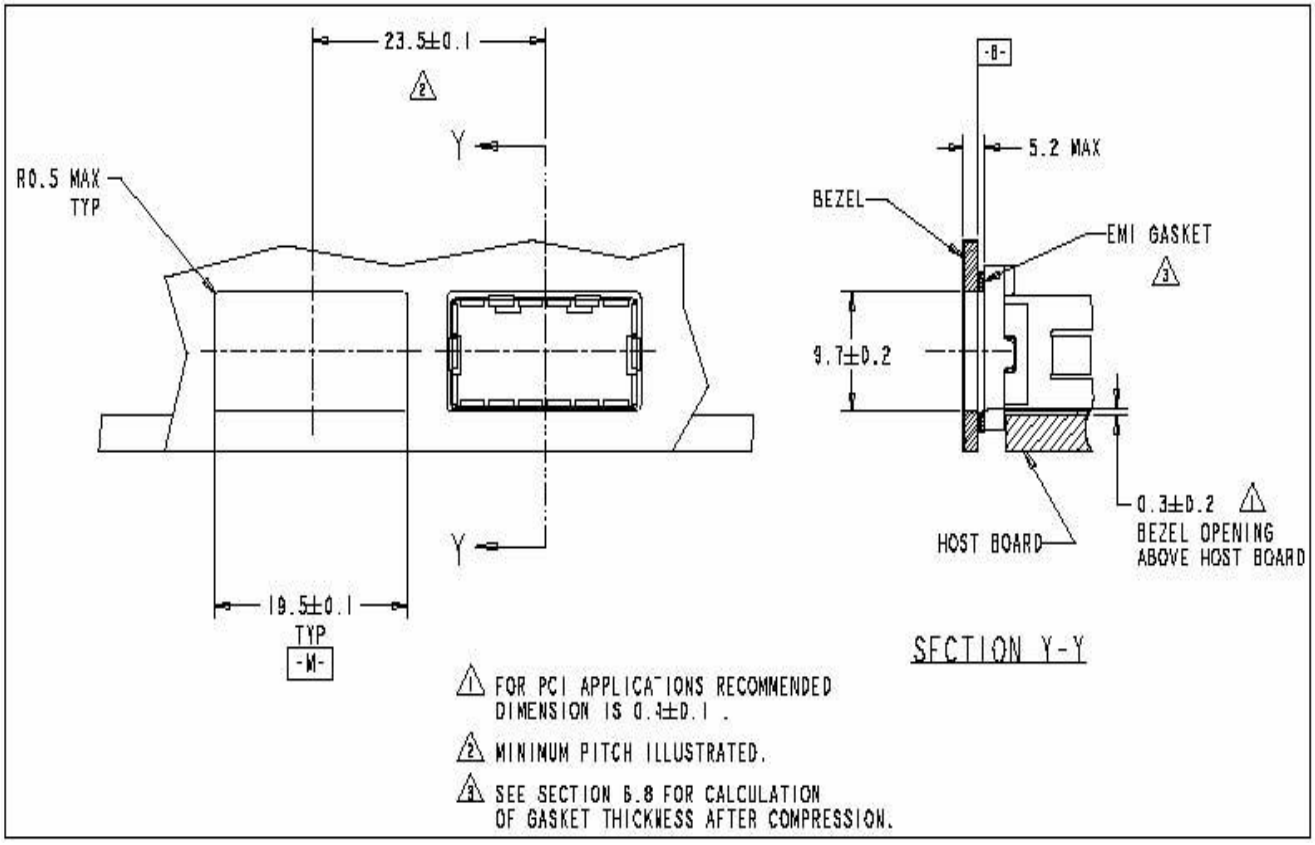
PCB Layout and Bezel Recommendations



XFP Host Board Mechanical Layout (dimensions are in mm)



XFP Detail Host Board Mechanical Layout (dimensions are in mm)



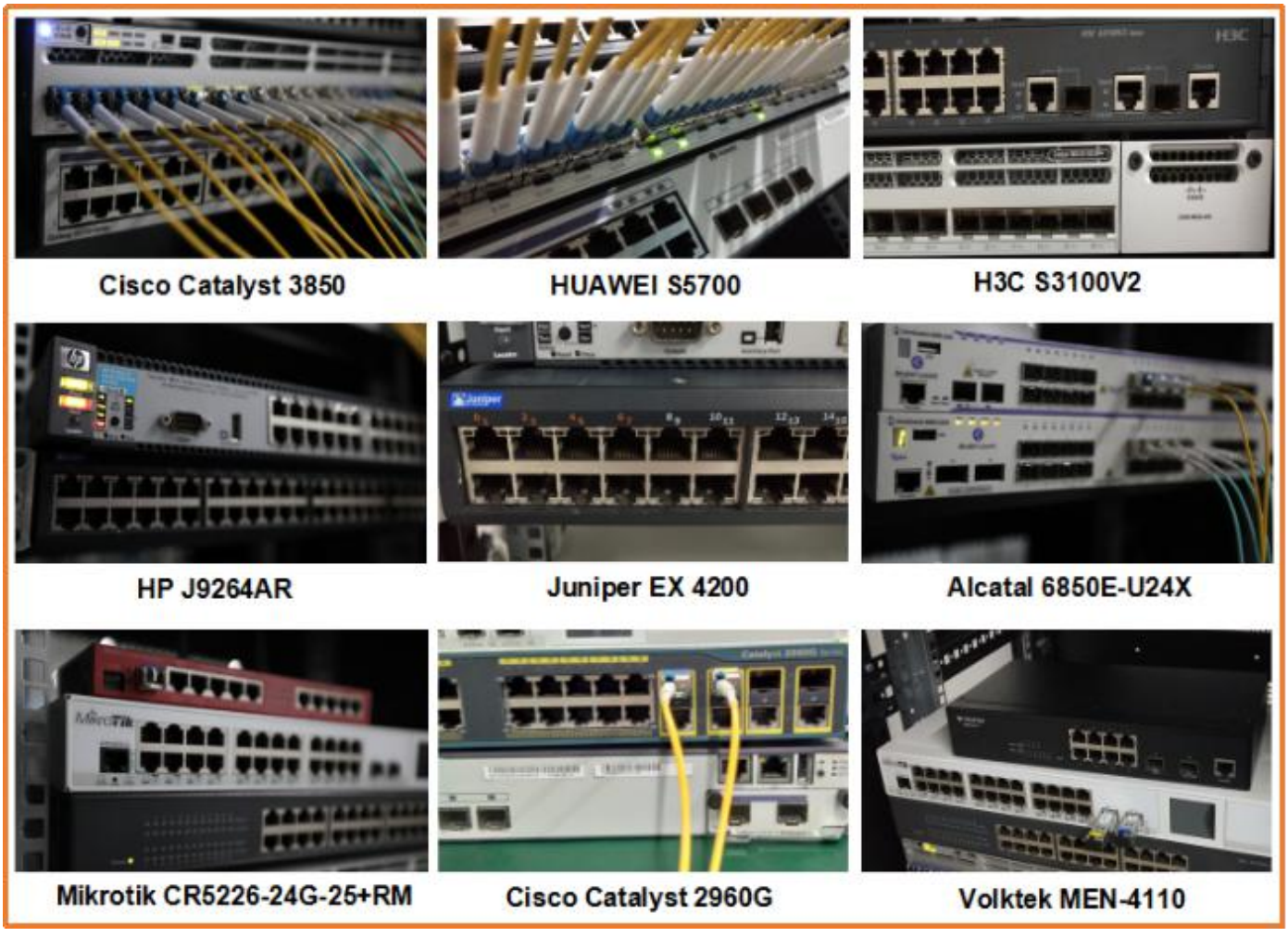
Regulatory Compliance

Feature	Reference	Performance
Electrostatic discharge（ESD）	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1, 2	Class 1 laser product
Component Recognition	IEC/EN 60950, UL	Compatible with standards
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards

Compatibility Test

In order to ensure the product compatibility, our products will be tested on the switch before shipment. Our modules can compatible with many mainstream brand switches, such as Cisco, Juniper, Extreme, Brocade, IBM, H3C, HP, Huawei, D-Link, Mikrotik, ZTE, TP-Link...

Our test equipment: VOLKTEK MEN-4110, HP 2530-8G, CRS226-24G-25+RM, Catalyst 2960G Series, Catalyst 3850 XS 10G SFP+, Catalyst 3750-E Series, HUAWEI S5700Series, H3C S3100V2 Series, Juniper-EX4200, etc



Packaging

ETU-Link provides two kinds of packaging, 10pcs/Tray and individual package.

Company: ETU-Link Technology Co., LTD
Address: 4th Floor, C Building, JinBoLong Industrial Park, QingQuan Road, LongHua District, Shenzhen city, GuangDong
Tel: +86-755 2328 4603

Addresses and phone number also have been listed at www.etulinktechnology.com.
Please e-mail us at sales@etulinktechnology.com or call us for assistance.