ETU-LINK

Optical Communication System

QSFP+ Series

QSFP+

EQ314X-3LCD2

40G QSFP+ LR4 2KM Transceiver

➢ High density interconnectivity
➢ Supports 40Gb/s data rate links up to 2KM on a Singlemode Fiber (SMF)
➢ Industry standard QSFP+ form factor Single 3.3V Power Supply

Applications

➢ Data Center interconnections
➢ 40GBASE Ethernet links
➢ 40G Telecom connections QDR/DDR Infiniband links

Product Specifications

The 40G QSFP+ LR4 is a 4×10G single-mode fiber, hot pluggable optical transceiver.

The optical connectivity is based on two Singlemode Fiber (SMF) LC connectors, one for Tx and one for Rx. The Tx and Rx each consist of 4 10GB/s CWDM channels, whose wavelengths are in the 1300nm range. The QSFP+ LR4 transceiver is designed for applications with a reach up to 2KM.

General Description

Compliant with QSFP+ SFF-8436 MSA for mechanical, low speed electrical and 2-wire serial management interface for control and real-time monitoring
Supports 40 Gbps data rates links from 2m to 2KM over a standard SMF
QSFP+ footprint (Quad Small Form-factor Pluggable) with 2 unidirectional LC SMF optical connector receptacles
38 pin hot pluggable edge connector electrical interface based on QSFP+ MSA
The transmitter consists of a retimed quad input, 4 un-cooled CWDM DFB lasers operating on the ITU G.694.2 wavelength grid at 1271, 1291, 1311 and 1331nm and multiplexed into a single SMF output
The receiver consists of a CWDM de-multiplexer, a quad photodiode receiver with a limiting electrical interface

and output amplitude control

Provides Bias and Transmit Power Monitoring (TPM) for each of the 4 transmitter channels Provides RSSI Monitoring for each of the 4 receiver channels

Provides monitoring of the voltage supplies and case temperature Provides Module Present and Interrupt signals Input control pins for Module Select, Module Reset and Low Power Modes Supports operation for a case temperature of 0°C to +70°C

Includes customized coding option for module security implementation.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Storage Temperature Range	T_{STG}	-40	+85	ºC
Supply Voltage	V_{CC}	0	4	V
Maximum Average Input Optical Power per Lane (Damage Threshold)	P_{IN}	3.3		dBm
Relative Humidity	RH		10% to 90% non-condensing	

Operating Conditions

Parameter	Symbol	Min	Typical	Max	Units
Case Temperature-Operating	T_{CASE}	0	25	70	ºC
Supply Voltage	V_{CC}	3.14	3.3	3.46	V
Power Consumption	P_{DISS}			3.5	W
Power Consumption-LP Mode	$P_{DISS-LP}$			1.5	W

Optical Characteristics

Transmitter Optical Specifications

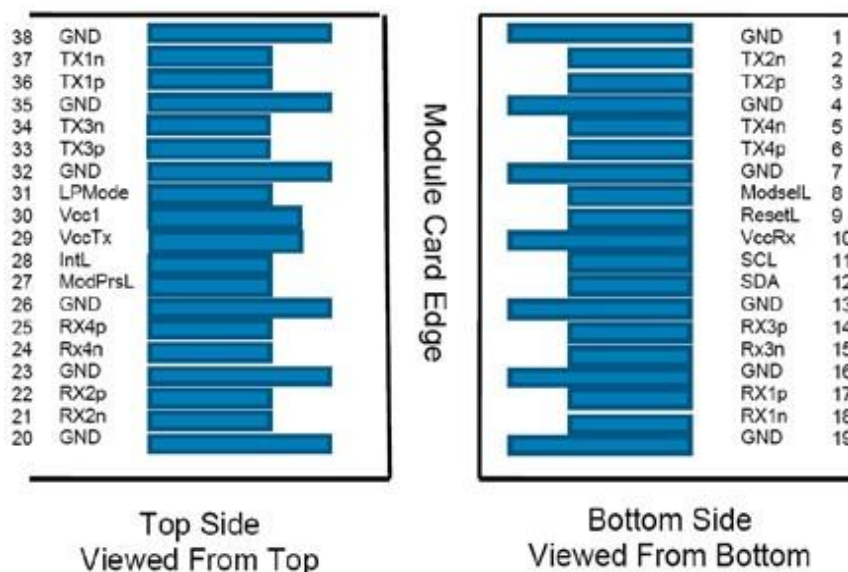| Transmitter Parameter	Lane	Min	Typical	Max	Units
Signaling rate, each lane	10.3125 ± 100ppm				Gb/s
Lane Wavelength Range	Lane 0	1264.5	1271	1277.5	nm
	Lane 1	1284.5	1291	1297.5	nm
	Lane 2	1304.5	1311	1317.5	nm
	Lane 3	1324.5	1331	1337.5	nm
Average Optical Power per lane		-7		2.3	dBm
Total Average Launch Power				8.3	dBm
Optical Modulation Amplitude (OMA), each lane		-4		3.5	dBm
Transmitter and Dispersion Penalty (TDP) each lane				2.6	dB
Average Launch Power per Lane @ TX Off State				-30	dBm
Extinction Ratio		3.5			dB
Relative Intensity Noise (OMA)				-128	dB/Hz
Side-Mode Suppression Ration (SMSR)		30			dB
Optical Return Loss Tolerance				20	dB
Transmitter Reflectance				-12	dB
Transmitter Output Power Monitoring Accuracy		-3		3	dB
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				

Receiver Optical Specifications

Receiver Parameter	Lane	Min	Typical	Max	Units
Signaling rate, each lane	10.3125 ± 100ppm				Gb/s
Lane Wavelength Range	Lane 0	1264.5	1271	1277.5	nm
	Lane 1	1284.5	1291	1297.5	nm
	Lane 2	1304.5	1311	1317.5	nm
	Lane 3	1324.5	1331	1337.5	nm
Damage Threshold		3.3			dBm
Average Receive Power, each lane		-13.7		2.3	dBm
Receiver Power, each lane (OMA)				3.5	dBm
Receiver Reflectance				-26.0	dB
Receiver Sensitivity (OMA) per lane (10.3125Gb/s @PRBS 2_{31}-1 and BER=1_{-12}				-11.5	dBm
RSSI Accuracy		-3.0		3.0	dB

Electrical Characteristics

QSFP+ Edge Connector and Pinout Description

The electrical interface to the transceiver is a 38 pins edge connector. The 38 pins provide high speed data, low speed monitoring and control signals, I2C communication, power and ground connectivity. The top and bottom views of the connector are provided below, as well as a table outlining the contact numbering, symbol and full description.

38	GND
37	TX1n
36	TX1p
35	GND
34	TX3n
33	TX3p
32	GND
31	LPMode
30	Vcc1
29	VccTx
28	IntL
27	ModPrsL
26	GND
25	RX4p
24	Rx4n
23	GND
22	RX2p
21	RX2n
20	GND

Module Card Edge

GND	1
TX2n	2
TX2p	3
GND	4
TX4n	5
TX4p	6
GND	7
ModselL	8
ResetL	9
VccRx	10
SCL	11
SDA	12
GND	13
RX3p	14
Rx3n	15
GND	16
RX1p	17
RX1n	18
GND	19

Top Side
Viewed From Top

Bottom Side
Viewed From Bottom

Electrical Interface – QSFP Transceiver Pinout

Pin No.	Description	Logic	Symbol	Plug Sequence
1	Ground		GND	1
2	Transmitted Inverted Data Input	CML-I	TX2n	3
3	Transmitted Non-Inverted Data Input	CML-I	TX2p	3
4	Ground		GND	1
5	Transmitted Inverted Data Input	CML-I	TX4n	3
6	Transmitted Non-Inverted Data Input	CML-I	TX4p	3
7	Ground		GND	1
8	Module Select	LVTTL-I	ModSeil	3
9	Module Reset	LVTTL-I	ResetL	3
10	+3.3 VDC Receiver Power Supply		Vcc Rx	2
11	Serial Clock for I2C Interface	LVCMOS-I/O	SCL	3
12	Serial Data for I2C Interface	LVCMOS-I/O	SDA	3
13	Ground		GND	1
14	Receiver Non-Inverted Data Output	CML-O	RX3p	3
15	Receiver Inverted Data Output	CML-O	RX3n	3
16	Ground		GND	1
17	Receiver Non-Inverted Data Output	CML-O	RX1p	3
18	Receiver Inverted Data Output	CML-O	RX1n	3
19	Ground		GND	1
20	Ground		GND	1
21	Receiver Inverted Data Output	CML-O	RX2n	3
22	Receiver Non-Inverted Data Output	CML-O	RX2p	3
23	Ground		GND	1
24	Receiver Inverted Data Output	CML-O	RX4n	3
25	Receiver Non-Inverted Data Output	CML-O	RX4p	3
26	Ground		GND	1
27	Module Present	LVTTL-O	ModPrsL	3
28	Interrupt	LVTTL-O	IntL	3
29	+3.3 VDC Transmitter Power Supply		Vcc Tx	2
30	+3.3 VDC Power Supply		Vcc1	2
31	Low Power Mode	LVTTL-I	LPMode	3
32	Ground		GND	1
33	Transmitted Non-Inverted Data Input	CML-I	TX3p	3
34	Transmitted Inverted Data Input	CML-I	TX3n	3
35	Ground		GND	1
36	Transmitted Non-Inverted Data Input	CML-I	TX1p	3
37	Transmitted Inverted Data Input	CML-I	TX1n	3
38	Ground		GND	1

Upper Memory Map Page 00h

Address	Description of Base ID Field	Size (Bytes)	Name	Default
	Base ID Fields			
128	Identifier type of serial transceiver	1	Identifier	0Dh
129	Extended identifier of serial transceiver	1	Ext. Identifier	C0h
130	Code for connector type	1	Connector	07h
131	Module connection compatablity	1	Transceiver	02h
132–138	Module connection compatablity	7	Transceiver	00h
139	Code for serial encoding algorithm	1	Encoding	03h
140	Nominal bit rate, units of 100MBits/s	1	BR. Nominal	67h
141	Tags for Extended Rate Select compliance	1	"Extended Rate Select Compliance"	00h
142	Link length supoported for SMF in km	1	Length (SMF)	0Ah
143	Link length supported for EBW 50/125µm fiber, units of 2m	1	Length (E-50µm)	00h
144	Link length supported for 50/125µm fiber, units of 1m	1	Length (50µm)	00h
145	Link length supported for 62.5/125µm fiber, units of 1m	1	Length (62.5µm)	00h
146	Link length supported for copper, units of 1m	1	Length (Copper)	00h
147	Device Technology	1	Device Tech	40h
148–163	QSFP Vendor name (ASCII)	16	Vendor name	
164	Extended Transceiver Codes for InfiniBand	1	Extended Transceiver	07h
165	QSFP Vendor IEEE Company ID	1	Vendor OUI	E4h
166	QSFP Vendor IEEE Company ID	1	Vendor OUI	25h
167	QSFP Vendor IEEE Company ID	1	Vendor OUI	E9h
168–183	Part number provided by QSFP Vendor (ASCII)	16	Vendor PN	
184–185	Revision level for part number provided by vendor (ASCII)	2	Vendor rev	Rev No.
186	Nominal laser wavelength	1	Wavelength	66h
187	Nominal laser wavelength	1	Wavelength	58h
188	Guaranteed range of laser WL	1	Wavelength Tolerance	05h
189	Guaranteed range of laser WL	1	Wavelength Tolerance	14h
190	Maximum Case Temperature in Degrees C.	1	Max Case Temp	46h
191	Check code for base ID Fields (addresses 128-190)	1	CC Base	check sum
	Extended ID Fields			
192	Rate Select, TX Disable, TX Fault, LOS, Warning indictors for: Temperature, VCC, RX power, TX Bias	1	Option	00h
193		1	Option	01h
194		1	Option	0Ch
195		1	Option	98h

196–211	Serial number provided by vendor (ASCII)	16	Vendor SN	serial no.
212–219	Vendor's manufacturing date code	8	Date Code	date code
220	"Indicates which type of diagnostic monitoring is implemented in the transceiver. Bit, 1,0 Reserved"	1	"Diagnostic Monitoring Type"	0Ch
221	Indicates which optional enhanced features are implemented in the transceiver	1	Enhanced Options	10h
222	Reserved	1	Reserved	00h
223	"Check code for the Extended ID Fields (addresses 192–222)"	1	CC_EXT	check sum
Vendor Specific ID Fields				
224–255	Vendor Specific EEPROM	32	Vendor Specific	00h

Mechanical Specifications

Pull Tab Pantone:　　Blue

Pantone:　　300U

Unit: mm
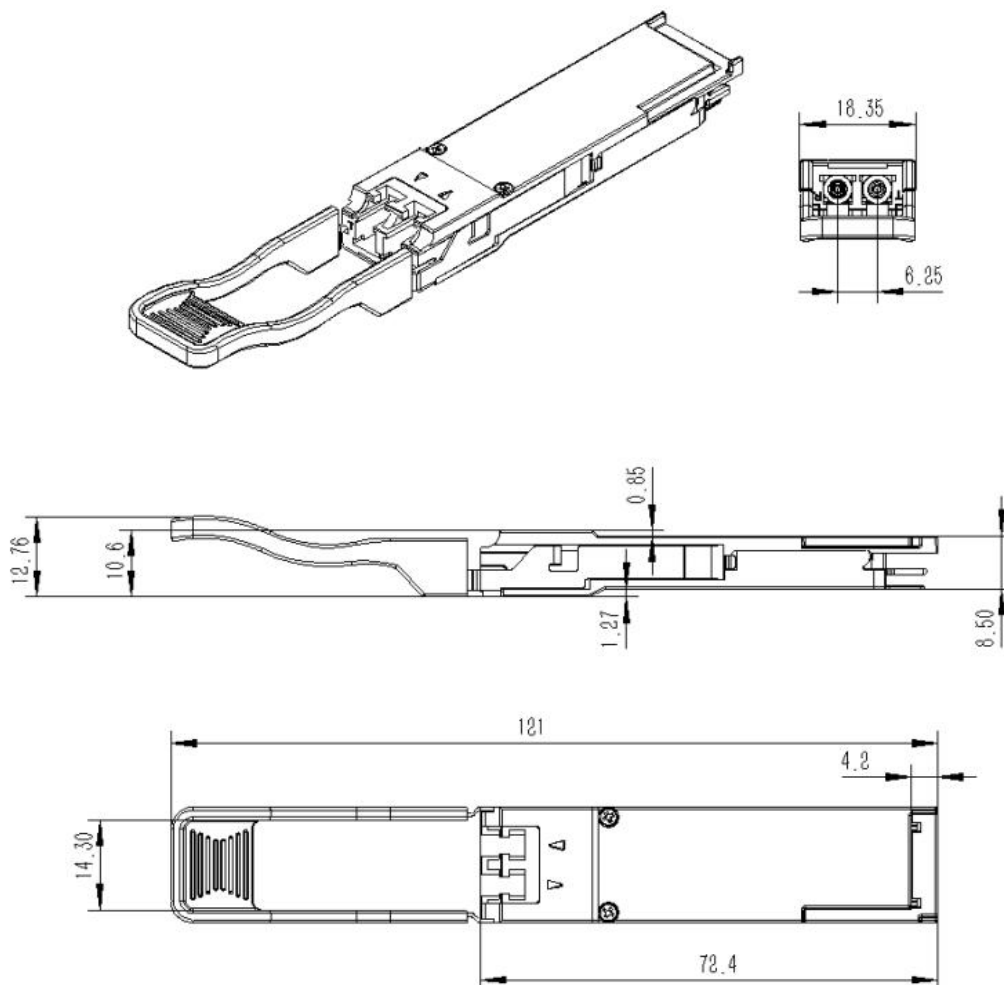
Compatibility Test

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.

Cisco Catalyst 3850 | HUAWEI S5700 | H3C S3100V2
HP J9264AR | Juniper EX 4200 | Alcatal 6850E-U24X
Mikrotik CR5226-24G-25+RM | Cisco Catalyst 2960G | Volktek MEN-4110

Product Production Process

Quality Assurance

Continuous introduction of new equipment, produced by strict standards, strict quality inspection, to guarantee the high quality standard of each product.
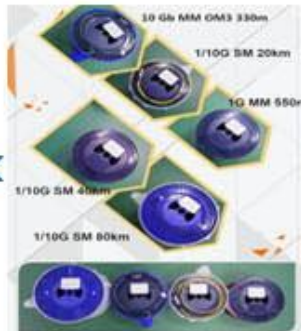
Standardized Production Line → **Professional Welding** → **Assembling**

Aging Testing ← **Distance Testing** ← **Cleaning end face**

Product Initial Test → **Switch Testing** → **Product Final Test**

Packaging

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

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