

Rev	Date	Modified by	Description
A0	2023		

Product Specifications

40G QSFP+ 1310nm LR4 10KM Transceiver

PN: EQP274X-10D

Features

- High density inter connectivity
- Supports 40Gb/s data rate links up to 10km on a Single mode 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

Description

The 40G QSFP+ LR4 is a 4×10G single-mode fiber, hot pluggable optical transceiver. ETU's unique System On Glass TM (SOGTM) technology enables the integration of 4 transmitters, 4 receivers and an optical MUX/DeMUX into a small form factor package that delivers a 40Gbps data link in a compact QSFP+ footprint. The optical connectivity is based on two Single mode 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 10km.

The LR4 transceiver is based on proprietary PLC technology, using surface mounted opto-electronic devices with no free space elements. The unique design of the optical engine facilitates unparalleled compactness while maintaining Telcordia robustness.

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 10km 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 four timed quad input, 4 un-cooled CWDM DFB lasers operating on the ITU G.694.2 wavelength grid at 1271, 1291, 1311 and 1331 nm 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	°C
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	°C
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

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

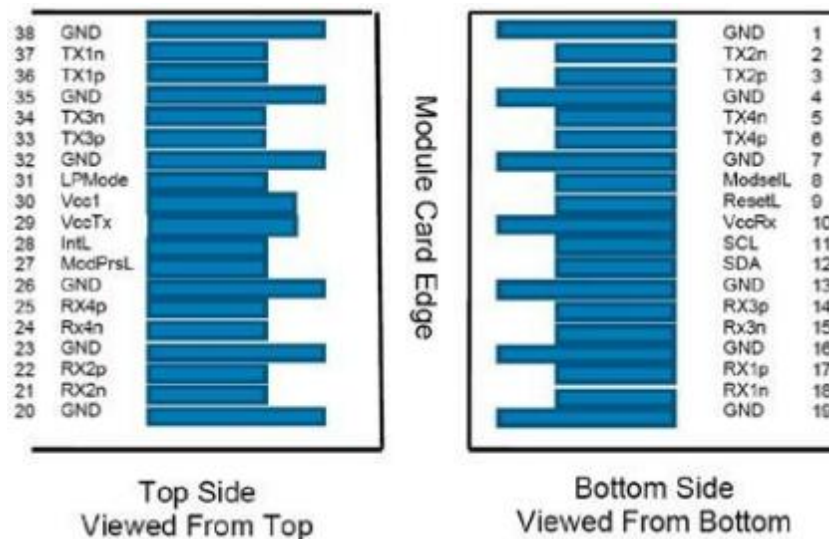
Average Receive Power, each lane		-13.7		2.3	dBm
Receiver Power, each lane (OMA)				3.5	dBm
Receiver Reflectance				-26.0	dB
Receiver Sensitivity (OMA) per lane (10.3125Gb/s @PRBS 2 ³¹ -1 and BER=1 ⁻¹²)				-11.5	dBm
RSSI Accuracy		-3.0		3.0	dB

Digital Diagnostic Monitoring Specifications

Parameters	Unit	Specification
Temperature Monitor	°C	± 3
Voltage Monitor	V	± 5 %
I_bias Monitor	mA	± 10 %
Received Power (Rx) Monitor	dB	± 3.0
Transmit Power (Tx) Monitor	dB	± 3.0

QSFP+ Edge Connector and Pin out 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.



Electrical Interface– QSFP Transceiver Pin out

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	LVTTTL-I	ModSelI	3
9	Module Reset	LVTTTL-I	ResetL	3
10	+3.3 VDC Receiver Power Supply		Vcc Rx	2
11	Serial Clock for I2C Interface	LVC MOS- I/O	SCL	3
12	Serial Data for I2C Interface	LVC MOS- 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	LVTTTL-O	ModPrsL	3
28	Interrupt	LVTTTL-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	LVTTTL-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

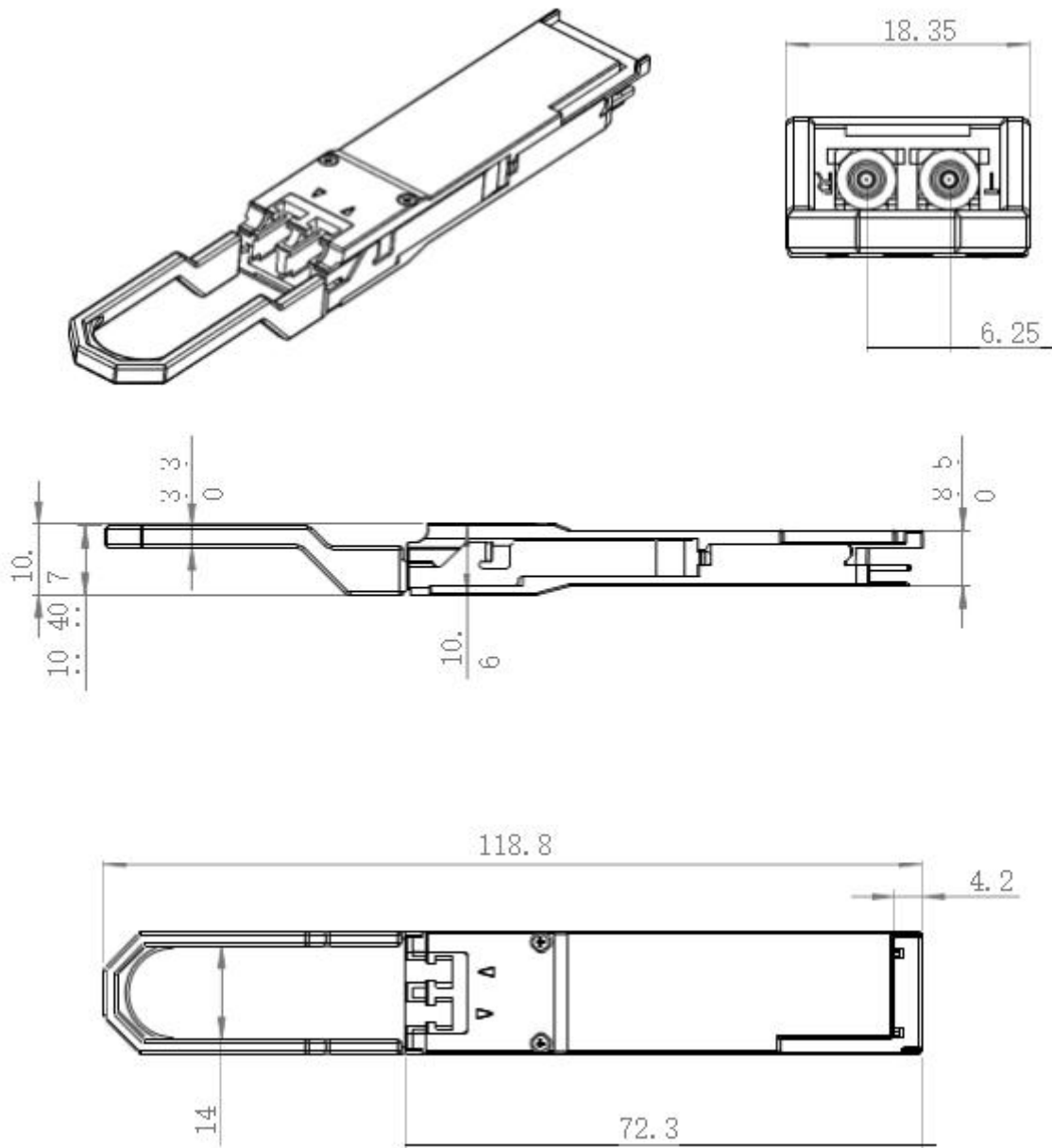
36	Transmitted Non-Inverted Data Input	CML-I	TX1p	3
37	Transmitted Inverted Data Input	CML-I	TX1n	3
38	Ground		GND	1

Upper Memory Map Page00h

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 compatability	1	Transceiver	02h
132–138	Module connection compatability	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 supported 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	'ColorChip Ltd'
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	C040Q100CWDM402B
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 indicators 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

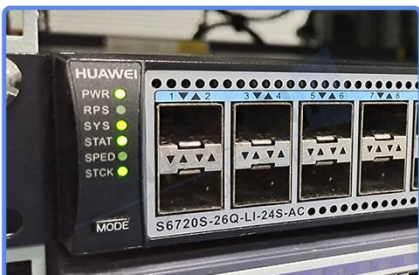
Mechanical Specifications (mm)



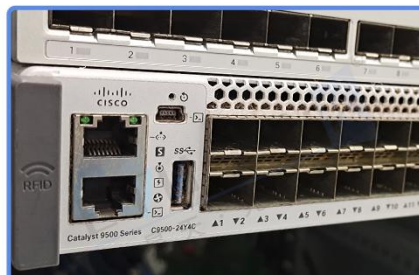
Compatibility Test

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.



HUAWEI S6720S



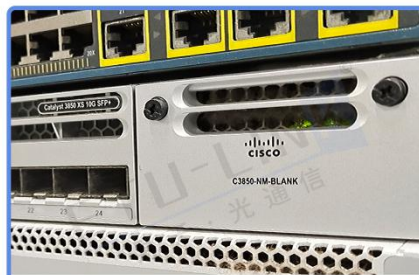
CISCO Catalyst 9500



DELL S5048F



H3C S3100V2



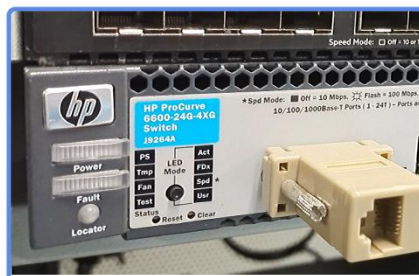
CISCO C3850



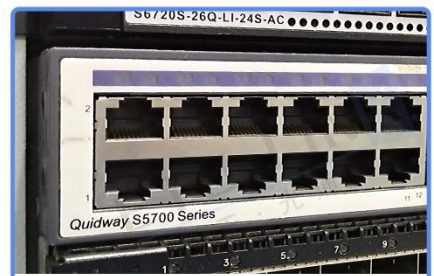
Aruba 2930F



Juniper EX 4200



HP J9264A

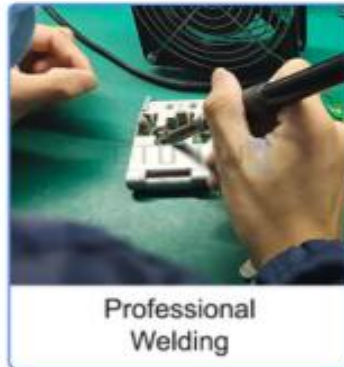


Quidway S5700

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.



Packaging

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



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