XF-CXX96-40D(A)

10Gb/s 40km CWDM XFP Optical Transceiver

PRODUCT FEATURES

- Hot-pluggable XFP footprint
- Supports 9.95Gb/s to 11.3Gb/s bit rates
- Supports Line-side and XFI loopback
- RoHS-6 Compliant (lead-free)
- Power dissipation <3.0W
- 3.3V &1.8V power supply
- Maximum link length of 80km
- Cooled CWDM EML and APD Receiver
- Full Duplex LC connector
- No Reference Clock required
- Built-in digital diagnostic functions
- Standard bail release mechanism
- Case operating temperature range: Commercial: 0°C to +70°C

  Industrial: -40°C to +85°

APPLICATIONS

- 10GBASE-ZR/ZW & 10G Ethernet
- 10G Fiber Channel
- SONET OC-192&SDH STM-64

PRODUCT DESCRIPTION

LONGLINE XFP-CWDM-LL-40KM Small Form Factor 10Gb/s (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification. They comply with 10-Gigabit Ethernet 10GBASE-ZR/ZW per IEEE 802.3ae.Digital diagnostics functions are available via a 2-wire serial interface, as specified in the XFP MSA. The transceiver is ROHS compliant and leads free. The transmitter and receiver features ac-coupled differential data inputs and outputs, and an LVTTL for Tx disable input and Tx fault output. The receiver features differential ac-coupled data outputs and LVTTL for LOS (Loss of Signal) output.

Order information

XFP-CWDM-LL-40KM

Wavelength	PN	Clasp Color Code
1470nm	XFP-CWDM-LL-40KM	Gray
1490 nm	XFP-CWDM-LL-40KM	Purple
1510 nm	XFP-CWDM-LL-40KM	Blue
1530 nm	XFP-CWDM-LL-40KM	Green
1550 nm	XFP-CWDM-LL-40KM	Yellow
1570 nm	XFP-CWDM-LL-40KM	Orange
1590 nm	XFP-CWDM-LL-40KM	Red
1610 nm	XFP-CWDM-LL-40KM	Brown

I. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Absolute Supply Voltage	Vcc3	-0.3		3.6	V	
	Vcc2	-0.3		2.0	V	
Storage Temperature	TS	-40		85	°C	
Case Operating Temperature	Tcase	0		70	°C	
		-40	-	85	ºC	
Operating Relative Humidity	RHop	5		95	%	

II. Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Supply Voltage – 1.8V supply	Vcc2	1.71		1.89	V	
Supply Voltage – 3.3V supply	Vcc3	3.13		3.47	V	
Supply Current – 1.8V supply	Icc2			250	mA	
Supply Current – 3.3V supply	Icc3			760	mA	
Module total power	P			3.0	W	1
XFP Interrupt, Mod_NR	Vol	0		0.4	V	
	Voh	V_{CCHOST} -0.5		V_{CCHOST} +0.3	V	
P_Down/RST	Vil	-0.3		0.8	V	
	Vih	2.0		Vcc3+0.3	V	
Interrupt Assert Delay	Interrupt_on			200	ms	
Interrupt Negate Delay	Interrupt_off			500	us	
Mod_NR Assert / Negate Delay				1	ms	
P-Down reset time		10			us	
Transmitter						
Input differential impedance	R_{in}	80	100	120	Ω	2
Differential data input swing	Vin,pp	120		820	mV	
Transmit Disable Voltage	V_D	2.0		Vcc	V	3
Transmit Enable Voltage	V_{EN}	GND		GND+ 0.8	V	
Receiver						
Differential Output Impedance	Rout	80	100	120	Ω	
Differential data output swing	Vout,pp	340		850	mV	4
Data output rise time	t_r			38	ps	5
Data output fall time	t_f			38	ps	5
LOS Fault	$V_{LOS\ fault}$	V_{CCHOST} – 0.5		V_{CCHOST}	V	6
LOS Normal	$V_{LOS\ norm}$	GND		GND+0.5	V	6

Notes:

1. Maximum total power value is specified across the full temperature and voltage range.
2. After internal AC coupling.
3. Or open circuit.
4. Into 100 ohms differential termination.
5. These are unfiltered 20-80% values
6. 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.

Ⅲ. Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Transmitter						
Average Optical Power	P_{out}	0		4	dBm	1
Optical Wavelength	λ	λc-6.5	λc	λc+6.5	nm	2
Side mode Suppression ratio	SMSR	30			dB	
Spectral Width(maximum-20dB width)				0.3	nm	
Optical Extinction Ratio	ER	8.2			dB	

Optical Return Loss		24			dB	
Average Launch power of OFF transmitter	POFF			-30	dBm	
Optical Rise/Fall Time (20%-80%)	Tr, Tf			35	ps	
Eye Mask Margin		10			%	
Receiver						
Receiver Sensitivity （back to back）	Psen			-24	dBm	3
Receiver Sensitivity with 80 km fiber	Psen			-21	dBm	3, 4
Input Saturation Power (Overload)	Psat	-8			dBm	
Wavelength Range	λ_C	1270		1610	nm	
Receiver Reflectance	Rrx			-27	dB	
LOS De-Assert	LOS_D			-27	dBm	
LOS Assert	LOS_A	-37			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. Average power measured at output.
2. “λc” is: 1470,1490,1510,1530,1550,1570,1590,1610，please the “order information”.
3. Measured with BER<10^{-12} @10.3Gbps,$2^{31}-1$ PRBS，ER=8.2dB
4. Receiver Sensitivity is -20dBm with 80 km fiber for input wavelength 1570,1590nm ,1610nm

Ⅳ. Pin Assignment

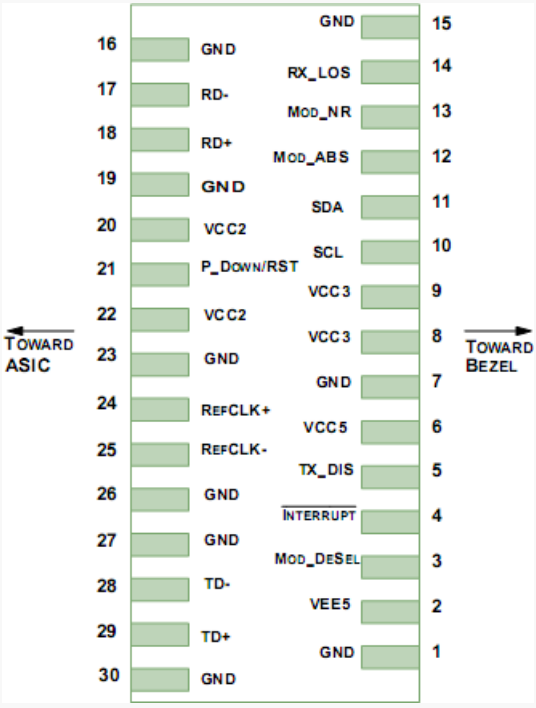


Diagram of Host Board Connector Block Pin Numbers and Name

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 – Not required	
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; LONGLINE 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	
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	
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:

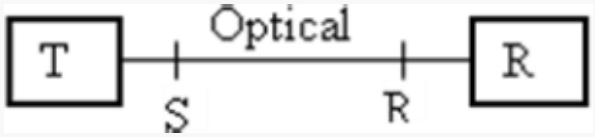
1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector; should be pulled up with 4.7k – 10kohms on host board to a voltage between 3.15V and 3.6V.
3. A Reference Clock input is not required by the XFP-CWDM-LL-40KM. If present, it will be ignored.

VI. Optical Path Specifications

Application with FEC					
Parameter		**Min**	**Typ.**	**Max.**	**Unit**
Chromatic Dispersion Range of the optical path from point S to R for the maximum optical path penalty	1470nm			962	ps/nm
	1490nm			1052	
	1510nm			1142	
	1530nm			1233	
	1550nm			1324	
	1570nm			1415	
	1590nm			1508	
	1610nm			1600	
Application without FEC (ITU-T G.695 S-C8S1-2D2)					
Parameter		**Min**	**Typ.**	**Max.**	**Unit**
Chromatic Dispersion Range of the optical path from point S to R for the maximum optical path penalty	1470nm			842	ps/nm
	1490nm			921	
	1510nm			1000	
	1530nm			1079	
	1550nm			1159	

	1570nm			1238	
	1590nm			1319	
	1610nm			1400	

Reference diagram



VII. Digital Diagnostic Functions

As defined by the XFP MSA, LONGLINE XFP 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 (DDTC) 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 o access to the 8 bit parameters, addressed from 000h to the maximum address of the memory.