RoHS compliant
10Gb/s 70km
CWDM XFP Optical Transceiver

Features

- Supports 9.95Gb/s to 11.1Gb/sBit Rates
- Hot-Pluggable XFP Footprint
- Compliant with XFP MSA
- 4-WavelengthsCWDMDFBTransmitter from1270nm to 1450nm, with Step 20nm
- 23dB Power Budget
- Duplex LC Connector
- Power Dissipation <2.5W
- Case Operation Temperature Range-5°Cto 70°C
- 2-Wire Interface for Integrated Digital Diagnostic Monitoring

Aapplication

- 10GBASE-ZR/ZW 10G Ethernet
- 1200-SM-LL-L 10G Fiber Channel
- 10GE over G.709 at 11.09Gbps

Ordering Information

PART NUMBER	TX/RX	INPUT/OUTPUT	SIGNAL DETECT	TEMPERATURE	Distance
CL-XFP-23C-L1-XX	-	AC/AC	TTL	-5°C to 70 °C	70km
CL-XFP-23C-L1-XXi	-	AC/AC	TTL	-40°C to 85 °C	70km

CWDM* Wavelength

Band	Nomenclature	Wavelength(nm)		
		Min.	Typ.	Max.
O-band Original	L1	1264	1270	1277.5
		1284	1290	1297.5
		1304	1310	1317.5
		1324	1330	1337.5
O-band Original		1344	1350	1357.5
E-band Extended		1364	1370	1377.5
		1384	1390	1397.5
		1404	1410	1417.5
		1424	1430	1437.5
		1444	1450	1457.5

CWDM*: 10 Wavelengths from 1270nm to 1450nm, each step 20nm.

Regulatory Compliance

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12+A2
		EN 60825-1:2014
		EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1
		CSA C22.2 No. 60950-1-07
EMC CE	AE 50285865 0001	EN 55022:2010
		EN 55024:2010
FCC	WTF14F0514417E	47 CFR PART 15 OCT., 2013
FDA	/	CDRH 1040.10
ROHS	/	2011/65/EU

Note2: The abovecertificate numberupdated toJune 2014, because somecertificatewill be updatedevery year, such as FDA and ROHS.For the latestcertification information, pleasecheck with Carelink.

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Product Description

The CL-XFP-23C-L1-XX series optical transceiver is designed for fiber communications application such as SONET OC-192, STM-64, 10G Ethernet (10GBASE-ZR/ZW) and 10G Fiber Channel (1200-SM-LL-L), which fully compliant with the specification of XFP MSA Rev 4.5.
This module is designed for single mode fiber and operates at a nominal wavelength of CWDM wavelength. There are four center wavelengths available from 1270nm to 1450nm, with each step 20nm.
The module is with the XFP 30-pin connector to allow hot plug capability. Only single 3.3V power supply is needed. The optical output can be disabled by LVTTL logic high-level input of TX_DIS. Loss of signal (RX_LOS) output is provided to indicate the loss of an input optical signal of This module provides digital diagnostic functions via a 2-wire serial interfaceas defined by the XFP MSA Rev 4.5.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit	Note
Maximum Supply Voltage	Vcc	-0.5		4.0	V	
Storage Temperature	T_S	-40		85	°C	
Case Operating Temperature	T_C	-5		70	°C	
Maximum Input Power	Pm			-8	dBm	

Recommend Operating Condition

Parameter	Symbol	Min	Typical	Max	Units	Note
Operating Temperature	T_C	-5		70	°C	
Supply Voltage	Vcc	3.13	3.3	3.45	V	
Supply Current	Icc			750	mA	
Module Total Power	P			2.5	W	

Electrical Characteristics

(T_C= -5 to 70℃, V_{CC}= 3.15to 3.45V)

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter						
Input Differential Impedance	Rin		100		Ω	1
Differential Data Input Swing	Vin, pp	180		820	mV	
Transmit Disable Voltage	V_{DIS}	2.0		Vcc	V	
Transmit Enable Voltage	V_{EN}	GND		GND+ 0.8	V	
Transmit Disable Assert Time				10	us	
Receiver						
Differential Data Output Swing	Vout, pp	340	650	850	mV	
Data Output Rise Time	tr			38	ps	2

Data Output Fall Time	tf			38	ps	2
LOS Fault	$V_{LOS\ fault}$	$V_{cc-0.5}$		$V_{cc\ HOST}$	V	3
LOS Normal	$V_{LOS\ norm}$	GND		GND+0.5	V	3
Power Supply Rejection	PSR	See Note 4 below				4

Notes:
1. After internal AC coupling.
2. 20 –80 %.
3. 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.
4. Reference theSection 2.7ofthe XFP MSA Rev 4.5.

Optical Characteristics

(Tc= -5 to 70℃, Vcc= 3.15 to 3.45V)

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter						
Output Opt. Pwr: 9/125 SMF	Pout	2		5	dBm	1
Optical Extinction Ratio	ER	3.5			dB	
Optical Wavelength	λ	λc–6	λc	λc+7.5	nm	2
-20dB Spectrum Width	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	32			dB	
Average Launch Power of OFF Transmitter	P_{OFF}			-30	dBm	
TX Jitter	TXj	Per 802.3ae requirements				
Relative Intensity Noise	RIN			-135	dB/Hz	
Receiver						
Receiver Sensitivity @ 10.3125Gb/s	Pmin			-21	dBm	3
Overload Power	Pmax	-8			dBm	
Optical Center Wavelength	λ	1260		1600	nm	
Receiver Reflectance	Rrf			-12	dB	
LOS De-Assert	LOS_D			-23	dBm	
LOS Assert	LOS_A	-35			dBm	
LOS Hysteresis		1			dB	

Note:

1. Output power is coupled into a 9/125μm SMF.
2. ITU-T G.694.2 CWDM wavelength from1270nm to 1450nm, each step 20nm.
3.Average received power; BER less than 1E-12, PRBS 2_{31}-1 test pattern.

Pin Descriptions

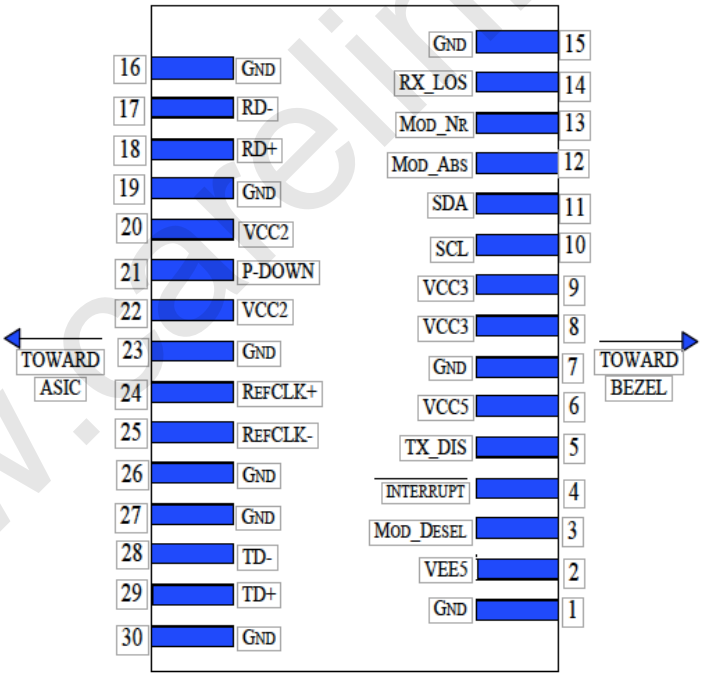
Pin	Logic	Symbol	Name/Description	Notes
1		GND	Module Ground	1
2		VEE5	Optional –5.2 Power Supply – Not Required	
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	LVTTL-O	/Interrupt	/Interrupt; Indicates presence of an important	2
			condition which can be read over the serial 2-wire interface	
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 line	2
11	LVTTL-I/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;	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/ R ST	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. Open connectshould be pulled up with 4.7k –10k ohm on host board to a voltagebetween 3.15Vand 3.6V.
3. A Reference Clock input is not required.

Pin Arrangement



General Specifications

Parameter	Symbol	Min	Typical	Max	Units	Note
Bit Rate	BR	9.95		11.1	Gb/s	
Bit Error Ratio	BER			10^{-12}		1

Notes:

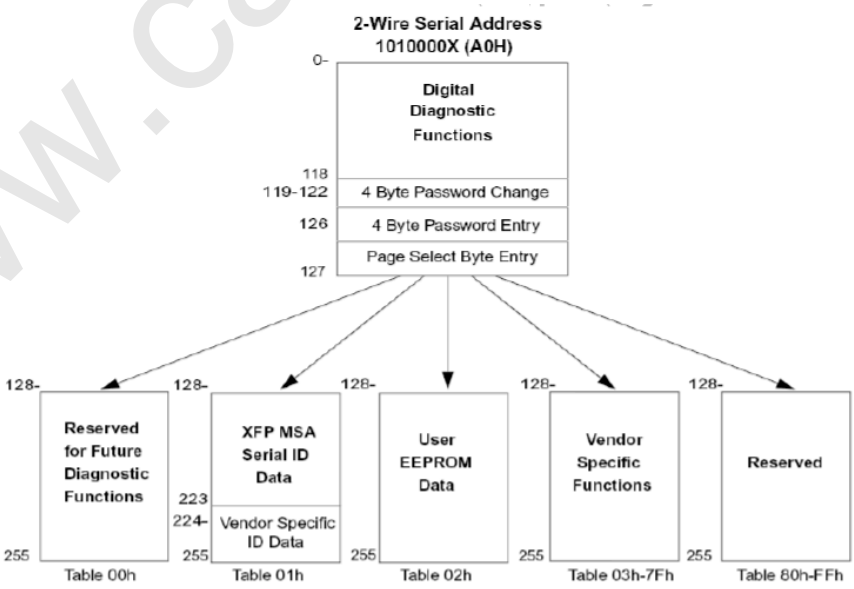
1. Tested 9.95G with $2^{31}-1$ PRBSpattern.

Digital Diagnostic Functions

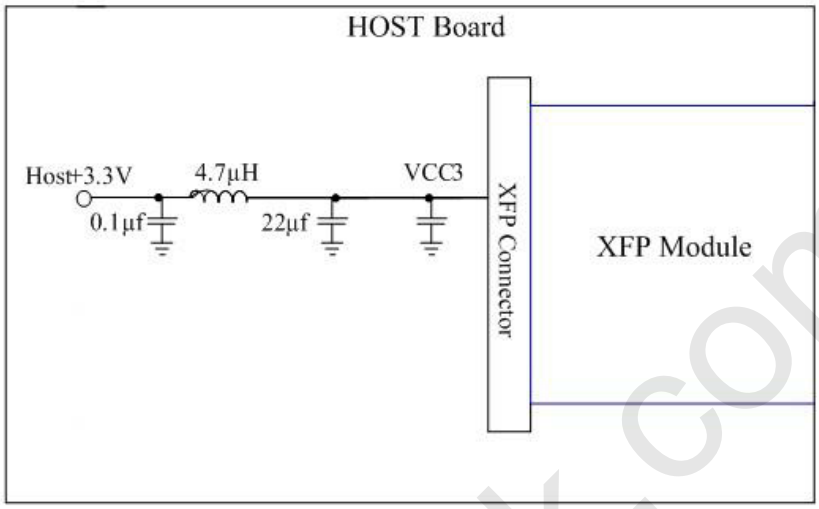
Carelink's Small Form Factor 10Gbps (XFP) transceiveriscompliant with the current XFP Multi-Source Agreement (MSA) Specification Rev 4.5.
As defined by the XFP MSA, Carelink XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Aux Monitoring

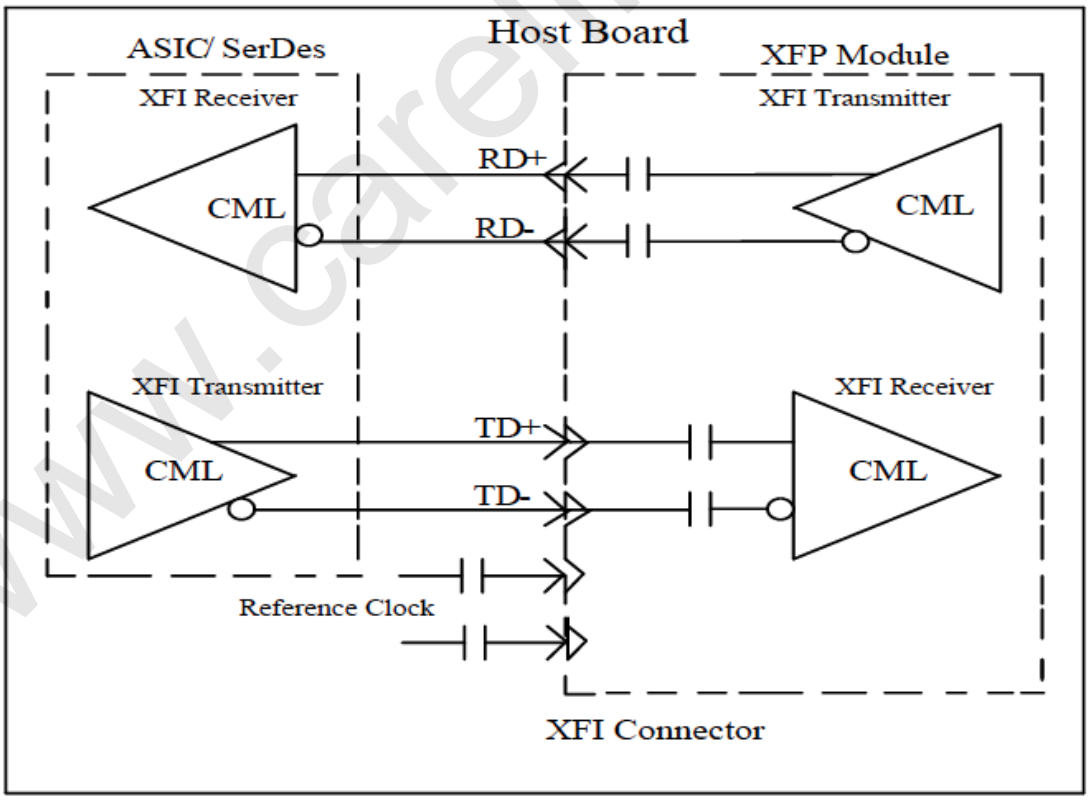
It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.
The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controllerinside the transceiver, which is accessed through the 2-wire serial interface. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCLto 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 00h to the maximum address of the memory.



Recommended Host Board Power Supply Circuit



Recommended High-Speed Interface Circuit



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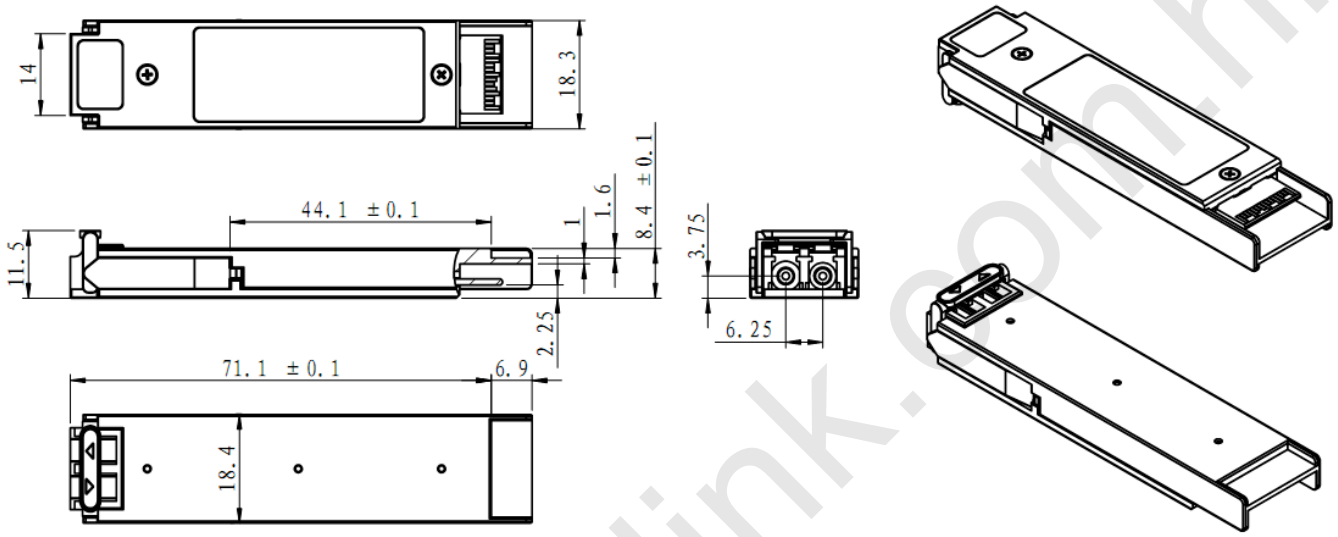
Mechanical Specifications

Carelink's XFP transceivers are compliant with thedimensions defined by the XFP Multi-Sourcing Agreement (MSA).



*This 2D drawing only for reference, please check with Carelink before ordering.

This single-mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

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