



RoHS compliant
1310 nm Single-mode Transceiver, (1000Base-LX)
Small Form Pluggable (SFP), 3.3V
1.0625Gbd Fiber Channel/1.25 Gigabit Ethernet



Features

- ✓ Up to 1.25Gb/s data links
- ✓ Duplex LC connector
- ✓ Hot-pluggable SFP footprint
- ✓ 1310nm FP laser transmitter
- ✓ RoHS compliant and Lead Free
- ✓ Up to 20Km on 9/125um SMF
- ✓ Metal enclosure for lower EMI
- ✓ Single +3.3V power supply
- ✓ Low power dissipation <800mW (-0~70°C), <1000mW (-40~85°C)
- ✓ Commercial and industrial operating temperature optional
- ✓ Digital Diagnostic Monitoring Interface
- ✓ SFP MSA SFF-8074i Compliant

Application

- ✓ 1000Base-LX
- ✓ 1x Fibre Channel

Ordering Information

PART NUMBER	INPUT/OUTPUT	SIGNAL DETECT	VOLTAGE	TEMPERATURE
CL-SFP-LX-20 DD	AC/AC	TTL	3.3V/5V	0°C to 70 °C
CL-SFP-LX-20 DDe	AC/AC	TTL	3.3V/5V	-30°C to 70 °C
CL-SFP-LX-20 DDi	AC/AC	TTL	3.3V/5V	-40°C to 85 °C



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General

Carelink's Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The SFP transceivers are high performance, cost effective modules supporting dual data-rate of 1.25Gbps/1.063Gbps and 20km transmission distance with SMF. They are RoHS compliant and lead-free.

Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Duplex LC Receptacle: compatible with IEC 61000-4-2
- Immunity compatible with IEC 61000-4-3
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2
- RoHS compliant with 2002/95/EC 4.1&4.2 2005/747/EC

Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	TX Fault	Transmitter Fault.	
3	TX Disable	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	4
9	VeeR	Receiver Ground (Common with Transmitter Ground)	1
10	VeeR	Receiver Ground (Common with Transmitter Ground)	1

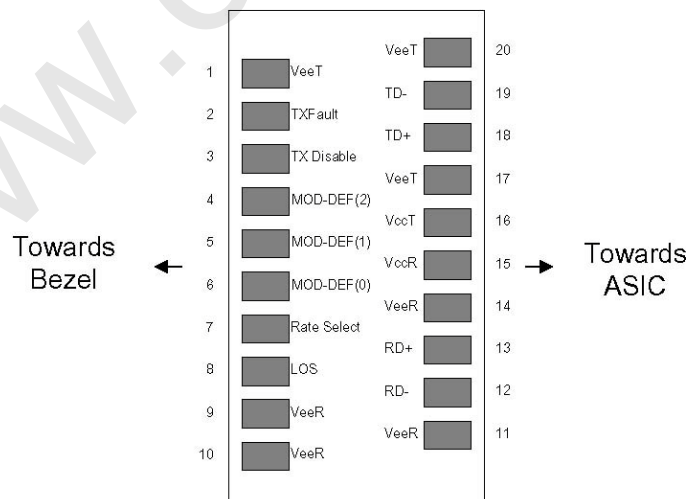


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11	VeeR	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VeeR	Receiver Ground (Common with Transmitter Ground)	1
15	VccR	Receiver Power Supply	
16	VccT	Transmitter Power Supply	
17	VeeT	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VeeT	Transmitter Ground (Common with Receiver Ground)	1

Notes :

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TX Disable >2.0V or open, enabled on TX Disable <0.8V.
3. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF (0) pulls line low to indicate module is plugged in.
4. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

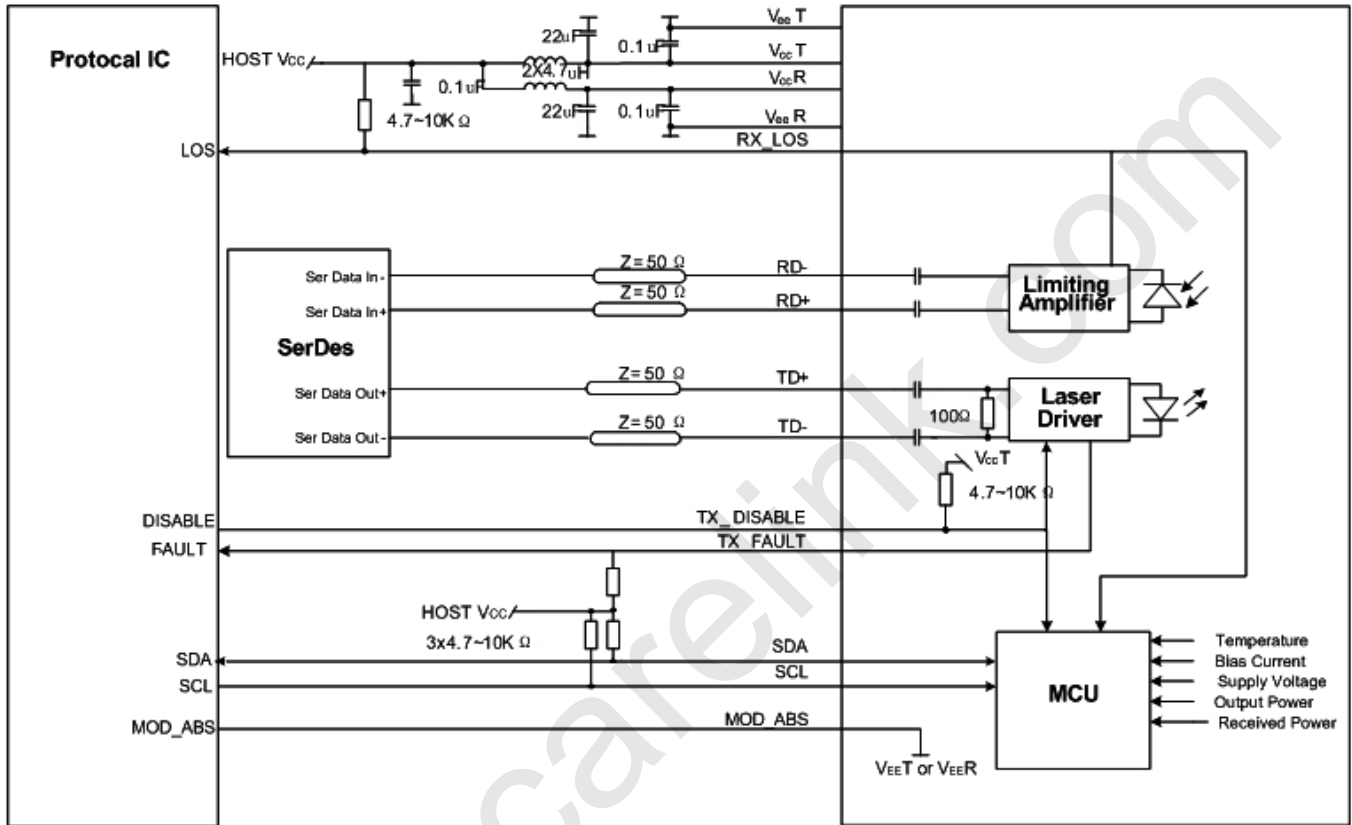


Pin-out of Connector Block on Host Board



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Recommend Circuit Schematic



Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		+4.0	V	
Storage Temperature	TS	-40		+85	°C	
Operating Humidity	RH	0		85	%	



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Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Power Supply Voltage	Vcc	3.13	3.30	3.47	V	
Power Supply Current	Icc			250	mA	Commercial
	Icc			300	mA	Industrial
Case Operating Temperature	Tc	-10		+70	°C	1
	Tl	-40		+85		2
Data Rate(Gigabit Ethernet)			1.25		Gbps	
Data Rate(Fibre Channel)			1.063		Gbps	
9/125um G.652 SMF	Lmax			20	km	

Notes1. :

For commercial class product.

2. For industrial class product.

Electrical Characteristics (TOP=25°C, Vcc=3.3Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Input differential impedance	Rin	-	100	-	Ω	1
Single ended data input swing	Vin, pp	250	-	1200	mV	
TX Disable-High	-	Vcc – 1.3	-	Vcc	V	
TX Disable-Low	-	Vee	-	Vee+ 0.8	V	
TX Fault-High	-	Vcc-0.5	-	Vcc	V	
TX Fault-Low	-	Vee	-	Vee+0.5	V	



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Receiver						
Single ended data output swing	Vout, pp	300	400	800	mV	2
Data output rise time	tr	-	-	300	ps	3
Data output fall time	tf	-	-	300	ps	3
LOS-High	-	Vcc – 0.5	-	Vcc	V	
LOS-Low	-	Vee	-	Vee+0.5	V	

Notes:

1. AC coupled.
2. Into 100 ohm differential termination.
3. 20 – 80 %

Optical Characteristics (TOP=25°C, Vcc=3.3 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Output Opt. Power	PO	-9	-	-3	dBm	1
Optical Wavelength	λ	1275	1310	1355	nm	
RMS Spectral Width	σ	-	-	3	nm	
Optical Rise/Fall Time	tr/tf	-	-	260	ps	2
Total Jitter	TJ	-	-	0.35	UI	
Optical Extinction Ratio	ER	9	-	-	dB	
Receiver						
RX Sensitivity @1.25Gb/s	SENS	-	-	-25	dBm	3, 4
Receiver Overload	-	-2	-	-	dBm	
Optical Center Wavelength	λ_C	1270	-	1600	nm	
LOS De-Assert	LOSD	-	-	-26	dBm	
LOS Assert	LOSA	-40	-	-	dBm	
LOS Hysteresis	-	0.5	-	5	dB	



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Notes:

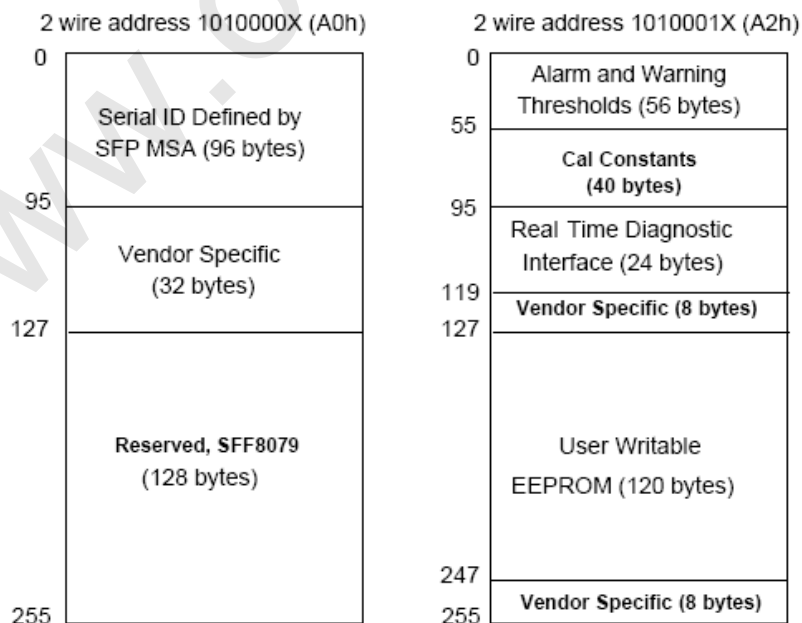
1. Class 1 Laser Safety.
2. Unfiltered, 20-80%. Complies with GE and 1x FC eye masks when filtered.
3. Measured with conformance signals defined in FC-PI-2 Rev. 10.0 specifications.
4. Measured with PRBS 2⁷-1 at 10⁻¹² BER.

Mechanical Specifications

Carelink's Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).

EEPROM Information

EEPROM memory map specific data field description is as below:





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Digital Diagnostic Monitoring Interface

Five transceiver parameter values are monitored. The following table defines the monitored parameter's accuracy.

Parameter	Range	Accuracy	Calibration
Temperature	-5 to +70°C (C)	±3°C	Internal
	-40 to +85°C (I)		
Voltage	2.97 to 3.63V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal
TX Power	-9 to -3dBm	±3dB	Internal
RX Power	-25 to -2dBm	±3dB	Internal