

## **CBXU-1G4780-CI**

MSA and TAA Compliant 1000Base-CWDM HD1 SFP Transceiver (SMF, 1470nm LTx/HRx, 80km, LC, DOM)

### **Features:**

- INF-8074 and SFF-8472 Compliance
- Simplex LC Connector
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



### **Applications:**

- Gigabit Ethernet over CWDM
- 1x Fibre Channel
- Access, Metro and Enterprise

### **Product Description**

This MSA Compliant SFP transceiver provides 1000Base-CWDM HD1 throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1470nm LTx/HRx via an LC connector. It is built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



### Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Conditions
Storage Temperature	Tstg	-40	+85	°C	Ambient
Power Supply Voltage	VCC		< +4.0	V	
Ambient Humidity	Hop	5	95	%	w/o dew
Operating Temperature	TC	-40	+85	°C	Case, w/airflow

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

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		Vcc	3.135	3.30	3.465	V	
Power Supply Current		Icc			550	mA	Cooled type
Power Supply Noise Rejection		PSNR			100	mVp-p	from 100Hz to 1MHz
Transmitter							
Data Rate		DRT	1.0625		1.25	Gb/s	
Differential Input Voltage		VINpp	150		1000	mV	
Differential Input Impedance		ZIN	90	100	110	ohm	
TX_Disable	Input Low	VIL	0		0.8	V	LVTTTL,Normal at Low, High is Shutdown(Poff)
	Input high	VIH	2.0		3.465	V	
	Assert Time	tOFF			10	us	High
	Negate Time	tON			1	ms	Low
Tx Disable to reset		treset	10			us	High
Time to Initialize Cooled Including reset of Tx_Fault		tinit_cooled			10	sec	1
TX_Fault	Output Low	VFOL	0		0.8	V	LVTTTL, Low is Normal
	Output High	VFOH	2.0		Vcc+0.3	V	
Receiver							
Data Rate		DRR	1.0625		1.25	Gb/s	
Differential Output Voltage		Vout	480		1080	mV	
Differential Output Impedance		Zout	90	100	110	ohm	
Rx_LOS (Loss of Signal)	Output Low	VLOSL	0		0.8	V	LVTTTL, Low is normal
	Output High	VLOSH	2		Vcc+0.3	V	
	Assert time	tLOS-ON			100	us	Low -> High
	Deassert time	tLOS-OFF			100	us	High -> Low

**Notes:**

1. Cooled version, for wavelength stabilization at worst case (Low & High temperature)

## Optical Characteristics

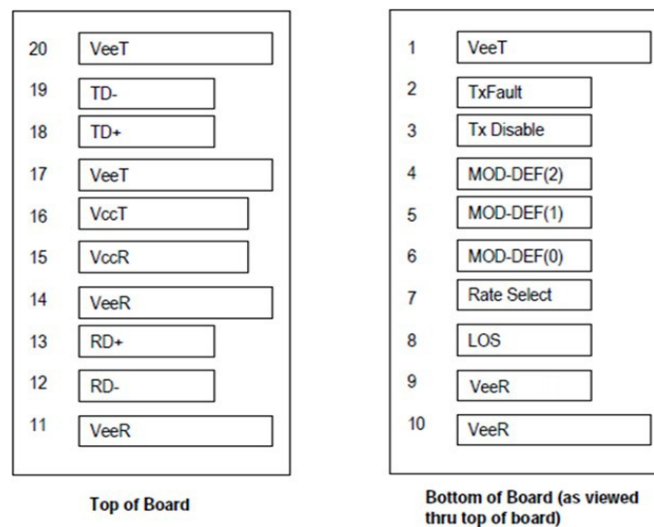
Parameter		Symbol	Min.	Typ.	Max.	Unit	Conditions
Transmitter							
Optical Transmit Power		P <sub>f</sub>	-2.5		2.0	dBm	
Transmitter Disable (Off) Power		P <sub>off</sub>			-35	dBm	@Tx_Diabile is High
Peak Wavelength	HBD24-AE2MW-IxL	λ <sub>p</sub>	λ <sub>c</sub> - 6.5 ~ λ <sub>c</sub> - 1.5			nm	CWDM, DFB-LD, Note1
	HBD24-AE2MW-IxH		λ <sub>c</sub> + 2.0 ~ λ <sub>c</sub> + 6.5				
Spectral Width		Δλ			1.0	nm	@-20 dB
Side Mode Suppression Ratio		SMSR	30			dB	
RIN <sub>12OMA</sub>		RIN			-117	dB/Hz	
Dispersion Penalty		DP			2.0	dB	
Extinction Ratio		ER	8.2			dB	@1.25Gb/s, PRBS 2 <sup>7</sup> -1
Eye pattern Mask		IEEE802.3/2008					
Receiver							
Optical Sensitivity		S			-29.5	dBm	Note 2
Optical Overload		OL	-5.0			dBm	Note 2
Operating wavelength	HBD24-AE2MW-IxL	λ <sub>o</sub>	λ <sub>c</sub> + 2.0 ~ λ <sub>c</sub> + 6.5			nm	Note 1
	HBD24-AE2MW-IxH		λ <sub>c</sub> - 6.5 ~ λ <sub>c</sub> - 1.5				
Rx_LOS (Loss of signal)	Assert	P <sub>A</sub>	-40.0			dBm	Squelch function enable
	De-assert	P <sub>D</sub>			-29.5	dBm	
	Hysteresis	P <sub>A</sub> -P <sub>D</sub>	0.5	2.0	5.0	dB	
Receiver Reflectance					-27	dB	@ λ <sub>o</sub>
RSSI Calibration		RCAL	Internal Calibrated (The host side can be read by an external way)				

## Notes:

- $\lambda_c=1271,1291,1311,1331,1351,1371,1391,1411,1431,1451,1471,1491,1511,1531,1551,1571,1591,1611\text{nm}$
- PRBS2<sup>7</sup>-1, BER1x10<sup>-12</sup>, Source ER=8.2[dB]

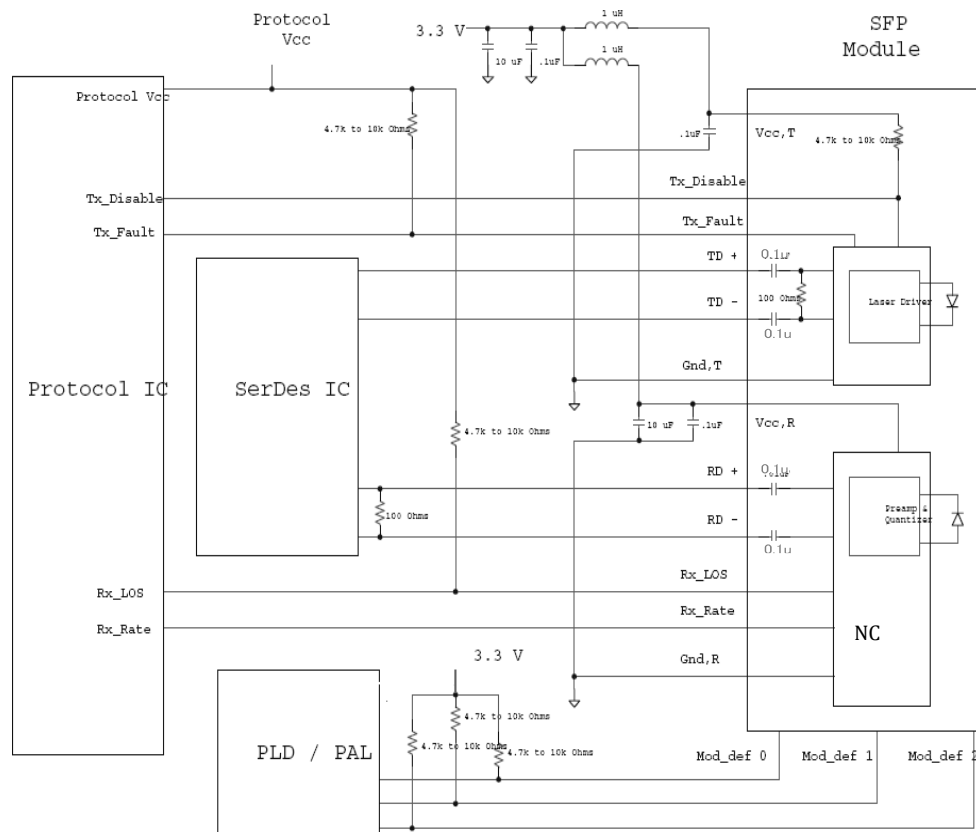
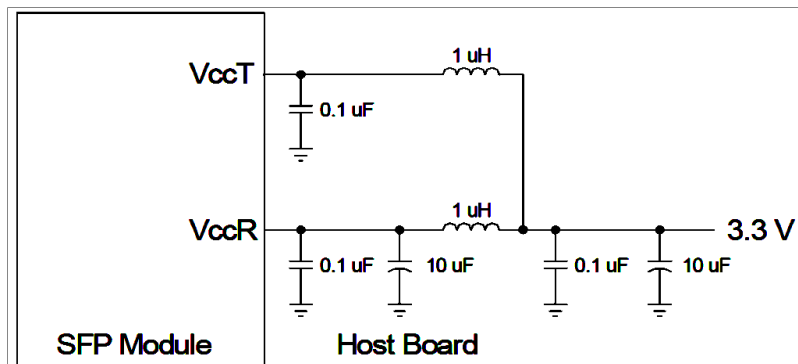
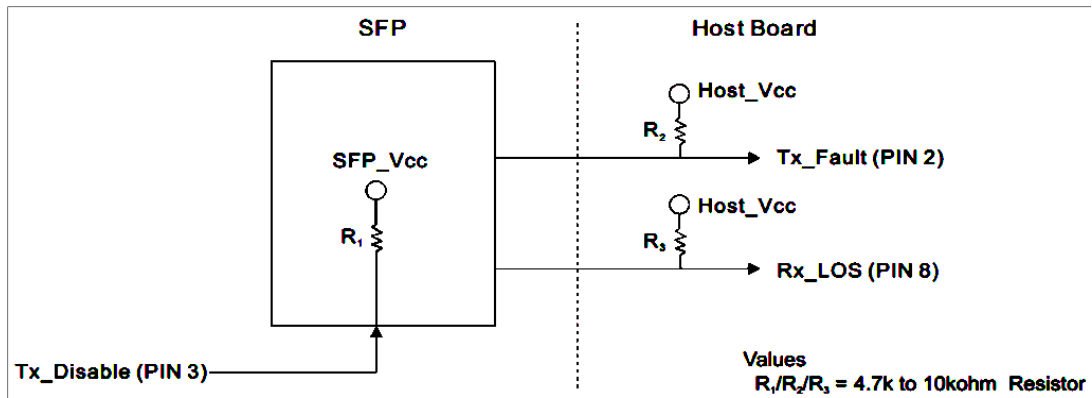
## Pin Descriptions

Pin	Symbol	Name/Descriptions	Ref.
1	TGND(VeeT)	Ground	1
2	Tx_Fault	Status Out	3
3	Tx_Disable	Control In	3
4	MOD_DEF(2)	Input/Output(SDA, I <sup>2</sup> C data)	3
5	MOD_DEF(1)	Input/Output(SCL, I <sup>2</sup> C clock)	3
6	MOD_DEF(0)	Indicates that the module is present,Grounded internally	3
7	Rate Select	Rate Select In(NC)	3
8	RX_LOS	Status Out	3
9	RGND(VeeR)	Ground	3
10	RGND(VeeR)	Ground	1
11	RGND(VeeR)	Ground	1
12	Rx_Data bar	Data Out Negative	3
13	Rx_Data	Data Out Positive	3
14	RGND(VeeR)	Ground	1
15	Rx_Vcc(VccR)	Power	2
16	Tx_Vcc(VccR)	Power	2
17	TGND(VeeT)	Ground	1
18	Tx_Data	Data In Positive	3
19	Tx_Data bar	Data In Negative	3
20	TGND(VeeT)	Ground	1



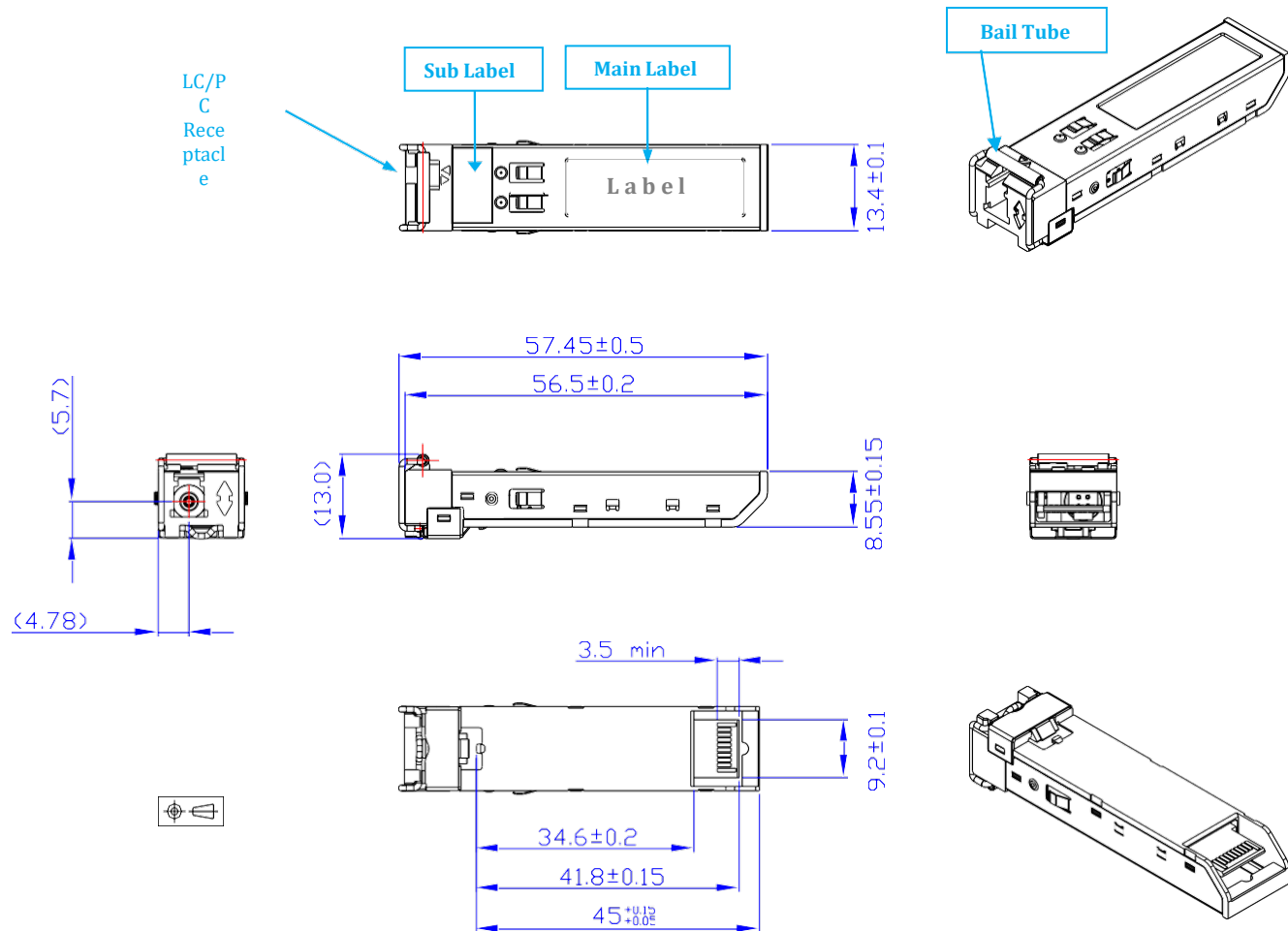
Pin-out of connector Block on Host board

# Recommended Circuit Schematic



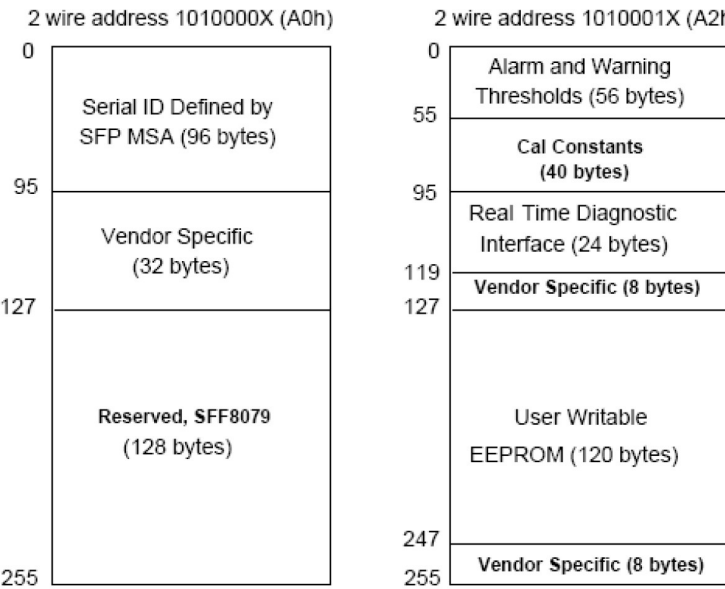
**Mechanical Specifications**

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

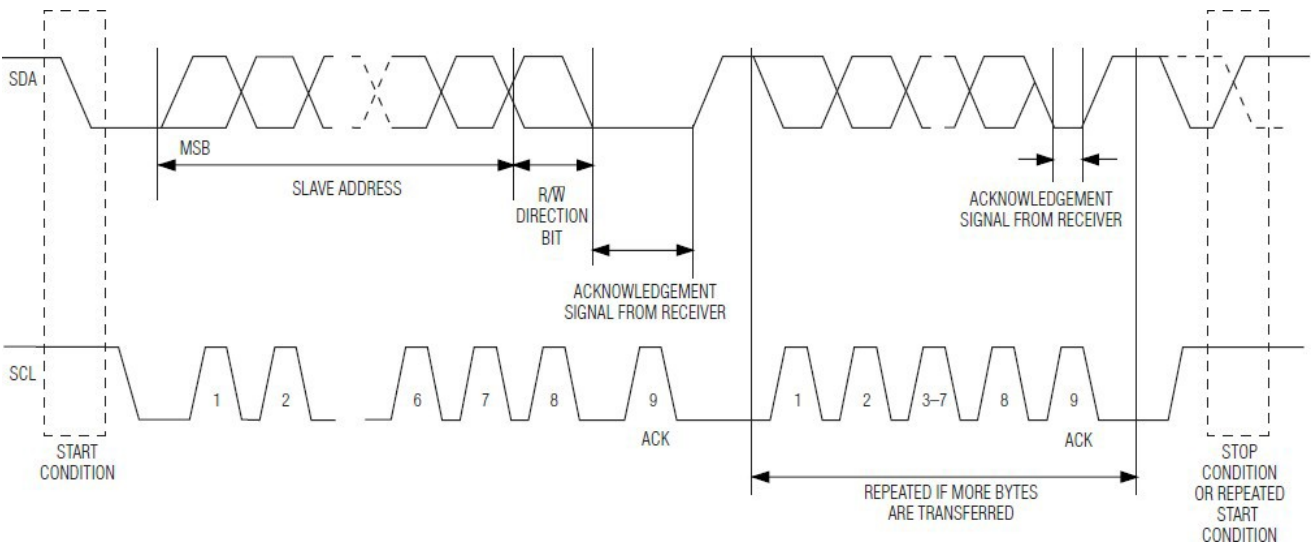


EEPROM Information

EEPROM memory map specific data field description is as below:



2-Wire Data Transfer Protocol





## **About ProLabs**

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

## **Complete Portfolio of Network Solutions**

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## **Trusted Partner**

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.

## **Contact Information**

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