

**280-0012-00-C**

Cyan® 280-0012-00 Compatible TAA OC-48-LR2 SFP Transceiver (SMF, 1550nm, 70km, LC)

**Features:**

- INF-8074 and SFF-8472 Compliance
- Duplex 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:**

- OC-48 Transmission

**Product Description**

This Cyan® 280-0012-00 compatible SFP transceiver provides OC-48 (2488mbps) transmission rates for up to 70km over single-mode fiber (SMF) using a wavelength of 1550nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Cyan® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. It is built to meet or exceed the specifications of Cyan®, as well as to comply with MSA (Multi-Source Agreement) standards to ensure seamless network integration. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' 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.")



## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Maximum Supply Voltage	Vcc	-0.5		3.6	V
Storage Temperature	Tstg	-40		85	°C
Operating Case Temperature	Tc	0		70	°C
Operating Relative Humidity	RH			95	%
Data Rate			2.488		Gbps
9µm Core Diameter SMF	L		80		km

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.15	3.30	3.45	V	
Power Supply Current	Icc			300	mA	
Transmitter						
LVPECL Differential Inputs	VIN	400		1600	mVp-p	1
Input Differential Impedance	ZIN	85	100	115	Ω	2
Tx_Disable	Disable	2		Vcc+0.3	V	
	Enable	0		0.8	V	
Tx_Fault	Fault	2		Vcc+0.3	V	
	Normal	0		0.5	V	
Receiver						
LVPECL Differential Outputs	VOUT	400	800	1200	mVp-p	3
Output Differential Impedance	ZOUT	85	100	115	Ω	
Tx_Disable Assert Time	t_off			10	us	
Rx_LOS	LOS	2		Vcc+0.3	V	
	Normal	0		0.8	V	
MOD_DEF(0.2)	VOH	2.5				
	VOL	0		0.5	V	

### Notes:

1. AC coupled inputs. LVPECL logic. Internally AC coupled.
2. RIN>100kΩ @DC.
3. AC coupled outputs. LVPECL logic. Internally AC coupled.

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
<b>Center Wavelength</b>	$\lambda_C$	1500	1550	1600	nm	
<b>Spectral Width (-20dB)</b>	$\Delta\lambda$			1	nm	
<b>Side-Mode Suppression Ratio</b>	SMSR	30			dB	
<b>Average Output Power</b>	POUT	-2		3	dBm	1
<b>Extinction Ratio</b>	ER	8.2			dB	2
<b>Rise/Fall Time (20-80%)</b>	Tr/Tf			150	ps	
<b>Total Jitter</b>	TJ			0.07	UI	2
<b>Output Optical Eye</b>		ITU-T G.957 Compliant				
<b>POUT @Tx_Disable Asserted</b>	POUT			-45	dBm	
<b>Receiver</b>						
<b>Receiver Sensitivity</b>	Pmin			-28	dBm	3
<b>Receiver Overload</b>	P <sub>MAX</sub>	-9			dBm	
<b>Center Wavelength</b>	$\lambda_C$	1260		1600	nm	
<b>LOS De-Assert</b>	LOSD			-29	dBm	
<b>LOS Assert</b>	LOSA	-42			dBm	
<b>LOS Hysteresis</b>		0.5			dB	

### Notes:

1. Output power is measured by coupling into a 9/125 $\mu$ m multi-mode fiber.
2. Filtered, measured with a PRBS 2<sup>23</sup>-1 test pattern @2500Mbps.
3. Minimum average optical power is measured at BER less than 1E<sup>-12</sup> with 2<sup>23</sup>-1 PRBS and ER=9dB.

## Pin Descriptions

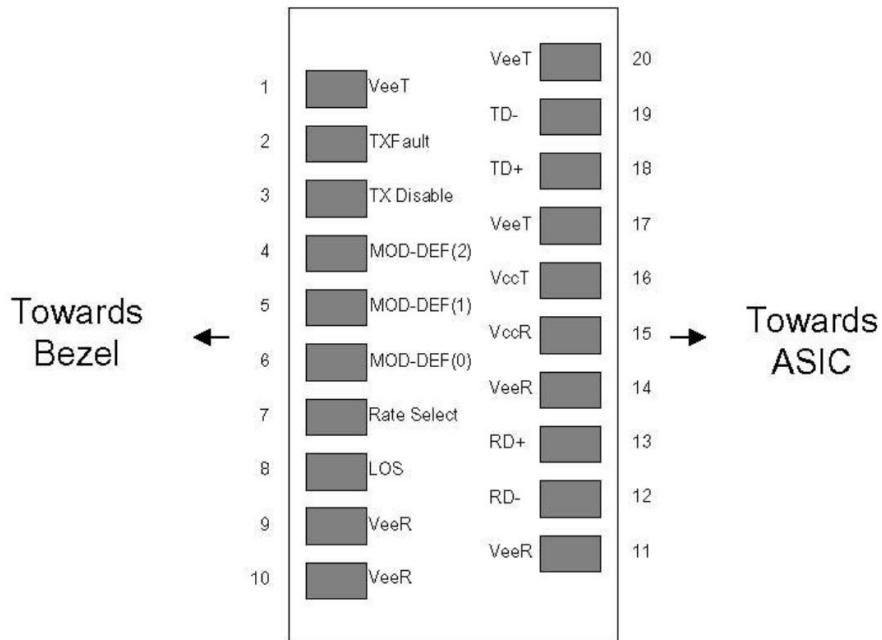
Pin	Symbol	Name/Description	Notes
1	VeeT	Transmitter Ground.	5
2	Tx_Fault	Transmitter Fault Indication.	1
3	Tx_Disable	Transmitter Disable. Module disables on “high” or “open.”	2
4	MOD_DEF2	Module Definition 2. 2-Wire Serial ID Interface.	3
5	MOD_DEF1	Module Definition 1. 2-Wire Serial ID Interface.	3
6	MOD_DEF0	Module Definition 0. Grounded within the module.	3
7	Rate Select	No Connection Required. Function not available.	
8	LOS	Loss of Signal.	4
9	VeeR	Receiver Ground.	5
10	VeeR	Receiver Ground.	5
11	VeeR	Receiver Ground.	5
12	RD-	Receiver Inverted Data Out.	6
13	RD+	Receiver Data Out.	7
14	VeeR	Receiver Ground.	5
15	VccR	3.3V ± 5% Receiver Power Supply.	7
16	VccT	3.3V ± 5% Transmitter Power Supply.	7
17	VeeT	Transmitter Ground.	5
18	TD+	Transmitter Data In.	8
19	TD-	Transmitter Inverted Data In.	8
20	VeeT	Transmitter Ground.	5

### Notes:

1. Tx\_Fault is an open collector/drain output that should be pulled up with a  $4.7\text{k}\Omega$  to  $10\text{k}\Omega$  resistor on the host board. Pull-up voltage is between 2.0V and  $\text{VccT}/R+0.3\text{V}$ . When “high,” this output indicates a laser fault of some kind. “Low” indicates normal operation. In the “low” state, the output will be pulled to  $<0.8\text{V}$ .
2. Tx\_Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a  $4.7\text{k}\Omega$  to  $10\text{k}\Omega$  resistor.
  - Low (0V – 0.8V): Transmitter On.
  - Between ( $>0.8\text{V}$  and  $<2.0\text{V}$ ): Undefined.
  - High (2.0V – 3.465V): Transmitter Disabled.
  - Open: Transmitter Disabled.
3. MOD-DEF0, 1, and 2. These are the module definition pins. They should be pulled up with a  $4.7\text{k}\Omega$  to  $10\text{k}\Omega$  resistor on the host board to supply less than VccT or VccR.
  - MOD-DEF0 is grounded by the module to indicate that the module is present.
  - MOD-DEF1 is the clock line of 2-wire serial interface for optional serial ID.
  - MOD-DEF2 is the data line of 2-wire serial interface for optional serial ID.
4. LOS (Loss of Signal) is an open collector/drain output that should be pulled up externally with a  $4.7\text{k}\Omega$  to  $10\text{k}\Omega$  resistor. Pull-up voltage is between 2.0V and  $\text{VccT}/R+0.3\text{V}$ . When “high,” this output indicates that

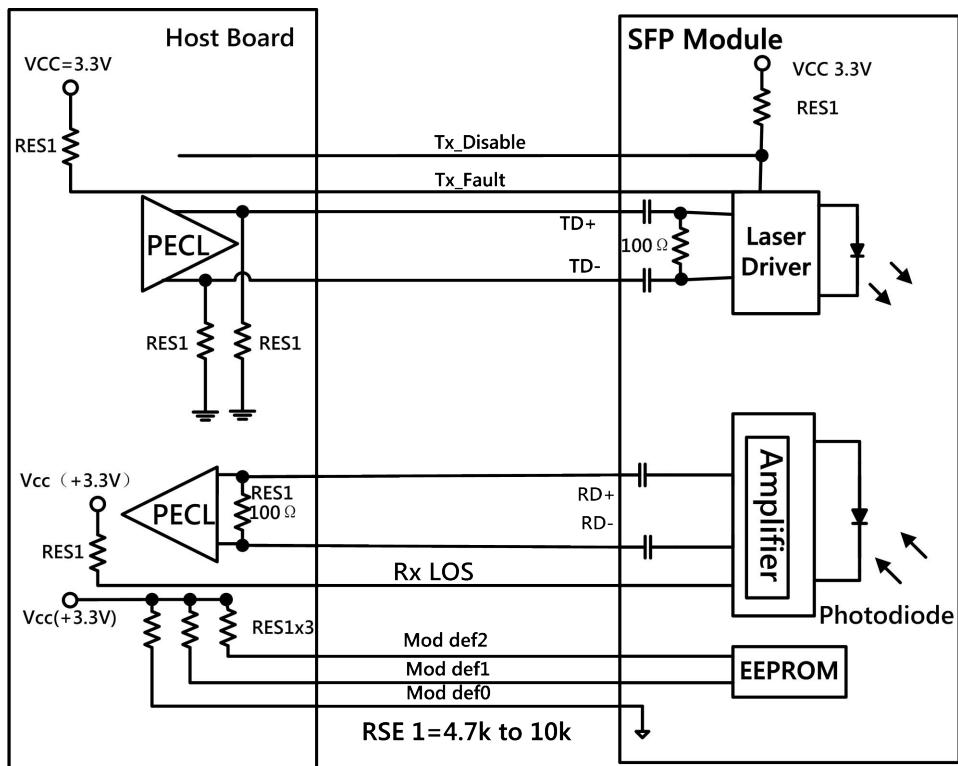
the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). "Low" indicates normal operation. In the "low" state, the output will be pulled to <0.8V.

5. VeeR and VeeT may be internally connected within the SFP module.
6. RD-/+ These are the differential receiver outputs. They are AC coupled 100 differential lines which should be terminated with 100 (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 400mV and 2000mV differential (200mV to 1000mV single-ended) when properly terminated.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as  $3.3V \pm 5\%$  at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than  $1\Omega$  should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot-plugging of the SFP transceiver module will result in an in-rush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.
8. TD-/+ These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 differential terminations inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 400mV to 2000mV (200mV to 1000mV single-ended).

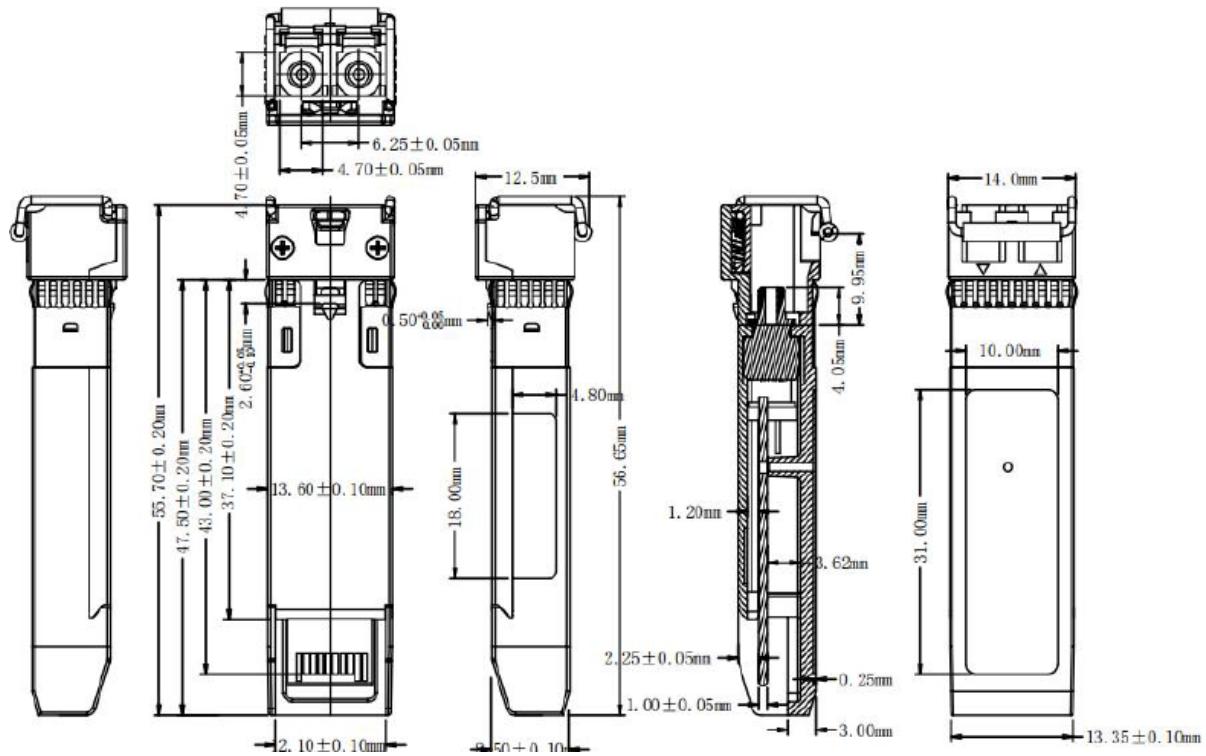


Pin-Out of Connector Block on the Host Board

## Recommended Circuit Schematic



## Mechanical Specifications



## About ProLabs

Our extensive experience comes as standard. For over 20 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 more than 100 optical switching and transport platforms.

## A 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 1.6T 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.

## The Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. 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.



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