

100-01673-C

Calix® 100-01673 Compatible TAA 1000Base-BX SFP Transceiver (SMF, 1490nmTx/1310nmRx, 60km, LC, DOM, -40 to 85C)

Features:

- INF-8074 and SFF-8472 Compliance
- Simplex LC Connector
- Single-mode Fiber
- Industrial Temperature -40 to 85 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free

**Applications:**

- 1000Base-BX Ethernet
- 1x Fibre Channel
- Access (FTTx) and Enterprise

Product Description

This Calix® 100-01673 compatible SFP transceiver provides 1000Base-BX throughput up to 60km over single-mode fiber (SMF) using a wavelength of 1490nmTx/1310nmRx via an LC connector. This bidirectional unit must be used with another transceiver or network appliance of complementing wavelengths. It is capable of withstanding rugged environments and can operate at temperatures between -40 and 85C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Calix®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. 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.")



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.	Typ.	Max.	Unit
Storage Temperature	T _s	-40		85	°C
Relative Humidity	RH	5		95	%
Receiver Power	V _{CC}	-0.5		4.0	V
Operating Case Temperature	T _c	-40	25	85	°C
Data Rate		0.1		1.25	Gb/s

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	V _{cc}	3.135	3.3	3.465	V	
Module Supply Current	I _{cc}			300	mA	
Power Dissipation	P _D			1000	mW	
Transmitter Differential Input Voltage (TD +/-)		300		2200	mV p-p	1
Receiver Differential Output Voltage (RD +/-)		600		1200	mVp-p	2
Low speed output: Transmitter Fault (TX_FAULT) / Loss of Signal (LOS)	VOH	2.0		V _{cc}	V	3
	VOL	0		0.8	V	
Low Speed input: Transmitter Disable (TX_DISABLE), MOD_DEF 1, MOD_DEF 2	VIH	2.0		V _{cc}	V	4
	VIL	0		0.8	V	

Notes:

1. Internally AC coupled and terminated to 100Ω differential load.
2. Internally AC coupled, but requires a 100Ω differential termination or internal to Serializer/Deserializer.
3. Pulled up externally with a 4.7KΩ-10KΩ resistor on the host board to V_{CCT,R}.
4. Mod_Def1 and Mod_Def2 must be pulled up externally with a 4.7KΩ-10KΩ resistor on the host board to V_{CCT,R}.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Launch Optical Power	P _o	-2		+3	dBm	
Center Wavelength Range	λ _c	1470	1490	1510	nm	
Extinction Ratio	EX	9			dB	
Spectral Width (-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Rise/Fall Time	T _{rise} /T _{fall}			260	ps	
Pout @TX-Disable Asserted	P _{off}			-45	dBm	
Eye Diagram	IEEE Std 802.3-2005 1000BASE-BX-D compatible					
Receiver						
Wavelength Range		1260	1310	1360	nm	
Receiver Sensitivity	S			-23	dBm	1
Receiver Overload	P _{OL}	-3			dBm	1
Optical Return Loss	ORL	12			dB	
LOS De-Assert	LOS _D			-24	dBm	
LOS Assert	LOS _A	-35			dBm	
LOS Hysteresis		0.5	3	5	dB	

Notes:

1. Measured with PRBS 2⁷-1 test pattern, 1.25Gb/s, EX=9dB, BER<10⁻¹².

Timing Characteristic

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Tx disable assert time	T _{off}			10	us	
Tx disable negate time	T _{on}			1	ms	
Time to initialize, include reset of TX_FAULT	T _{init}			300	ms	
Tx_disable time to start reset	T _{reset}	10			us	
Receiver LOS Assert Time (on to off)	T _{D,RX_LOS}			80	us	
Receiver LOS Assert Time (off to on)	T _{A,RX_LOS}			80	us	
Serial I2C Clock Rate	I2C_Clock			100	kHz	

Pin Descriptions

Pin	Symbol	Name/Descriptions	Engagement order (Insertion)	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	1
3	TX Disable	Transmitter Disable-Module disables on high or open	3	2
4	MOD-DEF2	Module Definition 2-Two wire serial ID interface	3	3
5	MOD-DEF1	Module Definition 1-Two wire serial ID interface	3	3
6	MOD_DEF0	Module Definition 0-Grounded in module	3	3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal.	3	4
9	VeeR	Receiver Ground	1	
10	VeeR	Receiver Ground	1	
11	Veer	Receiver Ground	1	
12	RD-	Inverse Received Data out	3	5
13	RD+	Received Data out	3	5
14	VeeR	Receiver Ground	1	
15	VccR	Receiver Power $+3.3V \pm 5\%$	2	6
16	VccT	Transmitter Power $+3.3V \pm 5\%$	2	6
17	VeeT	Transmitter Ground	1	
18	TD+	Transmitter Data In	3	7
19	TD-	Inverse Transmitter Data In	3	7
20	VeeT	Transmitter Ground	1	

Notes:

1. TX Fault is open collector/drain output which should be pulled up externally with a $4.7\text{K}\Omega$ - $10\text{K}\Omega$ resistor on the hostboard to supply $< \text{VccT} + 0.3\text{V}$ or $\text{VccR} + 0.3\text{V}$. 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 input is used to shut down the laser output per the state table below. It is pulled up within the module with a $4.7\text{K}\Omega$ - $10\text{K}\Omega$ resistor.
 - Low ($0 - 0.8\text{V}$): Transmitter on
 - Between (0.8V and 2V): Undefined
 - High ($2.0 - \text{VccT}$): Transmitter Disabled
 - Open: Transmitter Disabled
3. Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a $4.7\text{K}\Omega$ - $10\text{K}\Omega$ resistor on the host board to supply less than $\text{VccT} + 0.3\text{V}$ or $\text{VccR} + 0.3\text{V}$. Mod-Def 0 is grounded by the module to indicate that the module is present. Mod-Def 1 is clock line of two wire serial interface for optional serial ID. Mod-Def 2 is data line of two wire serial interface for optional serial ID.
4. LOS (Loss of Signal) is an open collector/drain output which should be pulled up externally with a $4.7\text{K}\Omega$ - $10\text{K}\Omega$ resistor on the host board to supply $< \text{VccT} + 0.3\text{V}$ or $\text{VccR} + 0.3\text{V}$. When high, this output indicates

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

5. RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω differential at the user SERDES. The AC coupling is done inside the module and thus not required on the host board.
6. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V±5% at the SFP connector pin. The in-rush current will typically be no more than 30mA above steady state supply current after 500ns.
7. TD-/+: These are the differential transmitter inputs. They are AC coupled differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on host board.

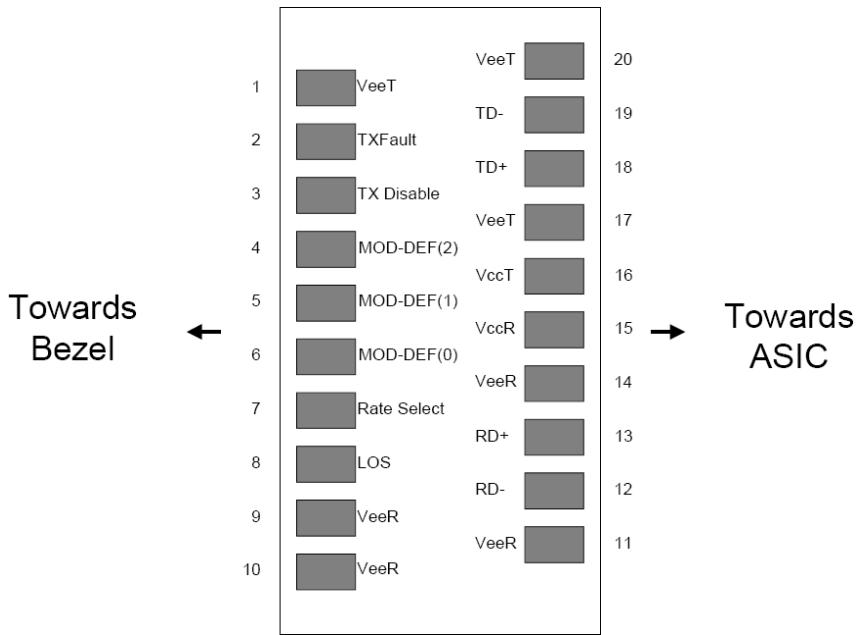
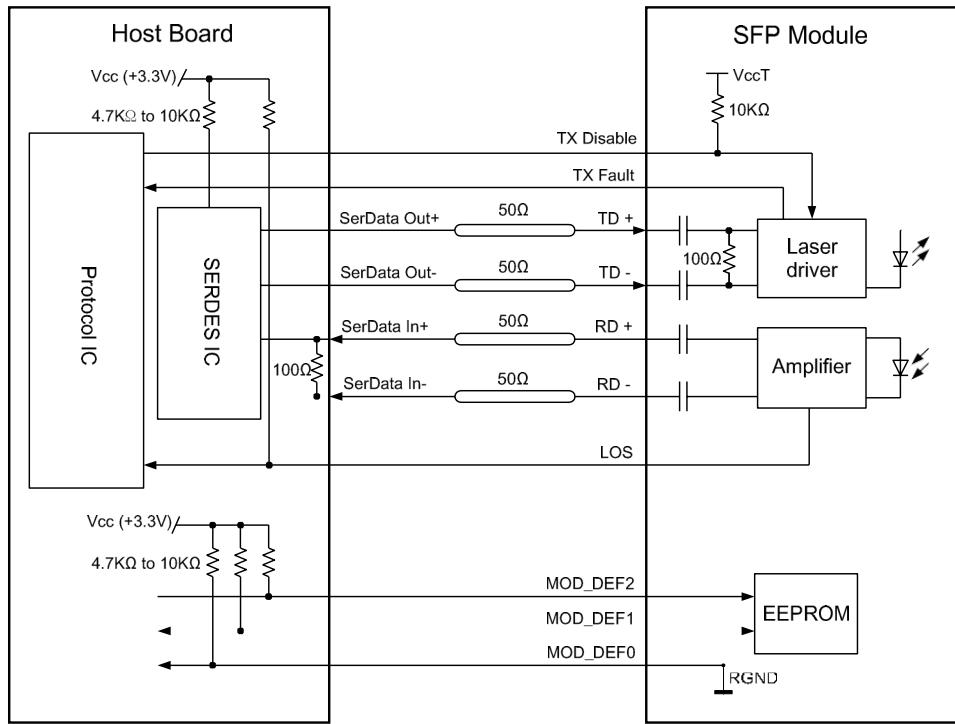
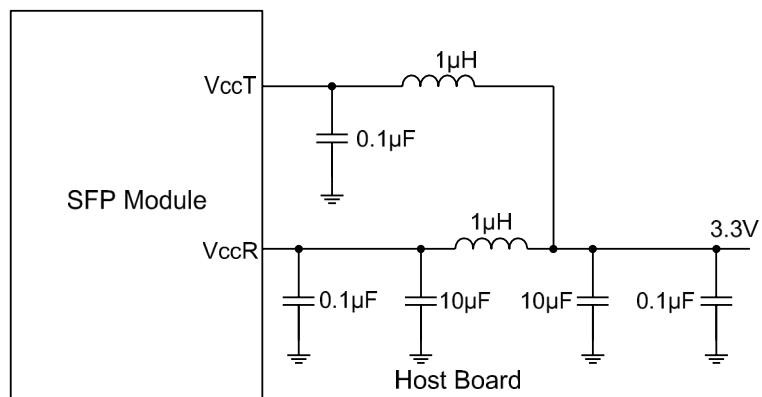


Diagram of Host Board Connector Block Pin Numbers and Names

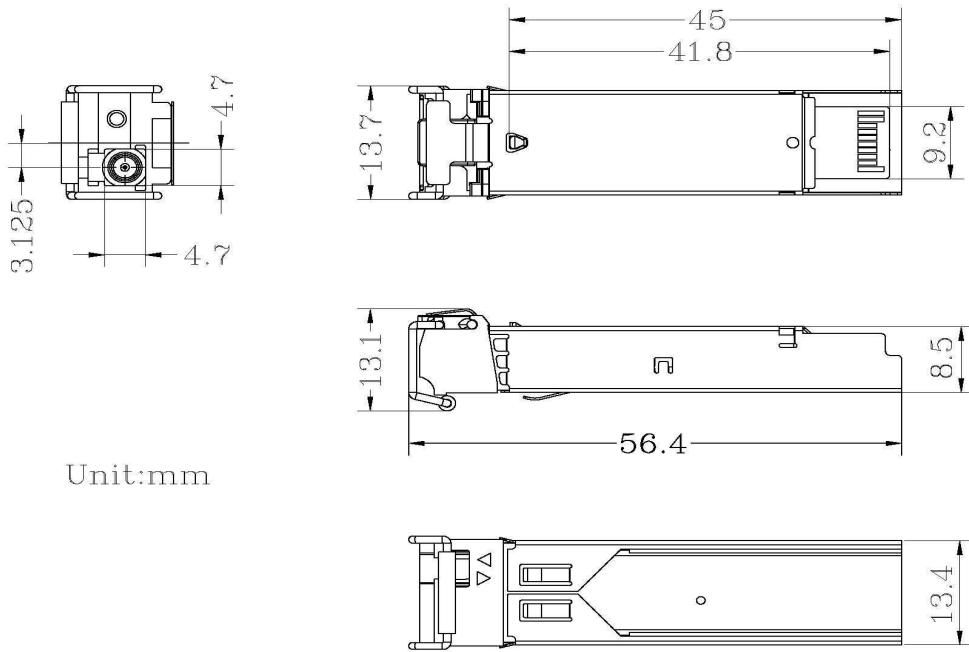
Recommended Application Interface Interface Circuit



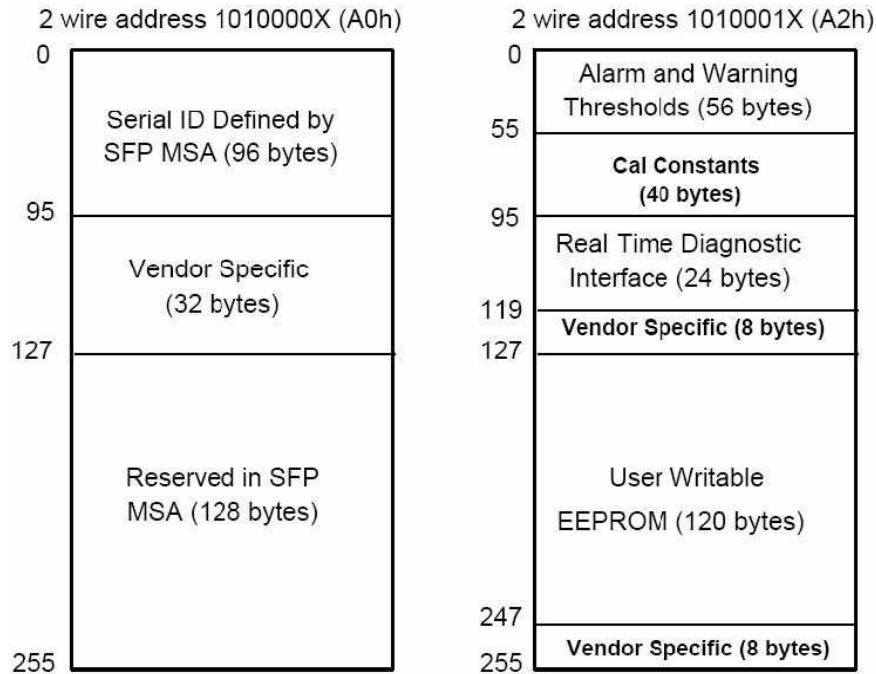
Required Host Board Components



Mechanical Specifications



Digital Diagnostic Memory Map



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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