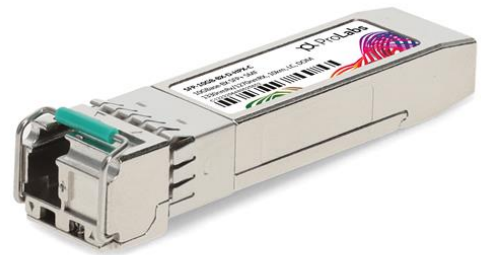


### **SFP-10GB-BX-D-HPX-C**

HP® Compatible 10GBase-BX SFP+ Transceiver (SMF, 1330nmTx/1270nmRx, 10km, LC, DOM)

#### **Features:**

- Operating Data Rate up to 10.31Gbps
- 1330nm DFB Transmitter/1270nm PIN Receiver
- Single 3.3V Power Supply and TTL Logic Interface
- Hot Pluggable
- LC Connector Interface
- Power Dissipation: 1.5W
- Operating temperature: 0C to 70C
- RoHS Compliant and Lead-Free



#### **Applications:**

- 10GBase-BX Ethernet
- 8x/10x Fibre Channel
- Access, Metro and Enterprise

#### **Product Description**

This HP® SFP+ transceiver provides 10GBase-BX throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1330nmTx/1270nmRx via an LC connector. It is guaranteed to be 100% compatible with the equivalent HP® 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. Digital optical monitoring (DOM) support is also present to allow 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.

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	0		70	°C	
Relative Humidity	RH	5		95	%	
Supply Voltage	Vcc	-0.5		3.6	V	
Data Rate			9.953/10.3125			
Power Budget			12		dB	

## Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		Vcc	3.15	3.3	3.45	V	
Power Supply Current		Icc			455	mA	
Surge Current		Isurge			30	mA	
Transmitter							
Differential CML Inputs		VIN	150		1200	mVp-p	1
Input AC Common-Mode Voltage			0		25	mV	RMS
Differential Input Impedance		ZIN	85	100	115	Ω	2
Tx_Disable	High		2		Vcc	V	
	Low		0		0.8		
Tx_Fault	High		2		Vcc+0.3	V	3
	Low		0		0.5		
Receiver							
Differential CML Outputs		VOUT	350		700	mVp-p	4
Differential Output Impedance		ZOUT	85	100	115	Ω	
Rx_LOS	High		2		Vcc+0.3		3
	Low		0		0.8		
MOD_DEF (0.2)		VOH	2.5			V	
		VOL	0		0.5		With Serial ID

## Notes:

1. AC coupled inputs.
2. RIN>100kΩ @DC.
3. Io=400μA: Host\_Vcc. Lo=-4.0mA.
4. AC coupled outputs.

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	$\lambda_C$	1320	1330	1340	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Average Output Power	POUT	-2		3	dBm	1
Extinction Ratio	ER	3.5			dB	
Average Power of Off Transmitter	Poff			-30	dBm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Transmitter Dispersion Penalty	TDP			2	dB	
Tx_Disable Assert Time	T_off			10	us	
Receiver						
Center Wavelength	$\lambda_C$	1260	1270	1280	nm	
Receiver Sensitivity	Pmin			-14	dBm	2
Receiver Overload	Pmax	0.5			dBm	
LOS De-Assert	LOSD			-16	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis	LOSH	0.5			dB	

### Notes:

1. Output is coupled into a 9/125 $\mu$ m SMF.
2. Minimum average optical power. Measured at BER less than  $1E^{-12}$ . The measured pattern is PRBS  $2^{31}-1$ .

## Pin Descriptions

Pin	Symbol	Name/Description	Plug Seq.	Notes
1	VeeT	Transmitter Ground.	1	5
2	Tx_Fault	Transmitter Fault Indication.	3	1
3	Tx_Disable	Transmitter Disable. Module disables on “high” or “open.”	3	2
4	MOD_DEF2	Transmitter Disable. 2-Wire Serial ID Interface.	3	3
5	MOD_DEF1	Module Definition 2. 2-Wire Serial ID Interface.	3	3
6	MOD_DEF0	Module Definition 1.	3	3
7	Rate Select	Rx Rate Select. LVTTTL. Rate Select 0 optionally controls SFP+ module receiver. This pin is pulled low to VeeT with a >30K resistor.	3	
8	LOS	Loss of Signal.	3	4
9	VeeR	Tx Rate Select. LVTTTL. Rate Select 1 optionally controls SFP+ module transmitter. This pin is pulled low to VeeT with a >30K resistor.	1	
10	VeeR	Receiver Ground.	1	5
11	VeeR	Receiver Ground.	1	5
12	RD-	Inverse Received Data Out.	3	6
13	RD+	Received Data Out.	3	6
14	VeeR	Receiver Ground.	1	5
15	VccR	3.3V $\pm$ 5% Receiver Power.	2	7
16	VccT	3.3V $\pm$ 5% Transmitter Power.	2	7
17	VeeT	Transmitter Ground.	1	5
18	TD+	Transmit Data In.	3	8
19	TD-	Inverse Transmit Data In.	3	8
20	VeeT	Transmitter Ground.	1	5

### Notes:

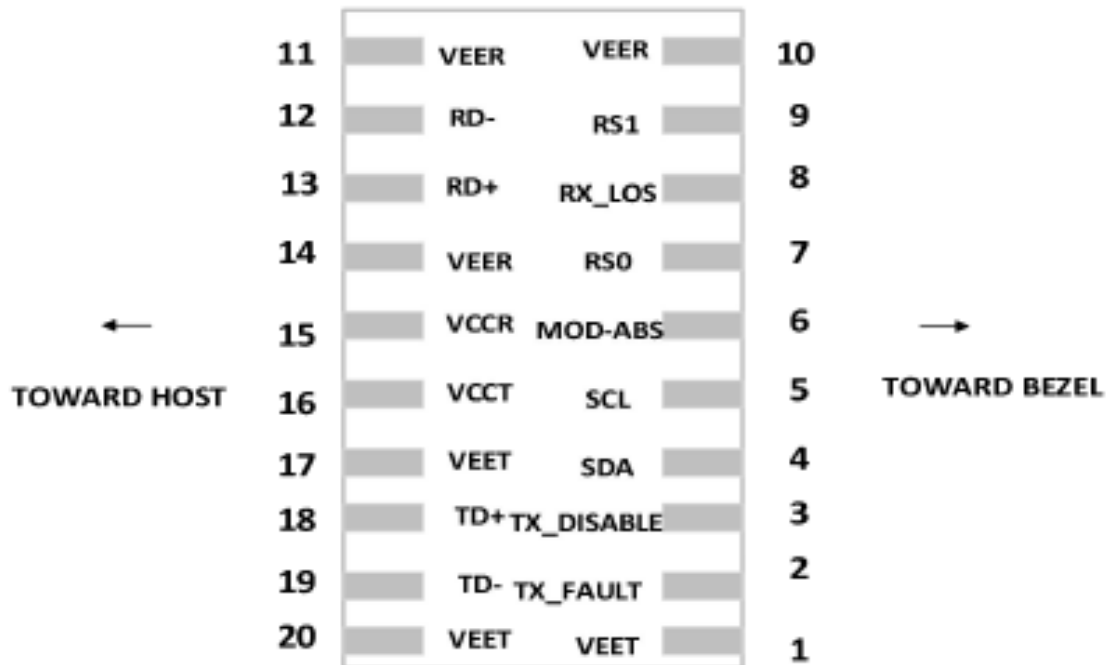
1. Tx\_Fault is an open collector/drain output that should be pulled up with a 4.7k $\Omega$  to 10k $\Omega$  resistor on the host board. Pull-up voltage between 2.0V and VccT/R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to <0.8V.
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 4.7k $\Omega$  to 10k $\Omega$  resistor. Its states are:
 

Low (0V to 0.8V):	Transmitter On
(>0.8V and <2V):	Undefined
High (2.0V to 3.465V):	Transmitter Disabled
Open:	Transmitter Disabled.
3. Modulation absent. Connected to the VeeT or VeeR in the module.
4. LOS (Loss of Signal) is an open collector/drain output that should be pulled up with a 4.7k $\Omega$  to 10k $\Omega$  resistor. Pull-up voltage between 2.0V and VccT/R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use).  
Low

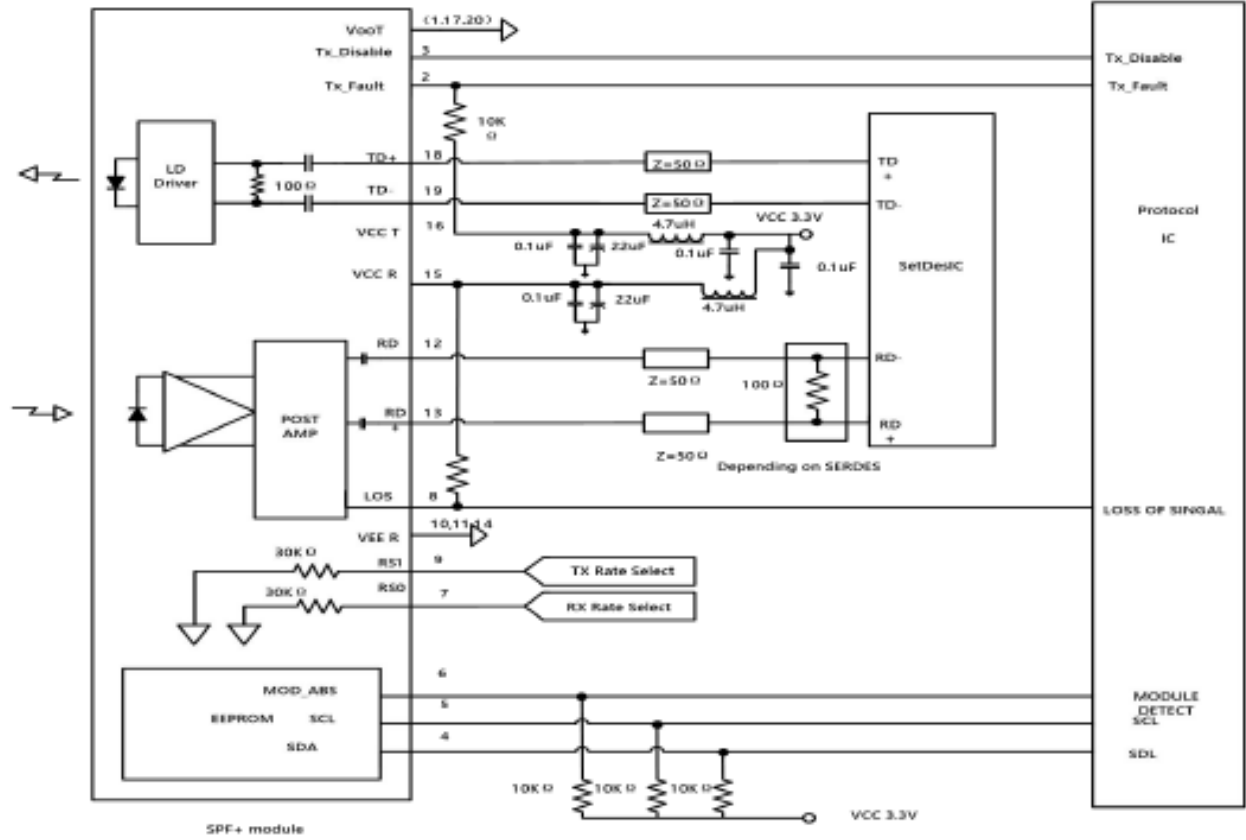
indicates normal operation in the low state. The output will be pulled to <0.8V.

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 and 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 545mA. 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 termination inside the module.

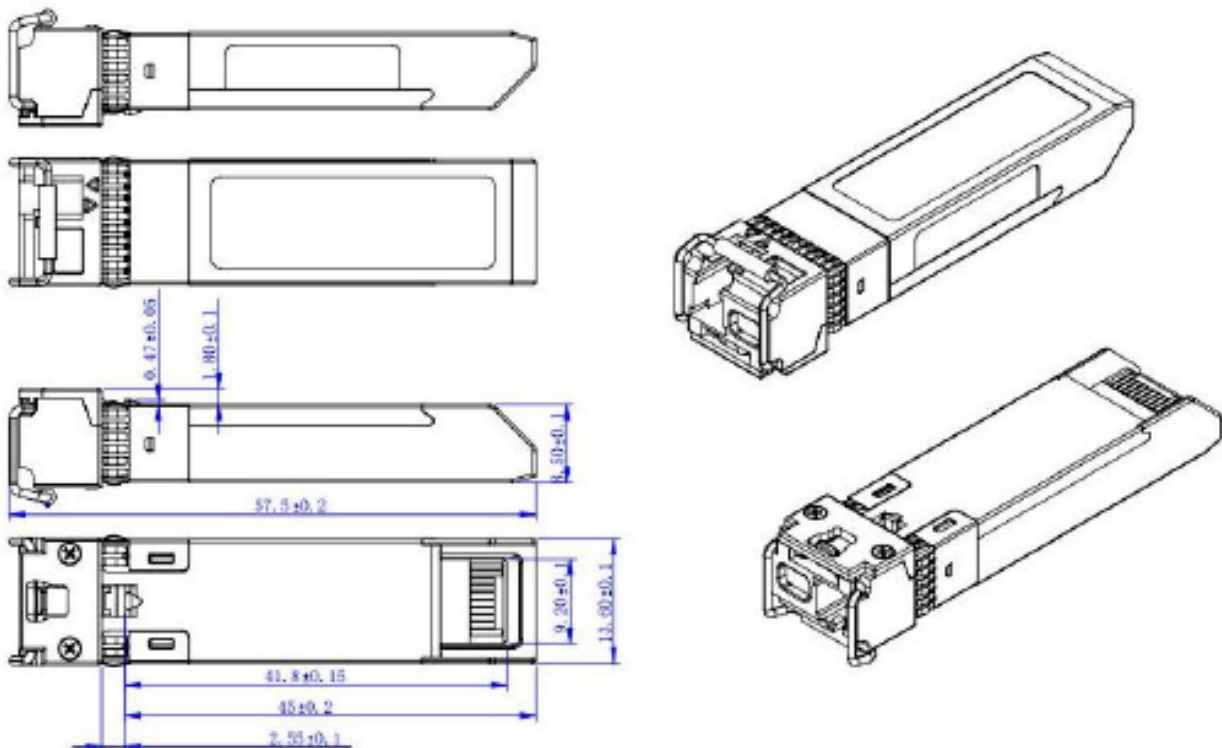
## Host Board Connector



Recommended Circuit Schematic



Mechanical Specifications



## 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.



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